In[49]:=
```
(*Assumptions*)
$Assumptions = Element[{r, s, x, y}, Reals] && r > 0 && s > 0 && x ≥ 0 && x ≤ s && y ≥ 0 && y ≤ s;

(*Definitions*)
star[x_, y_, r_, s_] :=
   Max[0, r^2 ArcCos[(x + s/2)/r] - (x + s/2) Sqrt[r^2 - (x + s/2)^2]] +
    Max[0, r^2 ArcCos[(3 s/2 - x)/r] - (3 s/2 - x) Sqrt[r^2 - (3 s/2 - x)^2]] +
    Max[0, r^2 ArcCos[(y + s/2)/r] - (y + s/2) Sqrt[r^2 - (y + s/2)^2]] +
    Max[0, r^2 ArcCos[(3 s/2 - y)/r] - (3 s/2 - y) Sqrt[r^2 - (3 s/2 - y)^2]] -
    Max[0, Integrate[Sqrt[r^2 - t^2] - (3 s/2 - y), {t, (3 s/2 - x), r}]] -
    Max[0, Integrate[Sqrt[r^2 - t^2] - (y + s/2), {t, (x + s/2), r}]] -
    Max[0, Integrate[Sqrt[r^2 - t^2] - (3 s/2 - y), {t, (x + s/2), r}]] -
    Max[0, Integrate[Sqrt[r^2 - t^2] - (y + s/2), {t, (3 s/2 - x), r}]];
fn[x_, y_, r_, s_] := Piecewise[{
     {star[x, y, r, s], 0 ≤ s ≤ 2 r},
     {0, 2 r < s}
    }];
p[x_, y_] := 1/s^2;
(*FN[r_,s_]=Integrate[fn[x,y,r,s]p[x,y],{x,0,s},{y,0,s}]*)
(*fp[x_,r_,s_]:=2s-(Min[x+2r,(3/2)s]-Max[x-2r,-s/2]);
p[x_]:=1/s;
FP[r_,s_]=Integrate[fp[x,r,s]p[x],{x,0,s}];
FN[r_,s_]=Integrate[fn[x,r,s]p[x],{x,0,s}];*)

(*Prints*)
star[x, y, r, s] // TraditionalForm
PiecewiseExpand[star[x, y, r, s]] // Simplify // TraditionalForm
fn[x, y, r, s] // TraditionalForm
PiecewiseExpand[fn[x, y, r, s]] // Simplify // TraditionalForm
(*FN[r,s]//Simplify//TraditionalForm*)
(*fp[x,r,s]//TraditionalForm
         PiecewiseExpand[fp[x,r,s]] //Simplify//TraditionalForm
       FP[r,s]//Simplify//TraditionalForm
     FN[r,s]//Simplify//TraditionalForm*)

(*Plots*)
(*Plot3D[fp[x,1,s],{s,0,5},{x,0,s},AxesLabel→Automatic]
 Plot3D[fn[x,1,s],{s,0,5},{x,0,s},AxesLabel→Automatic]
 Plot3D[{fp[x,1,s],fn[x,1,s]},{s,0,5},
  {x,0,s},AxesLabel→Automatic,PlotLegends→"Expressions"]

 Plot[{fp[x,1,1.6],fn[x,1,1.6]},
  {x,0,1.6},AxesLabel→Automatic,PlotLegends→"Expressions"]
 Plot[{fp[x,1,3],fn[x,1,3]},{x,0,3},AxesLabel→Automatic,PlotLegends→"Expressions"]

 Plot[{FP[1,s],FN[1,s]},{s,0,4},AxesLabel→Automatic,PlotLegends→"Expressions"]*)
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Out[53]//TraditionalForm=

$$\text{ConditionalExpression}\Big[-\max\Big(0,\ \frac{1}{8}\Big((2x-3s)\sqrt{4r^2-(3s-2x)^2}\ -4r^2\tan^{-1}\Big(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\Big)+2\pi r^2\Big)-\frac{1}{4}(3s-2y)(2r-3s+2x)\Big)-$$
$$\max\Big(0,\ \frac{1}{8}\Big((2x-3s)\sqrt{4r^2-(3s-2x)^2}\ -4r^2\tan^{-1}\Big(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\Big)+2\pi r^2\Big)-\frac{1}{4}(s+2y)(2r-3s+2x)\Big)-$$
$$\max\Big(0,\ \frac{1}{8}\Big(-(s+2x)\sqrt{4r^2-(s+2x)^2}\ -4r^2\tan^{-1}\Big(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\Big)+2\pi r^2\Big)-\frac{1}{4}(3s-2y)(2r-s-2x)\Big)-$$
$$\max\Big(0,\ \frac{1}{8}\Big(-(s+2x)\sqrt{4r^2-(s+2x)^2}\ -4r^2\tan^{-1}\Big(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\Big)+2\pi r^2\Big)-\frac{1}{4}(s+2y)(2r-s-2x)\Big)+$$
$$\max\Big(0,\ r^2\cos^{-1}\Big(\frac{\frac{3s}{2}-x}{r}\Big)-\Big(\frac{3s}{2}-x\Big)\sqrt{r^2-\Big(\frac{3s}{2}-x\Big)^2}\Big)+$$
$$\max\Big(0,\ r^2\cos^{-1}\Big(\frac{\frac{s}{2}+x}{r}\Big)-\Big(\frac{s}{2}+x\Big)\sqrt{r^2-\Big(\frac{s}{2}+x\Big)^2}\Big)+\max\Big(0,\ r^2\cos^{-1}\Big(\frac{\frac{3s}{2}-y}{r}\Big)-\Big(\frac{3s}{2}-y\Big)\sqrt{r^2-\Big(\frac{3s}{2}-y\Big)^2}\Big)+$$
$$\max\Big(0,\ r^2\cos^{-1}\Big(\frac{\frac{s}{2}+y}{r}\Big)-\Big(\frac{s}{2}+y\Big)\sqrt{r^2-\Big(\frac{s}{2}+y\Big)^2}\Big),\ 2r>s+2x\wedge 2(r+x)>3s\Big]$$

Out[54]//TraditionalForm=

$$\cos^{-1}\Big(\frac{\frac{3s}{2}-x}{r}\Big)r^2+\frac{1}{4}\sqrt{4r^2-(3s-2x)^2}\ (2x-3s)$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)<4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2$$
$$4\tan^{-1}\Big(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\Big)r^2+$$
$$3s\Big(4r+4x+4y+\sqrt{4r^2-($$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\Big(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\Big)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\Big(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\Big)r^2+12sr+$$
$$(s+2x)\Big(4y+\sqrt{4r^2-(s+2$$

$$r^2 \cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right) - \frac{1}{4}(s+2x)\sqrt{4r^2-(s+2x)^2}$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2 + 4\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 + 2\sqrt{4r^2-(3s-2x)^2}\,x - 3s\sqrt{4r^2-(3s-2x)^2} - s\sqrt{4r^2-(s+2x)^2} - 2x\sqrt{4r^2-(s+2x)^2}\right)$$

$$3\,s\left(4\,r+4\,x+4\,y+\sqrt{4\,r^2-($$

$$8\,y\,r+18\,s^2+2\,\sqrt{4\,r^2-(3\,s-$$

$$4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$

$$4\,s\,x+8\,x\,y+3\,s\,\sqrt{4\,r^2-(3\,s$$

$$2\,\pi\,r^2+6\,s^2+2\,\sqrt{4\,r^2-(3\,s-2$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$

$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2$$

$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$

$$(s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2}\;\geq$$

$$2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$

$$\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+\frac{1}{4}\,\sqrt{4\,r^2-(3\,s-2\,y)^2}\;\;(2\,y-3\,s)$$

$$\sqrt{4\,r^2-(3\,s-2\,x)^2}\;\;(3\,s-2\,x)\geq 4\,r$$

$$(s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2}\;\geq 4\,r^2$$

$$\sqrt{4\,r^2-(3\,s-2\,y)^2}\;\;(3\,s-2\,y)<4$$

$$(s+2\,y)\,\sqrt{4\,r^2-(s+2\,y)^2}\;\geq 4\,r^2$$

$$4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$

$$3\,s\left(4\,r+4\,x+4\,y+\sqrt{4\,r^2-($$

$$8\,y\,r+18\,s^2+2\,\sqrt{4\,r^2-(3\,s-$$

$$4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$

$$4\,s\,x+8\,x\,y+3\,s\,\sqrt{4\,r^2-(3\,s$$

$$2\,\pi\,r^2+6\,s^2+2\,\sqrt{4\,r^2-(3\,s-2$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$

$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2$$

$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+2\sqrt{4r^2-(3s-2x)^2}\,x+2\sqrt{4r^2-(3s-2y)^2}\,y-3s\sqrt{4r^2-(3s-2x)^2}-3s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$\begin{cases}(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 2\left(\pi r^2+(s+2x)(s+2y)\right)\wedge\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r\\ (s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2\wedge\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4\\ (s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2\end{cases}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$\begin{cases}2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge\\ 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2\end{cases}$$

$$\begin{cases}(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 2\left(\pi r^2+(s+2x)(s+2y)\right)\wedge\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r\\ (s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2\wedge\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4\\ (s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2\end{cases}$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+2\sqrt{4r^2-(3s-2y)^2}\,y-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-3s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4\,s\,x + 8\,x\,y + 3\,s\,\sqrt{4\,r^2 - (3\,s$$

$$2\,\pi\,r^2 + 6\,s^2 + 2\,\sqrt{4\,r^2 - (3\,s - 2$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 + 12\,s\,r +$$

$$(s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2$$

$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right) \wedge$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 + 4\,(s + 2$$

$$(s + 2\,x)\,\sqrt{4\,r^2 - (s + 2\,x)^2} \geq$$

$$2\left(\pi\,r^2 + (s + 2\,x)\,(s + 2\,y)\right)$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right) r^2 + 4\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right) r^2 + 4\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right) r^2 + \right.$$
$$2\,\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;x + 2\,\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;y -$$
$$3\,s\,\sqrt{4\,r^2 - (3\,s - 2\,x)^2} - s\,\sqrt{4\,r^2 - (s + 2\,x)^2} -$$
$$\left. 2\,x\,\sqrt{4\,r^2 - (s + 2\,x)^2} - 3\,s\,\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\right)$$

$$\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;(3\,s - 2\,x) < 4\,r$$

$$(s + 2\,x)\,\sqrt{4\,r^2 - (s + 2\,x)^2} < 4\,r^2$$

$$\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;(3\,s - 2\,y) < 4$$

$$(s + 2\,y)\,\sqrt{4\,r^2 - (s + 2\,y)^2} \geq 4\,r^2$$

$$4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right) r^2 +$$

$$3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4\,r^2 - (\right.$$

$$8\,y\,r + 18\,s^2 + 2\,\sqrt{4\,r^2 - (3\,s -$$

$$4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right) r^2 + 4\,s\,r +$$

$$4\,s\,x + 8\,x\,y + 3\,s\,\sqrt{4\,r^2 - (3\,s$$

$$2\,\pi\,r^2 + 6\,s^2 + 2\,\sqrt{4\,r^2 - (3\,s - 2$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 + 12\,s\,r +$$

$$(s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2$$

$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right) \wedge$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 + 4\,(s + 2$$

$$(s + 2\,x)\,\sqrt{4\,r^2 - (s + 2\,x)^2} \geq$$

$$2\left(\pi\,r^2 + (s + 2\,x)\,(s + 2\,y)\right)$$

$$r^2\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right) - \frac{1}{4}\,(s + 2\,y)\,\sqrt{4\,r^2 - (s + 2\,y)^2}$$

$$\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;(3\,s - 2\,x) \geq 4\,r$$

$$(s + 2\,x)\,\sqrt{4\,r^2 - (s + 2\,x)^2} > 4\,r^2$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+2\sqrt{4r^2-(3s-2x)^2}\,x-3s\sqrt{4r^2-(3s-2x)^2}-s\sqrt{4r^2-(s+2y)^2}-2y\sqrt{4r^2-(s+2y)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$\left(\sqrt{4r^2-(s+2x)^2}\right)$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2-\right.$$

$$s\sqrt{4r^2-(s+2x)^2}\ -2x\sqrt{4r^2-(s+2x)^2}\ -$$

$$\left.s\sqrt{4r^2-(s+2y)^2}\ -2y\sqrt{4r^2-(s+2y)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ <4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ <4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+\right.$$

$$2\sqrt{4r^2-(3s-2x)^2}\ x-3s\sqrt{4r^2-(3s-2x)^2}\ -$$

$$s\sqrt{4r^2-(s+2x)^2}\ -2x\sqrt{4r^2-(s+2x)^2}\ -$$

$$\left.s\sqrt{4r^2-(s+2y)^2}\ -2y\sqrt{4r^2-(s+2y)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ <4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ <4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+\right.$$

$$2\sqrt{4r^2-(3s-2y)^2}\ y-3s\sqrt{4r^2-(3s-2y)^2}\ -$$

$$\left.s\sqrt{4r^2-(s+2y)^2}\ -2y\sqrt{4r^2-(s+2y)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ <4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+2\sqrt{4r^2-(3s-2x)^2}\,x+2\sqrt{4r^2-(3s-2y)^2}\,y-3s\sqrt{4r^2-(3s-2x)^2}-3s\sqrt{4r^2-(3s-2y)^2}-s\sqrt{4r^2-(s+2y)^2}-2y\sqrt{4r^2-(s+2y)^2}\right)$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+2\sqrt{4r^2-(3s-2y)^2}\,y-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-3s\sqrt{4r^2-(3s-2y)^2}-s\sqrt{4r^2-(s+2y)^2}-2y\sqrt{4r^2-(s+2y)^2}\right)$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+2\sqrt{4r^2-(3s-2x)^2}\,x+2\sqrt{4r^2-(3s-2y)^2}\,y-3s\sqrt{4r^2-(3s-2x)^2}-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-3s\sqrt{4r^2-(3s-2y)^2}-s\sqrt{4r^2-(s+2y)^2}-2y\sqrt{4r^2-(s+2y)^2}\right)$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 2\left(\pi r^2+(s+2x)(s+2y)\right)$$
$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-($$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right) r^2 + \tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 - \frac{\pi r^2}{2} + 2sr - 3s^2 + 2sx$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x) < 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y) \geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2} \geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 +$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 + 4sr +$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 + 12sr +$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 + 4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{4}\left(4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 - 2\pi r^2+8sr-12s^2+8sx- 2\sqrt{4r^2-(3s-2x)^2}\ x+3s\sqrt{4r^2-(3s-2x)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x) \geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y) \geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2} \geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 +$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 + 4sr +$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2 + 6s^2 + 2\sqrt{4r^2 - (3s - 2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 + 12sr +$$

$$(s + 2x)\left(4y + \sqrt{4r^2 - (s + 2$$

$$2\left(\pi r^2 + 4yr + 3s^2 + 6sx\right) \wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 + 4(s + 2$$

$$(s + 2x)\sqrt{4r^2 - (s + 2x)^2} \geq$$

$$2\left(\pi r^2 + (s + 2x)(s + 2y)\right)$$

$$\frac{1}{8}\left(4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 - 2\pi r^2 + 12sr - 8yr - \right.$$

$$\left. 18s^2 + 12sx - 2\sqrt{4r^2 - (3s - 2x)^2}\, x + \right.$$

$$\left. 12sy - 8xy + 3s\sqrt{4r^2 - (3s - 2x)^2}\right)$$

$$\sqrt{4r^2 - (3s - 2x)^2}\ (3s - 2x) \geq 4r$$

$$(s + 2x)\sqrt{4r^2 - (s + 2x)^2} \geq 4r^2$$

$$\sqrt{4r^2 - (3s - 2y)^2}\ (3s - 2y) \geq 4$$

$$(s + 2y)\sqrt{4r^2 - (s + 2y)^2} \geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 +$$

$$3s\left(4r + 4x + 4y + \sqrt{4r^2 - (\right.$$

$$8yr + 18s^2 + 2\sqrt{4r^2 - (3s -$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 + 4sr +$$

$$4sx + 8xy + 3s\sqrt{4r^2 - (3s$$

$$2\pi r^2 + 6s^2 + 2\sqrt{4r^2 - (3s - 2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 + 12sr +$$

$$(s + 2x)\left(4y + \sqrt{4r^2 - (s + 2$$

$$2\left(\pi r^2 + 4yr + 3s^2 + 6sx\right) \wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 + 4(s + 2$$

$$(s + 2x)\sqrt{4r^2 - (s + 2x)^2} \geq$$

$$2\left(\pi r^2 + (s + 2x)(s + 2y)\right)$$

$$\frac{1}{8}\left(4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 - 2\pi r^2 + 4sr + \right.$$

$$\left. 8yr - 6s^2 + 4sx - 2\sqrt{4r^2 - (3s - 2x)^2}\, x - \right.$$

$$\sqrt{4r^2 - (3s - 2x)^2}\ (3s - 2x) \geq 4r$$

$$(s + 2x)\sqrt{4r^2 - (s + 2x)^2} \geq 4r^2$$

$$\sqrt{4r^2 - (3s - 2y)^2}\ (3s - 2y) \geq 4$$

$$12\,s\,y + 8\,x\,y + 3\,s\,\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\Bigg)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3\,s}{2} - x}{r}\right) r^2 + 4\tan^{-1}\left(\frac{3\,s - 2\,x}{\sqrt{4\,r^2 - (3\,s - 2\,x)^2}}\right) r^2 - \right.$$
$$2\,\pi\,r^2 + 12\,s\,r - 8\,y\,r - 18\,s^2 + 12\,s\,x +$$
$$2\,\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\; x + 12\,s\,y -$$
$$\left. 8\,x\,y - 3\,s\,\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\right)$$

$$\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;(3\,s - 2\,y) \geq 4$$
$$(s + 2\,y)\,\sqrt{4\,r^2 - (s + 2\,y)^2} \geq 4\,r^2$$
$$4\tan^{-1}\left(\frac{3\,s - 2\,x}{\sqrt{4\,r^2 - (3\,s - 2\,x)^2}}\right) r^2 +$$
$$3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4\,r^2 - (}\right.$$
$$8\,y\,r + 18\,s^2 + 2\,\sqrt{4\,r^2 - (3\,s -}$$
$$4\tan^{-1}\left(\frac{3\,s - 2\,x}{\sqrt{4\,r^2 - (3\,s - 2\,x)^2}}\right) r^2 + 4\,s\,r +$$
$$4\,s\,x + 8\,x\,y + 3\,s\,\sqrt{4\,r^2 - (3\,s}$$
$$2\,\pi\,r^2 + 6\,s^2 + 2\,\sqrt{4\,r^2 - (3\,s - 2}$$
$$4\tan^{-1}\left(\frac{s + 2\,x}{\sqrt{4\,r^2 - (s + 2\,x)^2}}\right) r^2 + 12\,s\,r +$$
$$(s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2\right.$$
$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right) \wedge$$
$$4\tan^{-1}\left(\frac{s + 2\,x}{\sqrt{4\,r^2 - (s + 2\,x)^2}}\right) r^2 + 4\,(s + 2$$
$$(s + 2\,x)\,\sqrt{4\,r^2 - (s + 2\,x)^2} \geq$$
$$2\left(\pi\,r^2 + (s + 2\,x)\,(s + 2\,y)\right)$$
$$\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;(3\,s - 2\,x) < 4\,r$$
$$(s + 2\,x)\,\sqrt{4\,r^2 - (s + 2\,x)^2} \geq 4\,r^2$$
$$\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;(3\,s - 2\,y) \geq 4$$
$$(s + 2\,y)\,\sqrt{4\,r^2 - (s + 2\,y)^2} \geq 4\,r^2$$
$$4\tan^{-1}\left(\frac{3\,s - 2\,x}{\sqrt{4\,r^2 - (3\,s - 2\,x)^2}}\right) r^2 +$$
$$3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4\,r^2 - (}\right.$$
$$8\,y\,r + 18\,s^2 + 2\,\sqrt{4\,r^2 - (3\,s -}$$
$$4\tan^{-1}\left(\frac{3\,s - 2\,x}{\sqrt{4\,r^2 - (3\,s - 2\,x)^2}}\right) r^2 + 4\,s\,r +$$
$$4\,s\,x + 8\,x\,y + 3\,s\,\sqrt{4\,r^2 - (3\,s}$$
$$2\,\pi\,r^2 + 6\,s^2 + 2\,\sqrt{4\,r^2 - (3\,s - 2}$$
$$4\tan^{-1}\left(\frac{s + 2\,x}{\sqrt{4\,r^2 - (s + 2\,x)^2}}\right) r^2 + 12\,s\,r +$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+\right.\quad\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)<4r$$

$$4sr+8yr-6s^2+4sx+2\sqrt{4r^2-(3s-2x)^2}\ x-\quad(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$

$$\left.12sy+8xy-3s\sqrt{4r^2-(3s-2x)^2}\right)\quad\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-\right.\quad\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4r$$

$$2\pi r^2+8sr-12s^2+8sx-\quad(s+2x)\sqrt{4r^2-(s+2x)^2}\ <4r^2$$

$$2\sqrt{4r^2-(3s-2x)^2}\ x+3s\sqrt{4r^2-(3s-2x)^2}\ -\quad\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$\left.s\sqrt{4r^2-(s+2x)^2}\ -2x\sqrt{4r^2-(s+2x)^2}\right)\quad(s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\quad}\right)r^2+$$

$$\left(\sqrt{4r^2-(3s-2x)^2}\right)$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+$$

$$\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-\frac{\pi r^2}{2}+2sr-3s^2+2sx-$$

$$\frac{1}{4}s\sqrt{4r^2-(s+2x)^2}\ -\frac{1}{2}x\sqrt{4r^2-(s+2x)^2}$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ <4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-\right.$$
$$2\pi r^2+12sr-8yr-18s^2+12sx-$$
$$2\sqrt{4r^2-(3s-2x)^2}\,x+12sy-$$
$$8xy+3s\sqrt{4r^2-(3s-2x)^2}\,-$$
$$\left.2s\sqrt{4r^2-(s+2x)^2}\,-4x\sqrt{4r^2-(s+2x)^2}\right)$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$
$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)\geq 4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;<4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;\geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+\right.$$
$$4sr+8yr-6s^2+4sx-2\sqrt{4r^2-(3s-2x)^2}\,x-$$
$$12sy+8xy+3s\sqrt{4r^2-(3s-2x)^2}\,-$$
$$\left.2s\sqrt{4r^2-(s+2x)^2}\,-4x\sqrt{4r^2-(s+2x)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)\geq 4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;<4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;\geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s$$

$$8\,y\,r + 18\,s^2 + 2\sqrt{4\,r^2 - (3\,s$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right) r^2 + 4\,s\,r +$$

$$4\,s\,x + 8\,x\,y + 3\,s\sqrt{4\,r^2 - (3\,s$$

$$2\,\pi\,r^2 + 6\,s^2 + 2\sqrt{4\,r^2 - (3\,s - 2$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 + 12\,s\,r +$$

$$(s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2$$

$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right) \wedge$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 + 4\,(s + 2$$

$$(s + 2\,x)\sqrt{4\,r^2 - (s + 2\,x)^2} \geq$$

$$2\left(\pi\,r^2 + (s + 2\,x)\,(s + 2\,y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right) r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right) r^2 + \right.$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right) r^2 - 2\,\pi\,r^2 + 12\,s\,r -$$

$$8\,y\,r - 18\,s^2 + 12\,s\,x + 2\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\; x +$$

$$12\,s\,y - 8\,x\,y - 3\,s\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\; -$$

$$\left. 2\,s\sqrt{4\,r^2 - (s + 2\,x)^2}\; - 4\,x\sqrt{4\,r^2 - (s + 2\,x)^2}\right)$$

$$\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;(3\,s - 2\,x) < 4\,r$$

$$(s + 2\,x)\sqrt{4\,r^2 - (s + 2\,x)^2}\; < 4\,r^2$$

$$\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;(3\,s - 2\,y) \geq 4$$

$$(s + 2\,y)\sqrt{4\,r^2 - (s + 2\,y)^2}\; \geq 4\,r^2$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right) r^2 +$$

$$3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4\,r^2 - (\right.$$

$$8\,y\,r + 18\,s^2 + 2\sqrt{4\,r^2 - (3\,s -$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right) r^2 + 4\,s\,r +$$

$$4\,s\,x + 8\,x\,y + 3\,s\sqrt{4\,r^2 - (3\,s$$

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$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 + 12\,s\,r +$$

$$(s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2$$

$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right) \wedge$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 + 4\,(s + 2$$

$$(s + 2\,x)\sqrt{4\,r^2 - (s + 2\,x)^2} \geq$$

$$2\left(\pi\,r^2 + (s + 2\,x)\,(s + 2\,y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+4sr+8yr-6s^2+4sx+2\sqrt{4r^2-(3s-2x)^2}\,x-12sy+8xy-3s\sqrt{4r^2-(3s-2x)^2}-2s\sqrt{4r^2-(s+2x)^2}-4x\sqrt{4r^2-(s+2x)^2}\right)$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+8sr-12s^2+8sx-2\sqrt{4r^2-(3s-2x)^2}\,x+2\sqrt{4r^2-(3s-2y)^2}\,y+3s\sqrt{4r^2-(3s-2x)^2}-3s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4$$

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$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4\,s\,x + 8\,x\,y + 3\,s\,\sqrt{4\,r^2 - (3\,s$$

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$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 + 12\,s\,r +$$

$$(s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2$$

$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right) \wedge$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 + 4\,(s + 2$$

$$(s + 2\,x)\,\sqrt{4\,r^2 - (s + 2\,x)^2} \geq$$

$$2\left(\pi\,r^2 + (s + 2\,x)\,(s + 2\,y)\right)$$

$$\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right) r^2 + \cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right) r^2 +$$

$$\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\ (3\,s - 2\,x) < 4\,r$$

$$\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right) r^2 - \frac{\pi\,r^2}{2} + 2\,s\,r - 3\,s^2 + 2\,s\,x +$$

$$(s + 2\,x)\,\sqrt{4\,r^2 - (s + 2\,x)^2} \geq 4\,r^2$$

$$\frac{1}{2}\,\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\ y - \frac{3}{4}\,s\,\sqrt{4\,r^2 - (3\,s - 2\,y)^2}$$

$$\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\ (3\,s - 2\,y) < 4$$

$$(s + 2\,y)\,\sqrt{4\,r^2 - (s + 2\,y)^2} \geq 4\,r^2$$

$$4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right) r^2 +$$

$$3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4\,r^2 - (\right.$$

$$8\,y\,r + 18\,s^2 + 2\,\sqrt{4\,r^2 - (3\,s -$$

$$4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right) r^2 + 4\,s\,r +$$

$$4\,s\,x + 8\,x\,y + 3\,s\,\sqrt{4\,r^2 - (3\,s$$

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$$(s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2$$

$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right) \wedge$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 + 4\,(s + 2$$

$$(s + 2\,x)\,\sqrt{4\,r^2 - (s + 2\,x)^2} \geq$$

$$2\left(\pi\,r^2 + (s + 2\,x)\,(s + 2\,y)\right)$$

$$\frac{1}{4}\left(4\,\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right) r^2 + 4\,\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right) r^2 +\right.$$

$$\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\ (3\,s - 2\,x) \geq 4\,r$$

$$(s + 2\,x)\,\sqrt{4\,r^2 - (s + 2\,x)^2} < 4\,r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+8sr-12s^2+8sx-2\sqrt{4r^2-(3s-2x)^2}\,x+2\sqrt{4r^2-(3s-2y)^2}\,y+3s\sqrt{4r^2-(3s-2x)^2}-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-3s\sqrt{4r^2-(3s-2y)^2}\Bigg)$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{4}\Bigg(4\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+8sr-12s^2+8sx+2\sqrt{4r^2-(3s-2y)^2}\,y-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-3s\sqrt{4r^2-(3s-2y)^2}\Bigg)$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{}}\right)r^2+12sr+$$

$$\left(\sqrt{4r^2-(s+2x)^2}\right)$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-\right.$$

$$2\pi r^2+12sr-8yr-18s^2+12sx-$$

$$2\sqrt{4r^2-(3s-2x)^2}\ x+12sy-$$

$$8xy+4\sqrt{4r^2-(3s-2y)^2}\ y+$$

$$\left.3s\sqrt{4r^2-(3s-2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

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$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+\right.$$

$$4sr+8yr-6s^2+4sx-2\sqrt{4r^2-(3s-2x)^2}\ x-$$

$$12sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\ y+$$

$$\left.3s\sqrt{4r^2-(3s-2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2$$

$$)$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+\right.$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+12sr-$$

$$8yr-18s^2+12sx+2\sqrt{4r^2-(3s-2x)^2}\ x+$$

$$12sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\ y-$$

$$\left.3s\sqrt{4r^2-(3s-2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)<4$$

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$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+4sr+8yr-6s^2+4sx+2\sqrt{4r^2-(3s-2x)^2}\,x-12sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\,y-3s\sqrt{4r^2-(3s-2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+12sr-8yr-18s^2+12sx-2\sqrt{4r^2-(3s-2x)^2}\,x+12sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\,y+3s\sqrt{4r^2-(3s-2x)^2}-2s\sqrt{4r^2-(s+2x)^2}-4x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+4sr+8yr-6s^2+4sx-2\sqrt{4r^2-(3s-2x)^2}\,x-12sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\,y+3s\sqrt{4r^2-(3s-2x)^2}-2s\sqrt{4r^2-(s+2x)^2}-4x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$\left(\right)$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}>$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+\right.$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+12sr-$$
$$8yr-18s^2+12sx+2\sqrt{4r^2-(3s-2x)^2}\,x+$$
$$12sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\,y-$$
$$3s\sqrt{4r^2-(3s-2x)^2}-2s\sqrt{4r^2-(s+2x)^2}-$$
$$\left.4x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s}$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+\right.$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+4sr+$$
$$8yr-6s^2+4sx+2\sqrt{4r^2-(3s-2x)^2}\,x-$$
$$12sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\,y-$$
$$3s\sqrt{4r^2-(3s-2x)^2}-2s\sqrt{4r^2-(s+2x)^2}-$$
$$\left.4x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4\,s\,x + 8\,x\,y + 3\,s\,\sqrt{4\,r^2 - (3\,s$$

$$2\,\pi\,r^2 + 6\,s^2 + 2\,\sqrt{4\,r^2 - (3\,s - 2$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 + 12\,s\,r +$$

$$(s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2$$

$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right) \wedge$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 + 4\,(s + 2$$

$$(s + 2\,x)\,\sqrt{4\,r^2 - (s + 2\,x)^2} \geq$$

$$2\left(\pi\,r^2 + (s + 2\,x)\,(s + 2\,y)\right)$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right) r^2 + 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right) r^2 - \right.$$

$$2\,\pi\,r^2 + 8\,s\,r - 12\,s^2 + 8\,s\,x -$$

$$\left. 2\,\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;x + 3\,s\,\sqrt{4\,r^2 - (3\,s - 2\,x)^2} - \right.$$

$$\left. s\,\sqrt{4\,r^2 - (s + 2\,y)^2} - 2\,y\,\sqrt{4\,r^2 - (s + 2\,y)^2}\right)$$

$$\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;(3\,s - 2\,x) \geq 4\,r$$

$$(s + 2\,x)\,\sqrt{4\,r^2 - (s + 2\,x)^2} \geq 4\,r^2$$

$$\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;(3\,s - 2\,y) \geq 4$$

$$(s + 2\,y)\,\sqrt{4\,r^2 - (s + 2\,y)^2} < 4\,r^2$$

$$4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right) r^2 +$$

$$3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4\,r^2 - (\right.$$

$$8\,y\,r + 18\,s^2 + 2\,\sqrt{4\,r^2 - (3\,s -$$

$$4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right) r^2 + 4\,s\,r +$$

$$4\,s\,x + 8\,x\,y + 3\,s\,\sqrt{4\,r^2 - (3\,s$$

$$2\,\pi\,r^2 + 6\,s^2 + 2\,\sqrt{4\,r^2 - (3\,s - 2$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 + 12\,s\,r +$$

$$(s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2$$

$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right) \wedge$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 + 4\,(s + 2$$

$$(s + 2\,x)\,\sqrt{4\,r^2 - (s + 2\,x)^2} \geq$$

$$2\left(\pi\,r^2 + (s + 2\,x)\,(s + 2\,y)\right)$$

$$\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right) r^2 + \cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right) r^2 +$$

$$\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;(3\,s - 2\,x) < 4\,r$$

$$\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-\frac{\pi r^2}{2}+2sr-3s^2+2sx-\frac{1}{4}s\sqrt{4r^2-(s+2y)^2}-\frac{1}{2}y\sqrt{4r^2-(s+2y)^2}$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+\right.$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+8sr-$$

$$12s^2+8sx-2\sqrt{4r^2-(3s-2x)^2}\ x+$$

$$3s\sqrt{4r^2-(3s-2x)^2}\ -$$

$$s\sqrt{4r^2-(s+2x)^2}\ -2x\sqrt{4r^2-(s+2x)^2}\ -$$

$$\left.s\sqrt{4r^2-(s+2y)^2}\ -2y\sqrt{4r^2-(s+2y)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+8sr-12s^2+8sx-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-s\sqrt{4r^2-(s+2y)^2}-2y\sqrt{4r^2-(s+2y)^2}\right)$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+8sr-\right.$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ <4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ <4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ <4r^2$$

$$12 s^2 + 8 s x - 2 \sqrt{4 r^2 - (3 s - 2 x)^2}\, x + 2 \sqrt{4 r^2 - (3 s - 2 y)^2}\, y + 3 s \sqrt{4 r^2 - (3 s - 2 x)^2} - 3 s \sqrt{4 r^2 - (3 s - 2 y)^2} - s \sqrt{4 r^2 - (s + 2 y)^2} - 2 y \sqrt{4 r^2 - (s + 2 y)^2} \Big)$$

$$(s + 2 y) \sqrt{4 r^2 - (s + 2 y)^2} < 4 r^2 \Big)$$

$$\frac{1}{4} \Big(4 \cos^{-1}\Big(\frac{\frac{3 s}{2} - x}{r}\Big) r^2 + 4 \cos^{-1}\Big(\frac{\frac{3 s}{2} - y}{r}\Big) r^2 + 4 \cos^{-1}\Big(\frac{\frac{s}{2} + y}{r}\Big) r^2 + 4 \tan^{-1}\Big(\frac{3 s - 2 x}{\sqrt{4 r^2 - (3 s - 2 x)^2}}\Big) r^2 - 2 \pi r^2 + 8 s r - 12 s^2 + 8 s x + 2 \sqrt{4 r^2 - (3 s - 2 y)^2}\, y - 3 s \sqrt{4 r^2 - (3 s - 2 y)^2} - s \sqrt{4 r^2 - (s + 2 y)^2} - 2 y \sqrt{4 r^2 - (s + 2 y)^2} \Big)$$

$$4 \tan^{-1}\Big(\frac{3 s - 2 x}{\sqrt{4 r^2 - (3 s - 2 x)^2}}\Big) r^2 + 3 s \Big(4 r + 4 x + 4 y + \sqrt{4 r^2 - (3 s - 2 x)^2} + \sqrt{4 r^2 - (3 s - 2 y)^2} + \sqrt{4 r^2 - (s + 2 y)^2}\Big) + 8 y r + 18 s^2 + 2 \sqrt{4 r^2 - (3 s - 2 x)^2}\, x + 2 \sqrt{4 r^2 - (3 s - 2 y)^2}\, y + 3 s \sqrt{4 r^2 - (3 s - 2 x)^2} - 3 s \sqrt{4 r^2 - (3 s - 2 y)^2} - s \sqrt{4 r^2 - (s + 2 y)^2} - 2 y \sqrt{4 r^2 - (s + 2 y)^2} \Big)$$

$$4 \tan^{-1}\Big(\frac{3 s - 2 x}{\sqrt{4 r^2 - (3 s - 2 x)^2}}\Big) r^2 + 4 s r + 4 s x + 8 x y + 3 s \sqrt{4 r^2 - (3 s - 2 x)^2} + 2 \sqrt{4 r^2 - (3 s - 2 y)^2}\, y - 3 s \sqrt{4 r^2 - (3 s - 2 y)^2} - s \sqrt{4 r^2 - (s + 2 y)^2} - 2 y \sqrt{4 r^2 - (s + 2 y)^2} \Big)$$

$$2 \pi r^2 + 6 s^2 + 2 \sqrt{4 r^2 - (3 s - 2 x)^2}\, x + 2 \sqrt{4 r^2 - (3 s - 2 y)^2}\, y + 3 s \sqrt{4 r^2 - (3 s - 2 x)^2} - 3 s \sqrt{4 r^2 - (3 s - 2 y)^2} - s \sqrt{4 r^2 - (s + 2 y)^2} - 2 y \sqrt{4 r^2 - (s + 2 y)^2} \Big)$$

$$4 \tan^{-1}\Big(\frac{s + 2 x}{\sqrt{4 r^2 - (s + 2 x)^2}}\Big) r^2 + 12 s r + 4 s x + 8 x y + 3 s \sqrt{4 r^2 - (3 s - 2 x)^2} + 2 \sqrt{4 r^2 - (3 s - 2 y)^2}\, y - 3 s \sqrt{4 r^2 - (3 s - 2 y)^2} - s \sqrt{4 r^2 - (s + 2 y)^2} - 2 y \sqrt{4 r^2 - (s + 2 y)^2} \Big)$$

$$(s + 2 x) \Big(4 y + \sqrt{4 r^2 - (s + 2 x)^2} + \sqrt{4 r^2 - (3 s - 2 x)^2} + \sqrt{4 r^2 - (3 s - 2 y)^2} + \sqrt{4 r^2 - (s + 2 y)^2}\Big) + 2 \Big(\pi r^2 + 4 y r + 3 s^2 + 6 s x\Big) \wedge$$

$$4 \tan^{-1}\Big(\frac{s + 2 x}{\sqrt{4 r^2 - (s + 2 x)^2}}\Big) r^2 + 4 (s + 2 x) \sqrt{4 r^2 - (s + 2 x)^2} \geq 2 \Big(\pi r^2 + (s + 2 x) (s + 2 y)\Big)$$

$$\sqrt{4 r^2 - (3 s - 2 x)^2}\, (3 s - 2 x) < 4 r^2 \Big)$$

$$(s + 2 x) \sqrt{4 r^2 - (s + 2 x)^2} \geq 4 r^2 \Big)$$

$$\sqrt{4 r^2 - (3 s - 2 y)^2}\, (3 s - 2 y) < 4 r^2 \Big)$$

$$(s + 2 y) \sqrt{4 r^2 - (s + 2 y)^2} < 4 r^2 \Big)$$

$$4 \tan^{-1}\Big(\frac{3 s - 2 x}{\sqrt{4 r^2 - (3 s - 2 x)^2}}\Big) r^2 + 3 s \Big(4 r + 4 x + 4 y + \sqrt{4 r^2 - (3 s - 2 x)^2} + \sqrt{4 r^2 - (3 s - 2 y)^2} + \sqrt{4 r^2 - (s + 2 y)^2}\Big) + 8 y r + 18 s^2 + 2 \sqrt{4 r^2 - (3 s - 2 x)^2}\, x + 2 \sqrt{4 r^2 - (3 s - 2 y)^2}\, y + 3 s \sqrt{4 r^2 - (3 s - 2 x)^2} - 3 s \sqrt{4 r^2 - (3 s - 2 y)^2} - s \sqrt{4 r^2 - (s + 2 y)^2} - 2 y \sqrt{4 r^2 - (s + 2 y)^2} \Big)$$

$$4 \tan^{-1}\Big(\frac{3 s - 2 x}{\sqrt{4 r^2 - (3 s - 2 x)^2}}\Big) r^2 + 4 s r + 4 s x + 8 x y + 3 s \sqrt{4 r^2 - (3 s - 2 x)^2} + 2 \sqrt{4 r^2 - (3 s - 2 y)^2}\, y - 3 s \sqrt{4 r^2 - (3 s - 2 y)^2} - s \sqrt{4 r^2 - (s + 2 y)^2} - 2 y \sqrt{4 r^2 - (s + 2 y)^2} \Big)$$

$$2 \pi r^2 + 6 s^2 + 2 \sqrt{4 r^2 - (3 s - 2 x)^2}\, x + 2 \sqrt{4 r^2 - (3 s - 2 y)^2}\, y + 3 s \sqrt{4 r^2 - (3 s - 2 x)^2} - 3 s \sqrt{4 r^2 - (3 s - 2 y)^2} - s \sqrt{4 r^2 - (s + 2 y)^2} - 2 y \sqrt{4 r^2 - (s + 2 y)^2} \Big)$$

$$4 \tan^{-1}\Big(\frac{s + 2 x}{\sqrt{4 r^2 - (s + 2 x)^2}}\Big) r^2 + 12 s r + 4 s x + 8 x y + 3 s \sqrt{4 r^2 - (3 s - 2 x)^2} + 2 \sqrt{4 r^2 - (3 s - 2 y)^2}\, y - 3 s \sqrt{4 r^2 - (3 s - 2 y)^2} - s \sqrt{4 r^2 - (s + 2 y)^2} - 2 y \sqrt{4 r^2 - (s + 2 y)^2} \Big)$$

$$(s + 2 x) \Big(4 y + \sqrt{4 r^2 - (s + 2 x)^2} + \sqrt{4 r^2 - (3 s - 2 x)^2} + \sqrt{4 r^2 - (3 s - 2 y)^2} + \sqrt{4 r^2 - (s + 2 y)^2}\Big) + 2 \Big(\pi r^2 + 4 y r + 3 s^2 + 6 s x\Big) \wedge$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+8sr-12s^2+8sx-2\sqrt{4r^2-(3s-2x)^2}\,x+2\sqrt{4r^2-(3s-2y)^2}\,y+3s\sqrt{4r^2-(3s-2x)^2}-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-3s\sqrt{4r^2-(3s-2y)^2}-s\sqrt{4r^2-(s+2y)^2}-2y\sqrt{4r^2-(s+2y)^2}\right)$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r^2\wedge(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2\wedge\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4r^2\wedge(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+8sr-12s^2+8sx+2\sqrt{4r^2-(3s-2y)^2}\,y-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-3s\sqrt{4r^2-(3s-2y)^2}-\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r^2\wedge(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2\wedge\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4r^2\wedge(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2\wedge 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$s\sqrt{4r^2-(s+2y)^2}\ -2y\sqrt{4r^2-(s+2y)^2}\ \Big)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-\right.$$
$$2\pi r^2+12sr-8yr-18s^2+12sx-$$
$$2\sqrt{4r^2-(3s-2x)^2}\ x+12sy-$$
$$8xy+3s\sqrt{4r^2-(3s-2x)^2}\ -$$
$$\left.2s\sqrt{4r^2-(s+2y)^2}\ -4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s}$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$
$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ <4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s}$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+4sr+8yr-6s^2+4sx-2\sqrt{4r^2-(3s-2x)^2}\ x-12sy+8xy+3s\sqrt{4r^2-(3s-2x)^2}\ -2s\sqrt{4r^2-(s+2y)^2}\ -4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ <4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+12sr-8yr-18s^2+12sx+2\sqrt{4r^2-(3s-2x)^2}\ x+12sy-8xy-3s\sqrt{4r^2-(3s-2x)^2}\ -2s\sqrt{4r^2-(s+2y)^2}\ -4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ <4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)2\ \ 4$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+\right.$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+4sr+$$

$$8yr-6s^2+4sx+2\sqrt{4r^2-(3s-2x)^2}\;x-$$

$$\left.12sy+8xy-3s\sqrt{4r^2-(3s-2x)^2}\;-\right.$$

$$\left.2s\sqrt{4r^2-(s+2y)^2}\;-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$1\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+\right.\qquad\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)>4r$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+\right.$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+12sr-$$
$$8yr-18s^2+12sx-2\sqrt{4r^2-(3s-2x)^2}\,x+$$
$$12sy-8xy+3s\sqrt{4r^2-(3s-2x)^2}\,-$$
$$2s\sqrt{4r^2-(s+2x)^2}\,-4x\sqrt{4r^2-(s+2x)^2}\,-$$
$$\left.2s\sqrt{4r^2-(s+2y)^2}\,-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\,<4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\,<4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\,\geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+\right.$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+4sr+$$
$$8yr-6s^2+4sx-2\sqrt{4r^2-(3s-2x)^2}\,x-$$
$$12sy+8xy+3s\sqrt{4r^2-(3s-2x)^2}\,-$$
$$2s\sqrt{4r^2-(s+2x)^2}\,-4x\sqrt{4r^2-(s+2x)^2}\,-$$
$$\left.2s\sqrt{4r^2-(s+2y)^2}\,-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\,<4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\,<4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$2\pi r^2 + 6s + 2\sqrt{4r^2 - (3s - 2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 + 12\,s\,r +$$

$$(s+2x)\left(4y + \sqrt{4r^2 - (s+2$$

$$2\left(\pi r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right) \wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 + 4\,(s+2$$

$$(s+2x)\sqrt{4r^2 - (s+2x)^2} \geq$$

$$2\left(\pi r^2 + (s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right) r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right) r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right) r^2 + \right.$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 - 2\,\pi\,r^2 + 12\,s\,r -$$

$$8\,y\,r - 18\,s^2 + 12\,s\,x + 2\sqrt{4r^2 - (3s-2x)^2}\; x +$$

$$12\,s\,y - 8\,x\,y - 3\,s\sqrt{4r^2 - (3s-2x)^2}\; -$$

$$\left. 2\,s\sqrt{4r^2 - (s+2x)^2}\; - 4\,x\sqrt{4r^2 - (s+2x)^2}\; - \right.$$

$$\left. 2\,s\sqrt{4r^2 - (s+2y)^2}\; - 4\,y\sqrt{4r^2 - (s+2y)^2}\; \right)$$

$$\sqrt{4r^2 - (3s-2x)^2}\;(3s-2x) < 4\,r$$

$$(s+2x)\sqrt{4r^2 - (s+2x)^2}\; < 4\,r^2$$

$$\sqrt{4r^2 - (3s-2y)^2}\;(3s-2y) \geq 4$$

$$(s+2y)\sqrt{4r^2 - (s+2y)^2}\; < 4\,r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 +$$

$$3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4r^2 - (\right.$$

$$8\,y\,r + 18\,s^2 + 2\sqrt{4r^2 - (3\,s\,-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 + 4\,s\,r +$$

$$4\,s\,x + 8\,x\,y + 3\,s\sqrt{4r^2 - (3\,s$$

$$2\,\pi\,r^2 + 6\,s^2 + 2\sqrt{4r^2 - (3\,s - 2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 + 12\,s\,r +$$

$$(s+2x)\left(4y + \sqrt{4r^2 - (s+2$$

$$2\left(\pi r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right) \wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 + 4\,(s+2$$

$$(s+2x)\sqrt{4r^2 - (s+2x)^2} \geq$$

$$2\left(\pi r^2 + (s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right) r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right) r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right) r^2 + \right.$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 - 2\,\pi\,r^2 + 4\,s\,r +$$

$$\sqrt{4r^2 - (3s-2x)^2}\;(3s-2x) < 4\,r$$

$$(s+2x)\sqrt{4r^2 - (s+2x)^2}\; < 4\,r^2$$

$$\sqrt{4r^2 - (3s-2y)^2}\;(3s-2y) \geq 4$$

$$8\,y\,r-6\,s^2+4\,s\,x+2\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x-$$
$$12\,s\,y+8\,x\,y-3\,s\sqrt{4\,r^2-(3\,s-2\,x)^2}\;-$$
$$2\,s\sqrt{4\,r^2-(s+2\,x)^2}\;-4\,x\sqrt{4\,r^2-(s+2\,x)^2}\;-$$
$$2\,s\sqrt{4\,r^2-(s+2\,y)^2}\;-4\,y\sqrt{4\,r^2-(s+2\,y)^2}\;\Bigg)$$

$$(s+2\,y)\sqrt{4\,r^2-(s+2\,y)^2}\;<4\,r^2$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$
$$3\,s\left(4\,r+4\,x+4\,y+\sqrt{4\,r^2-(\right.$$
$$8\,y\,r+18\,s^2+2\sqrt{4\,r^2-(3\,s-$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$
$$4\,s\,x+8\,x\,y+3\,s\sqrt{4\,r^2-(3\,s$$
$$2\,\pi\,r^2+6\,s^2+2\sqrt{4\,r^2-(3\,s-2$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$
$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2\right.$$
$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$
$$(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;\geq$$
$$2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2-2\,\pi\,r^2+12\,s\,r-$$
$$8\,y\,r-18\,s^2+12\,s\,x-2\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+$$
$$12\,s\,y-8\,x\,y+4\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y+$$
$$3\,s\sqrt{4\,r^2-(3\,s-2\,x)^2}\;-6\,s\sqrt{4\,r^2-(3\,s-2\,y)^2}\;-$$
$$2\,s\sqrt{4\,r^2-(s+2\,y)^2}\;-4\,y\sqrt{4\,r^2-(s+2\,y)^2}\;\Bigg)$$

$$\sqrt{4\,r^2-(3\,s-2\,x)^2}\;(3\,s-2\,x)\geq 4\,r$$
$$(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;\geq 4\,r^2$$
$$\sqrt{4\,r^2-(3\,s-2\,y)^2}\;(3\,s-2\,y)<4$$
$$(s+2\,y)\sqrt{4\,r^2-(s+2\,y)^2}\;<4\,r^2$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$
$$3\,s\left(4\,r+4\,x+4\,y+\sqrt{4\,r^2-(\right.$$
$$8\,y\,r+18\,s^2+2\sqrt{4\,r^2-(3\,s-$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$
$$4\,s\,x+8\,x\,y+3\,s\sqrt{4\,r^2-(3\,s$$
$$2\,\pi\,r^2+6\,s^2+2\sqrt{4\,r^2-(3\,s-2$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$
$$($$

$$
\begin{aligned}
&(s+2x)\left(4y+\sqrt{4r^2-(s+2\\
&2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge\\
&4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2\\
&(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq\\
&2\left(\pi r^2+(s+2x)(s+2y)\right)
\end{aligned}
$$

$$
\begin{aligned}
&\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+\right.\\
&\quad 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+4sr+\\
&\quad 8yr-6s^2+4sx-2\sqrt{4r^2-(3s-2x)^2}\ x-\\
&\quad 12sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\ y+\\
&\quad 3s\sqrt{4r^2-(3s-2x)^2}\ -6s\sqrt{4r^2-(3s-2y)^2}\ -\\
&\quad \left.2s\sqrt{4r^2-(s+2y)^2}\ -4y\sqrt{4r^2-(s+2y)^2}\ \right)
\end{aligned}
$$

$$
\begin{aligned}
&\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4r\\
&(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2\\
&\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)<4\\
&(s+2y)\sqrt{4r^2-(s+2y)^2}\ <4r^2\\
&4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+\\
&3s\left(4r+4x+4y+\sqrt{4r^2-(\right.\\
&8yr+18s^2+2\sqrt{4r^2-(3s-\\
&4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+\\
&4sx+8xy+3s\sqrt{4r^2-(3s\\
&2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2\\
&4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+\\
&(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.\\
&2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge\\
&4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2\\
&(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq\\
&2\left(\pi r^2+(s+2x)(s+2y)\right)
\end{aligned}
$$

$$
\begin{aligned}
&\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+\right.\\
&\quad 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+12sr-\\
&\quad 8yr-18s^2+12sx+2\sqrt{4r^2-(3s-2x)^2}\ x+\\
&\quad 12sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\ y-\\
&\quad 3s\sqrt{4r^2-(3s-2x)^2}\ -6s\sqrt{4r^2-(3s-2y)^2}
\end{aligned}
$$

$$
\begin{aligned}
&\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)<4r\\
&(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2\\
&\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)<4\\
&(s+2y)\sqrt{4r^2-(s+2y)^2}\ <4r^2\\
&4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2y)^2}}\right)r^2+
\end{aligned}
$$

$$3\,s\sqrt{4\,r^2-(3\,s-2\,x)^2}-6\,s\sqrt{4\,r^2-(3\,s-2\,y)^2}-$$
$$2\,s\sqrt{4\,r^2-(s+2\,y)^2}-4\,y\sqrt{4\,r^2-(s+2\,y)^2}\Bigg)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2-2\,\pi\,r^2+4\,s\,r+$$
$$8\,y\,r-6\,s^2+4\,s\,x+2\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x-$$
$$12\,s\,y+8\,x\,y+4\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y-$$
$$3\,s\sqrt{4\,r^2-(3\,s-2\,x)^2}-6\,s\sqrt{4\,r^2-(3\,s-2\,y)^2}-$$
$$2\,s\sqrt{4\,r^2-(s+2\,y)^2}-4\,y\sqrt{4\,r^2-(s+2\,y)^2}\Bigg)$$

$$\sqrt{4\,r^2-(3\,s-2\,x)^2}\;(3\,s-2\,x)<4\,r$$
$$(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\geq 4\,r^2$$
$$\sqrt{4\,r^2-(3\,s-2\,y)^2}\;(3\,s-2\,y)<4$$
$$(s+2\,y)\sqrt{4\,r^2-(s+2\,y)^2}<4\,r^2$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$
$$3\,s\left(4\,r+4\,x+4\,y+\sqrt{4\,r^2-(\right.$$
$$8\,y\,r+18\,s^2+2\sqrt{4\,r^2-(3\,s-$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$
$$4\,s\,x+8\,x\,y+3\,s\sqrt{4\,r^2-(3\,s$$
$$2\,\pi\,r^2+6\,s^2+2\sqrt{4\,r^2-(3\,s-2$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$
$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2\right.$$
$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$
$$(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\geq$$
$$2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$
$$3\,s\left(4\,r+4\,x+4\,y+\sqrt{4\,r^2-(\right.$$
$$8\,y\,r+18\,s^2+2\sqrt{4\,r^2-(3\,s-$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$
$$4\,s\,x+8\,x\,y+3\,s\sqrt{4\,r^2-(3\,s$$
$$2\,\pi\,r^2+6\,s^2+2\sqrt{4\,r^2-(3\,s-2$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$
$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2\right.$$
$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$

$$\left(\sqrt{4r^2-(s+2x)^2}\right)$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+\right.$$
$$\left.4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+12sr-8yr-18s^2+12sx-2\sqrt{4r^2-(3s-2x)^2}\,x+12sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\,y+3s\sqrt{4r^2-(3s-2x)^2}-2s\sqrt{4r^2-(s+2x)^2}-4x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x) \geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2} < 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y) < 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2} < 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+\right.$$
$$\left.4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+4sr+8yr-6s^2+4sx-2\sqrt{4r^2-(3s-2x)^2}\,x-12sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\,y+3s\sqrt{4r^2-(3s-2x)^2}-2s\sqrt{4r^2-(s+2x)^2}-4x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x) \geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2} < 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y) < 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2} < 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+\right.$$

$$8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+12sr-$$

$$8yr-18s^2+12sx+2\sqrt{4r^2-(3s-2x)^2}\;x+$$

$$12sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\;y-$$

$$3s\sqrt{4r^2-(3s-2x)^2}-2s\sqrt{4r^2-(s+2x)^2}-$$

$$4x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-$$

$$\left.2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;<4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+4sr+8yr-6s^2+4sx+2\sqrt{4r^2-(3s-2x)^2}\,x-12sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\,y-3s\sqrt{4r^2-(3s-2x)^2}-2s\sqrt{4r^2-(s+2x)^2}-4x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-\pi r^2+4sr-4s^2$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s}$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$
$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2 + 6s^2 + 2\sqrt{4r^2 - (3s - 2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 + 12sr +$$

$$(s+2x)\left(4y + \sqrt{4r^2 - (s+2$$

$$2\left(\pi r^2 + 4yr + 3s^2 + 6sx\right) \wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 + 4(s+2$$

$$(s+2x)\sqrt{4r^2 - (s+2x)^2} <$$

$$2\left(\pi r^2 + (s+2x)(s+2y)\right)$$

$$\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 + \tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 - \qquad \sqrt{4r^2 - (3s - 2x)^2}\ (3s - 2x) \geq 4r$$

$$\frac{\pi r^2}{2} + 2sr - s^2 - 2sx \qquad (s+2x)\sqrt{4r^2 - (s+2x)^2} < 4r^2$$

$$\sqrt{4r^2 - (3s - 2y)^2}\ (3s - 2y) \geq 4$$

$$(s+2y)\sqrt{4r^2 - (s+2y)^2} \geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 +$$

$$3s\left(4r + 4x + 4y + \sqrt{4r^2 - (\right.$$

$$8yr + 18s^2 + 2\sqrt{4r^2 - (3s -$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 + 4sr +$$

$$4sx + 8xy + 3s\sqrt{4r^2 - (3s$$

$$2\pi r^2 + 6s^2 + 2\sqrt{4r^2 - (3s - 2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 + 12sr +$$

$$(s+2x)\left(4y + \sqrt{4r^2 - (s+2$$

$$2\left(\pi r^2 + 4yr + 3s^2 + 6sx\right) \wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 + 4(s+2$$

$$(s+2x)\sqrt{4r^2 - (s+2x)^2} <$$

$$2\left(\pi r^2 + (s+2x)(s+2y)\right)$$

$$\frac{1}{4}\left(4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 - 2\pi r^2 + 8sr - 4s^2 - 8sx + \qquad \sqrt{4r^2 - (3s - 2x)^2}\ (3s - 2x) \geq 4r$$

$$s\sqrt{4r^2 - (s+2x)^2} + 2x\sqrt{4r^2 - (s+2x)^2}\Big) \qquad (s+2x)\sqrt{4r^2 - (s+2x)^2} \geq 4r^2$$

$$s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}\Big)$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ <$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+\right.$$

$$4sr+8yr-2s^2-4sx-4sy-8xy+$$

$$\left.s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+\right.$$

$$12sr-8yr-6s^2-12sx+4sy+8xy+$$

$$\left.s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-\right.$$

$$2\pi r^2+8sr-4s^2-8sx+$$

$$2\sqrt{4r^2-(3s-2x)^2}\ x-3s\sqrt{4r^2-(3s-2x)^2}+$$

$$\left.s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+4sr+8yr-2s^2-4sx+4\sqrt{4r^2-(3s-2x)^2}\;x-4sy-8xy-6s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}\right)$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s}$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$
$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)<4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s}$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-\right.$$
$$2\pi r^2+12sr-8yr-6s^2-12sx+$$
$$4\sqrt{4r^2-(3s-2x)^2}\;x+4sy+$$
$$8xy-6s\sqrt{4r^2-(3s-2x)^2}\;+$$
$$\left.s\sqrt{4r^2-(s+2x)^2}\;+2x\sqrt{4r^2-(s+2x)^2}\right)$$

$$\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+$$
$$\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-\frac{\pi r^2}{2}+2sr-s^2-2sx+$$
$$\frac{1}{2}\sqrt{4r^2-(3s-2x)^2}\;x-\frac{3}{4}s\sqrt{4r^2-(3s-2x)^2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$
$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)<4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq 4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;\geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$
$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)<4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;<4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;\geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8\,y\,r+18\,s^2+2\sqrt{4\,r^2-(3\,s-$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$

$$4\,s\,x+8\,x\,y+3\,s\sqrt{4\,r^2-(3\,s$$

$$2\,\pi\,r^2+6\,s^2+2\sqrt{4\,r^2-(3\,s-2$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$

$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2$$

$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$

$$(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;<$$

$$2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-2\,\pi\,r^2+\right.$$

$$\left.4\,s\,r+8\,y\,r-2\,s^2-4\,s\,x-4\,s\,y-8\,x\,y-\right.$$

$$\left.s\sqrt{4\,r^2-(s+2\,x)^2}\;-2\,x\sqrt{4\,r^2-(s+2\,x)^2}\right)$$

$$\sqrt{4\,r^2-(3\,s-2\,x)^2}\;(3\,s-2\,x)\geq 4\,r$$

$$(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;<4\,r^2$$

$$\sqrt{4\,r^2-(3\,s-2\,y)^2}\;(3\,s-2\,y)\geq 4$$

$$(s+2\,y)\sqrt{4\,r^2-(s+2\,y)^2}\;\geq 4\,r^2$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$

$$3\,s\left(4\,r+4\,x+4\,y+\sqrt{4\,r^2-(\right.$$

$$8\,y\,r+18\,s^2+2\sqrt{4\,r^2-(3\,s-$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$

$$4\,s\,x+8\,x\,y+3\,s\sqrt{4\,r^2-(3\,s$$

$$2\,\pi\,r^2+6\,s^2+2\sqrt{4\,r^2-(3\,s-2$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$

$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2$$

$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$

$$(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;<$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+12sr-8yr-6s^2-12sx+4sy+8xy-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}\right)$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ <4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+4sr+8yr-2s^2-4sx+4\sqrt{4r^2-(3s-2x)^2}\ x-4sy-8xy-6s\sqrt{4r^2-(3s-2x)^2}\ -s\sqrt{4r^2-(s+2x)^2}\ -2x\sqrt{4r^2-(s+2x)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ <4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+12sr-8yr-6s^2-12sx+4\sqrt{4r^2-(3s-2x)^2}\,x+4sy+8xy-6s\sqrt{4r^2-(3s-2x)^2}-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}\right)$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-\right.$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$
$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$
$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$

$$2\pi r^2 + 8sr - 4s^2 - 8sx + 2\sqrt{4r^2-(3s-2y)^2}\,y + s\sqrt{4r^2-(s+2x)^2} + 2x\sqrt{4r^2-(s+2x)^2} - 3s\sqrt{4r^2-(3s-2y)^2}\Bigg)$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y) < 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2} \geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 +$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

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$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2} <$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+\right.$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+8sr-$$

$$4s^2-8sx+2\sqrt{4r^2-(3s-2x)^2}\,x+$$

$$2\sqrt{4r^2-(3s-2y)^2}\,y-$$

$$3s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+$$

$$2x\sqrt{4r^2-(s+2x)^2}-3s\sqrt{4r^2-(3s-2y)^2}\Bigg)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x) < 4r$$

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$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+$$

$$\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-\frac{\pi r^2}{2}+2sr-s^2-2sx+$$

$$\frac{1}{2}\sqrt{4r^2-(3s-2y)^2}\;y-\frac{3}{4}s\sqrt{4r^2-(3s-2y)^2}$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;<4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)<4$$

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$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+\right.$$

$$4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-$$

$$2\pi r^2+8sr-4s^2-8sx+$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;<4r^2$$

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$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;\geq 4r^2$$

$$2\sqrt{4r^2-(3s-2x)^2}\;x+2\sqrt{4r^2-(3s-2y)^2}\;y-3s\sqrt{4r^2-(3s-2x)^2}-3s\sqrt{4r^2-(3s-2y)^2}\Bigg)$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
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$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+4sr+8yr-2s^2-4sx-4sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\;y+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)\geq 4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq 4r^2$$
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$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

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$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+\right.$$

$$12sr-8yr-6s^2-12sx+4sy+8xy+$$

$$4\sqrt{4r^2-(3s-2y)^2}\,y+s\sqrt{4r^2-(s+2x)^2}+$$

$$\left.2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4$$

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$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

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$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+\right.$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+4sr+$$

$$8yr-2s^2-4sx+4\sqrt{4r^2-(3s-2x)^2}\,x-$$

$$4sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\,y-$$

$$6s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4$$

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$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$2\,x\sqrt{4\,r^2-(s+2\,x)^2}-6\,s\sqrt{4\,r^2-(3\,s-2\,y)^2}\Bigg)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+\right.$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-2\,\pi\,r^2+12\,s\,r-$$

$$8\,y\,r-6\,s^2-12\,s\,x+4\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+$$

$$4\,s\,y+8\,x\,y+4\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y-$$

$$6\,s\sqrt{4\,r^2-(3\,s-2\,x)^2}\;+s\sqrt{4\,r^2-(s+2\,x)^2}\;+$$

$$2\,x\sqrt{4\,r^2-(s+2\,x)^2}\;-6\,s\sqrt{4\,r^2-(3\,s-2\,y)^2}\Bigg)$$

$$8\,y\,r+18\,s^2+2\sqrt{4\,r^2-(3\,s-$$

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$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$

$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2$$

$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$

$$(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;<$$

$$2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$

$$\sqrt{4\,r^2-(3\,s-2\,x)^2}\;\;(3\,s-2\,x)<4\,r$$

$$(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;\geq 4\,r^2$$

$$\sqrt{4\,r^2-(3\,s-2\,y)^2}\;\;(3\,s-2\,y)<4$$

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$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$

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$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge$$

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$$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+4sr+8yr-2s^2-4sx-4sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\,y-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\right)$$

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$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

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$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+\right.$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+4sr+$$

$$8yr-2s^2-4sx+4\sqrt{4r^2-(3s-2x)^2}\,x-$$

$$4sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\,y-$$

$$\left.6s\sqrt{4r^2-(3s-2x)^2}-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$

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$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+\right.\quad\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$

$$\left(\right.$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+12sr-$$
$$8yr-6s^2-12sx+4\sqrt{4r^2-(3s-2x)^2}\;x+$$
$$4sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\;y-$$
$$6s\sqrt{4r^2-(3s-2x)^2}\;-s\sqrt{4r^2-(s+2x)^2}\;-$$
$$2x\sqrt{4r^2-(s+2x)^2}\;-6s\sqrt{4r^2-(3s-2y)^2}\;\Bigg)$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-\right.$$
$$2\pi r^2+8sr-4s^2-8sx+$$
$$s\sqrt{4r^2-(s+2x)^2}\;+2x\sqrt{4r^2-(s+2x)^2}\;-$$
$$\left.s\sqrt{4r^2-(s+2y)^2}\;-2y\sqrt{4r^2-(s+2y)^2}\;\right)$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;<4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)<4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;\geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s}$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$
$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)\geq 4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq 4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;<4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s}$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$
\begin{cases}
\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+\right. & 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+ \\
\quad 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+8sr- & (s+2x)\left(4y+\sqrt{4r^2-(s+2 \\
\quad 4s^2-8sx+2\sqrt{4r^2-(3s-2x)^2}\,x- & 2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge \\
\quad 3s\sqrt{4r^2-(3s-2x)^2}\,+ & 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2 \\
\quad s\sqrt{4r^2-(s+2x)^2}\,+2x\sqrt{4r^2-(s+2x)^2}\,- & (s+2x)\sqrt{4r^2-(s+2x)^2}\,< \\
\quad \left.s\sqrt{4r^2-(s+2y)^2}\,-2y\sqrt{4r^2-(s+2y)^2}\right) & 2\left(\pi r^2+(s+2x)(s+2y)\right)
\end{cases}
$$

$$
\begin{cases}
\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+ & \sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r \\
\quad \tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-\frac{\pi r^2}{2}+2sr-s^2-2sx- & (s+2x)\sqrt{4r^2-(s+2x)^2}\,<4r^2 \\
\quad \frac{1}{4}s\sqrt{4r^2-(s+2y)^2}\,-\frac{1}{2}y\sqrt{4r^2-(s+2y)^2} & \sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4
\end{cases}
$$

$$
\begin{cases}
\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r \\
(s+2x)\sqrt{4r^2-(s+2x)^2}\,\geq 4r^2 \\
\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4 \\
(s+2y)\sqrt{4r^2-(s+2y)^2}\,<4r^2 \\
4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+ \\
\quad 3s\left(4r+4x+4y+\sqrt{4r^2-(\right. \\
\quad 8yr+18s^2+2\sqrt{4r^2-(3s- \\
4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+ \\
\quad 4sx+8xy+3s\sqrt{4r^2-(3s \\
\quad 2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2 \\
4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+ \\
\quad (s+2x)\left(4y+\sqrt{4r^2-(s+2\right. \\
\quad 2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge \\
4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2 \\
\quad (s+2x)\sqrt{4r^2-(s+2x)^2}\,< \\
\quad 2\left(\pi r^2+(s+2x)(s+2y)\right)
\end{cases}
$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+8sr-4s^2-8sx+2\sqrt{4r^2-(3s-2x)^2}\,x-3s\sqrt{4r^2-(3s-2x)^2}-s\sqrt{4r^2-(s+2y)^2}-2y\sqrt{4r^2-(s+2y)^2}\right)$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+\right.$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+8sr-$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)<4$$

$$4s^2-8sx+2\sqrt{4r^2-(3s-2y)^2}\ y+$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ <4r^2$$

$$s\sqrt{4r^2-(s+2x)^2}\ +2x\sqrt{4r^2-(s+2x)^2}\ -$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\sqrt{4r^2-(3s-2y)^2}\ -$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$\left.s\sqrt{4r^2-(s+2y)^2}\ -2y\sqrt{4r^2-(s+2y)^2}\right)$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+\right.$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)<4r$$

$$4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)<4$$

$$2\pi r^2+8sr-4s^2-8sx+$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ <4r^2$$

$$2\sqrt{4r^2-(3s-2x)^2}\ x+2\sqrt{4r^2-(3s-2y)^2}\ y-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\sqrt{4r^2-(3s-2x)^2}\ +s\sqrt{4r^2-(s+2x)^2}\ +$$

$$2\,x\,\sqrt{4\,r^2-(s+2\,x)^2}\;-3\,s\,\sqrt{4\,r^2-(3\,s-2\,y)^2}\;-$$
$$s\,\sqrt{4\,r^2-(s+2\,y)^2}\;-2\,y\,\sqrt{4\,r^2-(s+2\,y)^2}\Big)$$

$$3\,s\Big(4\,r+4\,x+4\,y+\sqrt{4\,r^2-($$
$$8\,y\,r+18\,s^2+2\,\sqrt{4\,r^2-(3\,s-$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$
$$4\,s\,x+8\,x\,y+3\,s\,\sqrt{4\,r^2-(3\,s$$
$$2\,\pi\,r^2+6\,s^2+2\,\sqrt{4\,r^2-(3\,s-2$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$
$$(s+2\,x)\Big(4\,y+\sqrt{4\,r^2-(s+2$$
$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$
$$(s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2}\;<$$
$$2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$

$$\frac{1}{4}\Bigg(4\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+$$
$$4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-$$
$$2\,\pi\,r^2+8\,s\,r-4\,s^2-8\,s\,x+$$
$$2\,\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y-3\,s\,\sqrt{4\,r^2-(3\,s-2\,y)^2}\;-$$
$$s\,\sqrt{4\,r^2-(s+2\,y)^2}\;-2\,y\,\sqrt{4\,r^2-(s+2\,y)^2}\Bigg)$$

$$\sqrt{4\,r^2-(3\,s-2\,x)^2}\;(3\,s-2\,x)\geq 4\,r$$
$$(s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2}\;<4\,r^2$$
$$\sqrt{4\,r^2-(3\,s-2\,y)^2}\;(3\,s-2\,y)<4$$
$$(s+2\,y)\,\sqrt{4\,r^2-(s+2\,y)^2}\;<4\,r^2$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$
$$3\,s\Big(4\,r+4\,x+4\,y+\sqrt{4\,r^2-($$
$$8\,y\,r+18\,s^2+2\,\sqrt{4\,r^2-(3\,s-$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$
$$4\,s\,x+8\,x\,y+3\,s\,\sqrt{4\,r^2-(3\,s$$
$$2\,\pi\,r^2+6\,s^2+2\,\sqrt{4\,r^2-(3\,s-2$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$
$$(s+2\,x)\Big(4\,y+\sqrt{4\,r^2-(s+2$$
$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2} <$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+\right.$$
$$4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-$$
$$2\pi r^2+8sr-4s^2-8sx+$$
$$2\sqrt{4r^2-(3s-2x)^2}\,x+2\sqrt{4r^2-(3s-2y)^2}\,y-$$
$$3s\sqrt{4r^2-(3s-2x)^2}-3s\sqrt{4r^2-(3s-2y)^2}-$$
$$\left.s\sqrt{4r^2-(s+2y)^2}-2y\sqrt{4r^2-(s+2y)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s}$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+\right.$$
$$4sr+8yr-2s^2-4sx-4sy-8xy+$$
$$s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-$$
$$\left.2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+12sr-8yr-6s^2-12sx+4sy+8xy+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$
$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+4sr+8yr-2s^2-4sx+4\sqrt{4r^2-(3s-2x)^2}\;x-4sy-8xy-6s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+12sr-8yr-6s^2-12sx+4\sqrt{4r^2-(3s-2x)^2}\;x+4sy+8xy-6s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$
\begin{array}{l}
\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+\right. \\
\quad 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+4sr+ \\
\quad 8yr-2s^2-4sx-4sy-8xy- \\
\quad s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}- \\
\quad \left.2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)
\end{array}
$$

$$
\begin{array}{l}
2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2 \\
4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+ \\
(s+2x)\left(4y+\sqrt{4r^2-(s+2\right. \\
2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge \\
4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2 \\
(s+2x)\sqrt{4r^2-(s+2x)^2}\geq \\
2\left(\pi r^2+(s+2x)(s+2y)\right) \\
\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4r \\
(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2 \\
\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4 \\
(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2 \\
4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+ \\
3s\left(4r+4x+4y+\sqrt{4r^2-(\right. \\
8yr+18s^2+2\sqrt{4r^2-(3s- \\
4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+ \\
4sx+8xy+3s\sqrt{4r^2-(3s \\
2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2 \\
4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+ \\
(s+2x)\left(4y+\sqrt{4r^2-(s+2\right. \\
2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge \\
4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2 \\
(s+2x)\sqrt{4r^2-(s+2x)^2}< \\
2\left(\pi r^2+(s+2x)(s+2y)\right)
\end{array}
$$

$$
\begin{array}{l}
\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+\right. \\
\quad 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+12sr- \\
\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4r \\
(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2 \\
\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4
\end{array}
$$

$$\left(\sqrt{4r^2-(s+2x)^2}\right)$$

$$8yr-6s^2-12sx+4sy+8xy-$$
$$s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-$$
$$2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\Bigg)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+4sr+$$
$$8yr-2s^2-4sx+4\sqrt{4r^2-(3s-2x)^2}\,x-$$
$$4sy-8xy-6s\sqrt{4r^2-(3s-2x)^2}-$$
$$s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-$$
$$2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\Bigg)$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+12sr-8yr-6s^2-12sx+4\sqrt{4r^2-(3s-2x)^2}\,x+4sy+8xy-6s\sqrt{4r^2-(3s-2x)^2}-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+4sr+8yr-2s^2-4sx-4sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\,y+s\sqrt{4r^2-(s+2x)^2}+\right.$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\right.}\right)r^2+$$

$$2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\Bigg)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+12sr-8yr-6s^2-12sx+4sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\,y+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\Bigg)$$

$$\left(\sqrt{4r^2-(3s-2x)^2}\right)$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+4sr+8yr-2s^2-4sx+4\sqrt{4r^2-(3s-2x)^2}\,x-4sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\,y-6s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 2\left(\pi r^2+(s+2x)(s+2y)\right)\wedge\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2\wedge\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4r(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2x)\sqrt{4r^2-(s+2x)^2}<2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+12sr-8yr-6s^2-12sx+4\sqrt{4r^2-(3s-2x)^2}\,x+4sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\,y-6s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 2\left(\pi r^2+(s+2x)(s+2y)\right)\wedge\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2\wedge\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4r(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+4sr+8yr-2s^2-4sx-4sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\,y-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$\frac{1}{8}\left(4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s-2x)^2}+2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r^2\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2x)^2}\right)+2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2x)\sqrt{4r^2-(s+2x)^2}<2\left(\pi r^2+(s+2x)(s+2y)\right)\right)$$

$$\frac{1}{8}\left(4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s-2x)^2}+2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r^2\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2x)^2}\right)+2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2\tan^{-1}\left(\frac{3s-2y}{\sqrt{4r^2-(3s-2y)^2}}\right)+12sr+(s+2y)\left(4x+\sqrt{4r^2-(3s-2y)^2}\right)+2\left(\pi r^2+4xr+3s^2+6sy\right)\wedge 4\tan^{-1}\left(\frac{s+2y}{\sqrt{4r^2-(s+2y)^2}}\right)r^2+4(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2\right)$$

$$\frac{1}{8}\left(4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(3s-2x)^2}\right)+8yr+18s^2+2\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r^2\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)+4sr+4sx+8xy+3s\sqrt{4r^2-(3s-2x)^2}+2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r^2\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2x)^2}\right)+2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2x)\sqrt{4r^2-(s+2x)^2}<2\left(\pi r^2+(s+2x)(s+2y)\right)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+12sr-8yr-6s^2-12sx+4sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\,y-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+4sr+8yr-2s^2-4sx+4\sqrt{4r^2-(3s-2x)^2}\,x-4sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\,y-6s\sqrt{4r^2-(3s-2x)^2}-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+12sr-8yr-6s^2-12sx+4\sqrt{4r^2-(3s-2x)^2}\;x+4sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\;y-6s\sqrt{4r^2-(3s-2x)^2}-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$\frac{1}{4}\left(4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq 4r^2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-16s^2-2\sqrt{4r^2-(3s-2x)^2}\,x+3s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}\Bigg)$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+8sr+16yr-8s^2-2\sqrt{4r^2-(3s-2x)^2}\,x-16sy+3s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}\Bigg)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$\left(\sqrt{4\,r^2-(s+2\,x)^2}\right)$$

$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2$$

$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$

$$(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}<$$

$$2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$

$$\frac{1}{8}\left(4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+\right.$$

$$\sqrt{4\,r^2-(3\,s-2\,x)^2}\;(3\,s-2\,x)\geq 4\,r$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-4\,\pi\,r^2+24\,s\,r-$$

$$(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;\geq 4\,r^2$$

$$16\,y\,r-24\,s^2-2\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+$$

$$\sqrt{4\,r^2-(3\,s-2\,y)^2}\;(3\,s-2\,y)\geq 4$$

$$16\,s\,y+3\,s\sqrt{4\,r^2-(3\,s-2\,x)^2}\;+$$

$$(s+2\,y)\sqrt{4\,r^2-(s+2\,y)^2}\;\geq 4\,r^2$$

$$\left.s\sqrt{4\,r^2-(s+2\,x)^2}\;+2\,x\sqrt{4\,r^2-(s+2\,x)^2}\right)$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$

$$3\,s\left(4\,r+4\,x+4\,y+\sqrt{4\,r^2-(\right.$$

$$8\,y\,r+18\,s^2+2\sqrt{4\,r^2-(3\,s-$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$

$$4\,s\,x+8\,x\,y+3\,s\sqrt{4\,r^2-(3\,s$$

$$2\,\pi\,r^2+6\,s^2+2\sqrt{4\,r^2-(3\,s-2$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$

$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2\right.$$

$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$

$$(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;\geq$$

$$2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$

$$\frac{1}{8}\left(4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+\right.$$

$$\sqrt{4\,r^2-(3\,s-2\,x)^2}\;(3\,s-2\,x)\geq 4\,r$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-4\,\pi\,r^2+16\,s\,r-$$

$$(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;\geq 4\,r^2$$

$$20\,s^2+8\,s\,x-2\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+$$

$$\sqrt{4\,r^2-(3\,s-2\,y)^2}\;(3\,s-2\,y)\geq 4$$

$$(s+2\,y)\sqrt{4\,r^2-(s+2\,y)^2}\;\geq 4\,r^2$$

$$8\,s\,y - 16\,x\,y + 3\,s\,\sqrt{4\,r^2 - (3\,s - 2\,x)^2} +$$
$$s\,\sqrt{4\,r^2 - (s + 2\,x)^2} + 2\,x\,\sqrt{4\,r^2 - (s + 2\,x)^2}\Bigg)$$

$$\frac{1}{8}\left(4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 + 4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 - 4\,\pi\,r^2 + 16\,s\,r - 12\,s^2 - 8\,s\,x - 2\,\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;x - 8\,s\,y + 16\,x\,y + 3\,s\,\sqrt{4\,r^2 - (3\,s - 2\,x)^2} + s\,\sqrt{4\,r^2 - (s + 2\,x)^2} + 2\,x\,\sqrt{4\,r^2 - (s + 2\,x)^2}\right)$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 +$$
$$3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4\,r^2 - (\right.$$
$$8\,y\,r + 18\,s^2 + 2\,\sqrt{4\,r^2 - (3\,s -$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 + 4\,s\,r +$$
$$4\,s\,x + 8\,x\,y + 3\,s\,\sqrt{4\,r^2 - (3\,s$$
$$2\,\pi\,r^2 + 6\,s^2 + 2\,\sqrt{4\,r^2 - (3\,s - 2$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 12\,s\,r +$$
$$(s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2\right.$$
$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right) \wedge$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 4\,(s + 2$$
$$(s + 2\,x)\,\sqrt{4\,r^2 - (s + 2\,x)^2} <$$
$$2\left(\pi\,r^2 + (s + 2\,x)\,(s + 2\,y)\right)$$
$$\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;(3\,s - 2\,x) \geq 4\,r$$
$$(s + 2\,x)\,\sqrt{4\,r^2 - (s + 2\,x)^2} \geq 4\,r^2$$
$$\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;(3\,s - 2\,y) \geq 4$$
$$(s + 2\,y)\,\sqrt{4\,r^2 - (s + 2\,y)^2} \geq 4\,r^2$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 +$$
$$3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4\,r^2 - (\right.$$
$$8\,y\,r + 18\,s^2 + 2\,\sqrt{4\,r^2 - (3\,s -$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 + 4\,s\,r +$$
$$4\,s\,x + 8\,x\,y + 3\,s\,\sqrt{4\,r^2 - (3\,s$$
$$2\,\pi\,r^2 + 6\,s^2 + 2\,\sqrt{4\,r^2 - (3\,s - 2$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 12\,s\,r +$$
$$(s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2\right.$$
$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right) \wedge$$

$$\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right) r^2 + \tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 + \tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 - \pi r^2 + 4sr - 4s^2 + \frac{1}{4} s\sqrt{4r^2-(s+2x)^2} + \frac{1}{2} x\sqrt{4r^2-(s+2x)^2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 + 4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq$$
$$2\left(\pi r^2 + (s+2x)(s+2y)\right)$$
$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x) < 4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq 4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y) \geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2} \geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 +$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr + 18s^2 + 2\sqrt{4r^2-(3s-}$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 + 4sr +$$
$$4sx + 8xy + 3s\sqrt{4r^2-(3s}$$
$$2\pi r^2 + 6s^2 + 2\sqrt{4r^2-(3s-2}$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 + 12sr +$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.$$
$$2\left(\pi r^2 + 4yr + 3s^2 + 6sx\right) \wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 + 4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2} <$$
$$2\left(\pi r^2 + (s+2x)(s+2y)\right)$$
$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right) r^2 + 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 + 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 - 4\pi r^2 + 8sr + 16yr - 8s^2 + 2\sqrt{4r^2-(3s-2x)^2}\ x - 16sy - 3s\sqrt{4r^2-(3s-2x)^2} + s\sqrt{4r^2-(s+2x)^2} + 2x\sqrt{4r^2-(s+2x)^2}\right)$$
$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x) < 4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq 4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y) \geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2} \geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 +$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+24sr-16yr-24s^2+2\sqrt{4r^2-(3s-2x)^2}\,x+16sy-3s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}\right)$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-($$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-20s^2+8sx+2\sqrt{4r^2-(3s-2x)^2}\,x+8sy-16xy-3s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}\right)$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}\,4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}\,4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2(s+2x)\sqrt{4r^2-(s+2x)^2}<2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-12s^2-8sx+2\sqrt{4r^2-(3s-2x)^2}\,x-8sy+16xy-3s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}\,4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4\,s\,x + 8\,x\,y + 3\,s\,\sqrt{4\,r^2 - (3\,s$$

$$2\,\pi\,r^2 + 6\,s^2 + 2\,\sqrt{4\,r^2 - (3\,s - 2$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 + 12\,s\,r +$$

$$(s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2$$

$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right) \wedge$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 + 4\,(s + 2$$

$$(s + 2\,x)\,\sqrt{4\,r^2 - (s + 2\,x)^2} \geq$$

$$2\left(\pi\,r^2 + (s + 2\,x)\,(s + 2\,y)\right)$$

$$\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right) r^2 + \tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right) r^2 +$$

$$\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\ (3\,s - 2\,x) \geq 4\,r$$

$$\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 - \pi\,r^2 + 4\,s\,r - 4\,s^2 -$$

$$(s + 2\,x)\,\sqrt{4\,r^2 - (s + 2\,x)^2} < 4\,r^2$$

$$\frac{1}{2}\,\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\ x + \frac{3}{4}\,s\,\sqrt{4\,r^2 - (3\,s - 2\,x)^2}$$

$$\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\ (3\,s - 2\,y) \geq 4$$

$$(s + 2\,y)\,\sqrt{4\,r^2 - (s + 2\,y)^2} \geq 4\,r^2$$

$$4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right) r^2 +$$

$$3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4\,r^2 - (\right.$$

$$8\,y\,r + 18\,s^2 + 2\,\sqrt{4\,r^2 - (3\,s -$$

$$4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right) r^2 + 4\,s\,r +$$

$$4\,s\,x + 8\,x\,y + 3\,s\,\sqrt{4\,r^2 - (3\,s$$

$$2\,\pi\,r^2 + 6\,s^2 + 2\,\sqrt{4\,r^2 - (3\,s - 2$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 + 12\,s\,r +$$

$$(s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2\,x)^2}\right.$$

$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right) \wedge$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 + 4\,(s + 2$$

$$(s + 2\,x)\,\sqrt{4\,r^2 - (s + 2\,x)^2} <$$

$$2\left(\pi\,r^2 + (s + 2\,x)\,(s + 2\,y)\right)$$

$$\frac{1}{8}\left(8\,\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right) r^2 + 4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right) r^2 +\right.$$

$$\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\ (3\,s - 2\,x) \geq 4\,r$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+8sr+16yr-8s^2-2\sqrt{4r^2-(3s-2x)^2}\;x-16sy+3s\sqrt{4r^2-(3s-2x)^2}\;-s\sqrt{4r^2-(s+2x)^2}\;-2x\sqrt{4r^2-(s+2x)^2}\Bigg)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+24sr-16yr-24s^2-2\sqrt{4r^2-(3s-2x)^2}\;x+16sy+3s\sqrt{4r^2-(3s-2x)^2}\;-s\sqrt{4r^2-(s+2x)^2}\;-2x\sqrt{4r^2-(s+2x)^2}\Bigg)$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;<4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;<4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$($$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-20s^2+8sx-2\sqrt{4r^2-(3s-2x)^2}\,x+8sy-16xy+3s\sqrt{4r^2-(3s-2x)^2}-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}\right)$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2x)^2}\right)\geq 2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r^2(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4r^2(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2x)\sqrt{4r^2-(s+2x)^2}<2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-12s^2-8sx-2\sqrt{4r^2-(3s-2x)^2}\,x-\right.$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r^2(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4r^2(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$\text{ConditionalExpression}\Bigg[\begin{cases}
\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 + 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 + 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 - 4\pi r^2 + 8sr + 16yr - 8s^2 + 2\sqrt{4r^2-(3s-2x)^2}\,x - 16sy - 3s\sqrt{4r^2-(3s-2x)^2} - s\sqrt{4r^2-(s+2x)^2} - 2x\sqrt{4r^2-(s+2x)^2}\right) & \\
\end{cases}$$

$$\begin{cases}
8sy + 16xy + 3s\sqrt{4r^2-(3s-2x)^2} - s\sqrt{4r^2-(s+2x)^2} - 2x\sqrt{4r^2-(s+2x)^2}\right) & \\
\end{cases}$$

$$\begin{cases}
4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 + 3s\left(4r+4x+4y+\sqrt{4r^2-(\right. & \\
8yr+18s^2+2\sqrt{4r^2-(3s- & \\
4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 + 4sr + & \\
4sx+8xy+3s\sqrt{4r^2-(3s & \\
2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2 & \\
4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 + 12sr + & \\
(s+2x)\left(4y+\sqrt{4r^2-(s+2 & \\
2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge & \\
4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 + 4(s+2 & \\
(s+2x)\sqrt{4r^2-(s+2x)^2} \geq & \\
2\left(\pi r^2+(s+2x)(s+2y)\right) & \\
\sqrt{4r^2-(3s-2x)^2}\,(3s-2x) < 4r & \\
(s+2x)\sqrt{4r^2-(s+2x)^2} < 4r^2 & \\
\sqrt{4r^2-(3s-2y)^2}\,(3s-2y) \geq 4 & \\
(s+2y)\sqrt{4r^2-(s+2y)^2} \geq 4r^2 & \\
4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 + & \\
3s\left(4r+4x+4y+\sqrt{4r^2-(\right. & \\
8yr+18s^2+2\sqrt{4r^2-(3s- & \\
4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 + 4sr + & \\
4sx+8xy+3s\sqrt{4r^2-(3s & \\
2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2 & \\
4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 + 12sr + & \\
(s+2x)\left(4y+\sqrt{4r^2-(s+2 & \\
\end{cases}$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+24sr-16yr-24s^2+2\sqrt{4r^2-(3s-2x)^2}\,x+16sy-3s\sqrt{4r^2-(3s-2x)^2}-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}\right)$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2x)\sqrt{4r^2-(s+2x)^2}<2\left(\pi r^2+(s+2x)(s+2y)\right)\wedge\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2\wedge\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2\wedge 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-20s^2+8sx+2\sqrt{4r^2-(3s-2x)^2}\,x+\right.$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2\wedge\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2\wedge 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+\left(\right.$$

$$8\,s\,y - 16\,x\,y - 3\,s\,\sqrt{4\,r^2 - (3\,s - 2\,x)^2} -$$
$$s\,\sqrt{4\,r^2 - (s + 2\,x)^2} - 2\,x\,\sqrt{4\,r^2 - (s + 2\,x)^2}\Bigg)$$

$$3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4\,r^2 - (\right.$$
$$8\,y\,r + 18\,s^2 + 2\,\sqrt{4\,r^2 - (3\,s -}$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 + 4\,s\,r +$$
$$4\,s\,x + 8\,x\,y + 3\,s\,\sqrt{4\,r^2 - (3\,s}$$
$$2\,\pi\,r^2 + 6\,s^2 + 2\,\sqrt{4\,r^2 - (3\,s - 2}$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 12\,s\,r +$$
$$(s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2\right.$$
$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 4\,(s + 2$$
$$(s + 2\,x)\,\sqrt{4\,r^2 - (s + 2\,x)^2} <$$
$$2\left(\pi\,r^2 + (s + 2\,x)\,(s + 2\,y)\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2 +$$
$$8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 + 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 +$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 - 4\,\pi\,r^2 + 16\,s\,r -$$
$$12\,s^2 - 8\,s\,x + 2\,\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;x -$$
$$8\,s\,y + 16\,x\,y - 3\,s\,\sqrt{4\,r^2 - (3\,s - 2\,x)^2} -$$
$$s\,\sqrt{4\,r^2 - (s + 2\,x)^2} - 2\,x\,\sqrt{4\,r^2 - (s + 2\,x)^2}\Bigg)$$

$$\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;(3\,s - 2\,x) < 4\,r$$
$$(s + 2\,x)\,\sqrt{4\,r^2 - (s + 2\,x)^2} < 4\,r^2$$
$$\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;(3\,s - 2\,y) \geq 4$$
$$(s + 2\,y)\,\sqrt{4\,r^2 - (s + 2\,y)^2} \geq 4\,r^2$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 +$$
$$3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4\,r^2 - (\right.$$
$$8\,y\,r + 18\,s^2 + 2\,\sqrt{4\,r^2 - (3\,s -}$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 + 4\,s\,r +$$
$$4\,s\,x + 8\,x\,y + 3\,s\,\sqrt{4\,r^2 - (3\,s}$$
$$2\,\pi\,r^2 + 6\,s^2 + 2\,\sqrt{4\,r^2 - (3\,s - 2}$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 12\,s\,r +$$
$$(s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2\right.$$
$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 4\,(s + 2$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-16s^2-2\sqrt{4r^2-(3s-2x)^2}\,x+2\sqrt{4r^2-(3s-2y)^2}\,y+3s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-3s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-\pi r^2+4sr-4s^2+\frac{1}{2}\sqrt{4r^2-(3s-2y)^2}\,y+\frac{1}{4}s\sqrt{4r^2-(s+2x)^2}+\frac{1}{2}x\sqrt{4r^2-(s+2x)^2}-\frac{3}{4}s\sqrt{4r^2-(3s-2y)^2}$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\right.$$ $$r^2+4sr+$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-\pi r^2+4sr-4s^2-$$

$$\frac{1}{2}\sqrt{4r^2-(3s-2x)^2}\,x+\frac{1}{2}\sqrt{4r^2-(3s-2y)^2}\,y+$$

$$\frac{3}{4}s\sqrt{4r^2-(3s-2x)^2}-\frac{3}{4}s\sqrt{4r^2-(3s-2y)^2}$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$

$$\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right) r^2 + \tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 +$$

$$\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 - \pi r^2 + 4sr - 4s^2 +$$

$$\frac{1}{2}\sqrt{4r^2-(3s-2y)^2}\; y - \frac{3}{4} s \sqrt{4r^2-(3s-2y)^2}$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right) r^2 + 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 + \right.$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 - 4\pi r^2 + 8sr +$$

$$16yr - 8s^2 - 2\sqrt{4r^2-(3s-2x)^2}\; x -$$

$$16sy + 4\sqrt{4r^2-(3s-2y)^2}\; y +$$

$$3s\sqrt{4r^2-(3s-2x)^2} + s\sqrt{4r^2-(s+2x)^2} +$$

$$\left. 2x\sqrt{4r^2-(s+2x)^2} - 6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2} < 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y) < 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2} \geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 +$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr + 18s^2 + 2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 + 4sr +$$

$$4sx + 8xy + 3s\sqrt{4r^2-(3s}$$

$$2\pi r^2 + 6s^2 + 2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 + 12sr +$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.$$

$$2\left(\pi r^2 + 4yr + 3s^2 + 6sx\right) \wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 + 4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2} <$$

$$2\left(\pi r^2 + (s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x) \geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y) < 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2} \geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 +$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr + 18s^2 + 2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 + 4sr +$$

$$4sx + 8xy + 3s\sqrt{4r^2-(3s}$$

$$2\pi r^2 + 6s^2 + 2\sqrt{4r^2-(3s-2}$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+24sr-16yr-24s^2-2\sqrt{4r^2-(3s-2x)^2}\,x+16sy+4\sqrt{4r^2-(3s-2y)^2}\,y+3s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<2\left(\pi r^2+(s+2x)(s+2y)\right)\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-\right.$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4$$

$$20 s^2 + 8 s x - 2 \sqrt{4 r^2 - (3 s - 2 x)^2}\ x +$$
$$8 s y - 16 x y + 4 \sqrt{4 r^2 - (3 s - 2 y)^2}\ y +$$
$$3 s \sqrt{4 r^2 - (3 s - 2 x)^2}\ + s \sqrt{4 r^2 - (s + 2 x)^2}\ +$$
$$2 x \sqrt{4 r^2 - (s + 2 x)^2}\ - 6 s \sqrt{4 r^2 - (3 s - 2 y)^2}\ \Bigg)$$

$$\frac{1}{8}\left(8 \cos^{-1}\left(\frac{\frac{3 s}{2} - y}{r}\right) r^2 + 4 \tan^{-1}\left(\frac{3 s - 2 x}{\sqrt{4 r^2 - (3 s - 2 x)^2}}\right) r^2 +\right.$$
$$4 \tan^{-1}\left(\frac{s + 2 x}{\sqrt{4 r^2 - (s + 2 x)^2}}\right) r^2 - 4 \pi r^2 + 16 s r -$$
$$12 s^2 - 8 s x - 2 \sqrt{4 r^2 - (3 s - 2 x)^2}\ x -$$
$$8 s y + 16 x y + 4 \sqrt{4 r^2 - (3 s - 2 y)^2}\ y +$$
$$3 s \sqrt{4 r^2 - (3 s - 2 x)^2}\ + s \sqrt{4 r^2 - (s + 2 x)^2}\ +$$
$$\left. 2 x \sqrt{4 r^2 - (s + 2 x)^2}\ - 6 s \sqrt{4 r^2 - (3 s - 2 y)^2}\ \right)$$

$$(s + 2 y) \sqrt{4 r^2 - (s + 2 y)^2}\ \geq 4 r^2$$
$$4 \tan^{-1}\left(\frac{3 s - 2 x}{\sqrt{4 r^2 - (3 s - 2 x)^2}}\right) r^2 +$$
$$3 s \left(4 r + 4 x + 4 y + \sqrt{4 r^2 - (\right.$$
$$8 y r + 18 s^2 + 2 \sqrt{4 r^2 - (3 s -$$
$$4 \tan^{-1}\left(\frac{3 s - 2 x}{\sqrt{4 r^2 - (3 s - 2 x)^2}}\right) r^2 + 4 s r +$$
$$4 s x + 8 x y + 3 s \sqrt{4 r^2 - (3 s$$
$$2 \pi r^2 + 6 s^2 + 2 \sqrt{4 r^2 - (3 s - 2$$
$$4 \tan^{-1}\left(\frac{s + 2 x}{\sqrt{4 r^2 - (s + 2 x)^2}}\right) r^2 + 12 s r +$$
$$(s + 2 x) \left(4 y + \sqrt{4 r^2 - (s + 2\right.$$
$$2 \left(\pi r^2 + 4 y r + 3 s^2 + 6 s x\right) \wedge$$
$$4 \tan^{-1}\left(\frac{s + 2 x}{\sqrt{4 r^2 - (s + 2 x)^2}}\right) r^2 + 4 (s + 2$$
$$(s + 2 x) \sqrt{4 r^2 - (s + 2 x)^2}\ <$$
$$2 \left(\pi r^2 + (s + 2 x) (s + 2 y)\right)$$
$$\sqrt{4 r^2 - (3 s - 2 x)^2}\ (3 s - 2 x) \geq 4 r$$
$$(s + 2 x) \sqrt{4 r^2 - (s + 2 x)^2}\ \geq 4 r^2$$
$$\sqrt{4 r^2 - (3 s - 2 y)^2}\ (3 s - 2 y) < 4$$
$$(s + 2 y) \sqrt{4 r^2 - (s + 2 y)^2}\ \geq 4 r^2$$
$$4 \tan^{-1}\left(\frac{3 s - 2 x}{\sqrt{4 r^2 - (3 s - 2 x)^2}}\right) r^2 +$$
$$3 s \left(4 r + 4 x + 4 y + \sqrt{4 r^2 - (\right.$$
$$8 y r + 18 s^2 + 2 \sqrt{4 r^2 - (3 s -$$
$$4 \tan^{-1}\left(\frac{3 s - 2 x}{\sqrt{4 r^2 - (3 s - 2 x)^2}}\right) r^2 + 4 s r +$$
$$4 s x + 8 x y + 3 s \sqrt{4 r^2 - (3 s$$
$$2 \pi r^2 + 6 s^2 + 2 \sqrt{4 r^2 - (3 s - 2$$
$$4 \tan^{-1}\left(\frac{s + 2 x}{\sqrt{4 r^2 - (s + 2 x)^2}}\right) r^2 + 12 s r +$$
$$(s + 2 x) \left(4 y + \sqrt{4 r^2 - (s + 2\right.$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+8sr+16yr-8s^2+2\sqrt{4r^2-(3s-2x)^2}\,x-16sy+4\sqrt{4r^2-(3s-2y)^2}\,y-3s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+24sr-16yr-24s^2+2\sqrt{4r^2-(3s-2x)^2}\,x+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$
$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)<4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)<4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ <$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$
$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)<4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)<4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$16\,s\,y+4\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y-$$
$$3\,s\sqrt{4\,r^2-(3\,s-2\,x)^2}+s\sqrt{4\,r^2-(s+2\,x)^2}+$$
$$2\,x\sqrt{4\,r^2-(s+2\,x)^2}-6\,s\sqrt{4\,r^2-(3\,s-2\,y)^2}\Bigg)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2+$$
$$8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-4\,\pi\,r^2+16\,s\,r-$$
$$20\,s^2+8\,s\,x+2\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+$$
$$8\,s\,y-16\,x\,y+4\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y-$$
$$3\,s\sqrt{4\,r^2-(3\,s-2\,x)^2}+s\sqrt{4\,r^2-(s+2\,x)^2}+$$
$$2\,x\sqrt{4\,r^2-(s+2\,x)^2}-6\,s\sqrt{4\,r^2-(3\,s-2\,y)^2}\Bigg)$$

$$3\,s\Big(4\,r+4\,x+4\,y+\sqrt{4\,r^2-($$
$$8\,y\,r+18\,s^2+2\sqrt{4\,r^2-(3\,s-$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$
$$4\,s\,x+8\,x\,y+3\,s\sqrt{4\,r^2-(3\,s$$
$$2\,\pi\,r^2+6\,s^2+2\sqrt{4\,r^2-(3\,s-2$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$
$$(s+2\,x)\Big(4\,y+\sqrt{4\,r^2-(s+2$$
$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$
$$(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;\geq$$
$$2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$
$$\sqrt{4\,r^2-(3\,s-2\,x)^2}\;(3\,s-2\,x)<4\,r$$
$$(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;\geq 4\,r^2$$
$$\sqrt{4\,r^2-(3\,s-2\,y)^2}\;(3\,s-2\,y)<4$$
$$(s+2\,y)\sqrt{4\,r^2-(s+2\,y)^2}\;\geq 4\,r^2$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$
$$3\,s\Big(4\,r+4\,x+4\,y+\sqrt{4\,r^2-(}$$
$$8\,y\,r+18\,s^2+2\sqrt{4\,r^2-(3\,s-$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$
$$4\,s\,x+8\,x\,y+3\,s\sqrt{4\,r^2-(3\,s$$
$$2\,\pi\,r^2+6\,s^2+2\sqrt{4\,r^2-(3\,s-2$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$
$$(s+2\,x)\Big(4\,y+\sqrt{4\,r^2-(s+2$$
$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$

$$\left(\sqrt{4r^2-(s+2x)^2}\right)$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2} <$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+\right.$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)<4r$$

$$8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)<4$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2$$

$$12s^2-8sx+2\sqrt{4r^2-(3s-2x)^2}\ x-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$8sy+16xy+4\sqrt{4r^2-(3s-2y)^2}\ y-$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$3s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$\left.2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+\right.$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4r$$

$$8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ <4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)<4$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+8sr+$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2$$

$$16yr-8s^2-2\sqrt{4r^2-(3s-2x)^2}\ x-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$16sy+4\sqrt{4r^2-(3s-2y)^2}\ y+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$3s\sqrt{4r^2-(3s-2x)^2}\ -s\sqrt{4r^2-(s+2x)^2}\ -$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$2\,x\,\sqrt{4\,r^2-(s+2\,x)^2}\;-6\,s\,\sqrt{4\,r^2-(3\,s-2\,y)^2}\;\Bigg)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+\right.$$

$$8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-4\,\pi\,r^2+24\,s\,r-$$

$$16\,y\,r-24\,s^2-2\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+$$

$$16\,s\,y+4\,\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y+$$

$$3\,s\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;-s\,\sqrt{4\,r^2-(s+2\,x)^2}\;-$$

$$\left.2\,x\,\sqrt{4\,r^2-(s+2\,x)^2}\;-6\,s\,\sqrt{4\,r^2-(3\,s-2\,y)^2}\;\right)$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$

$$4\,s\,x+8\,x\,y+3\,s\,\sqrt{4\,r^2-(3\,s$$

$$2\,\pi\,r^2+6\,s^2+2\,\sqrt{4\,r^2-(3\,s-2$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$

$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2$$

$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$

$$(s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2}\;<$$

$$2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$

$$\sqrt{4\,r^2-(3\,s-2\,x)^2}\;(3\,s-2\,x)\geq 4\,r$$

$$(s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2}\;<4\,r^2$$

$$\sqrt{4\,r^2-(3\,s-2\,y)^2}\;(3\,s-2\,y)<4$$

$$(s+2\,y)\,\sqrt{4\,r^2-(s+2\,y)^2}\;\geq 4\,r^2$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$

$$3\,s\left(4\,r+4\,x+4\,y+\sqrt{4\,r^2-(}\right.$$

$$8\,y\,r+18\,s^2+2\,\sqrt{4\,r^2-(3\,s-$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$

$$4\,s\,x+8\,x\,y+3\,s\,\sqrt{4\,r^2-(3\,s$$

$$2\,\pi\,r^2+6\,s^2+2\,\sqrt{4\,r^2-(3\,s-2$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$

$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2$$

$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$

$$(s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2}\;\geq$$

$$2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+\right.$$

$$8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-$$

$$20s^2+8sx-2\sqrt{4r^2-(3s-2x)^2}\;x+$$

$$8sy-16xy+4\sqrt{4r^2-(3s-2y)^2}\;y+$$

$$3s\sqrt{4r^2-(3s-2x)^2}\;-s\sqrt{4r^2-(s+2x)^2}\;-$$

$$\left.2x\sqrt{4r^2-(s+2x)^2}\;-6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;<4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+\right.$$

$$8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-$$

$$12s^2-8sx-2\sqrt{4r^2-(3s-2x)^2}\;x-$$

$$8sy+16xy+4\sqrt{4r^2-(3s-2y)^2}\;y+$$

$$3s\sqrt{4r^2-(3s-2x)^2}\;-s\sqrt{4r^2-(s+2x)^2}\;-$$

$$\left.2x\sqrt{4r^2-(s+2x)^2}\;-6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;<4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+8sr+16yr-8s^2+2\sqrt{4r^2-(3s-2x)^2}\,x-16sy+4\sqrt{4r^2-(3s-2y)^2}\,y-3s\sqrt{4r^2-(3s-2x)^2}-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$
$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s}$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$
$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$

$$\left(\sqrt{4r^2-(3s-2x)^2}\right)$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 - 4\pi r^2 + 24sr -$$
$$16yr - 24s^2 + 2\sqrt{4r^2-(3s-2x)^2}\,x +$$
$$16sy + 4\sqrt{4r^2-(3s-2y)^2}\,y -$$
$$3s\sqrt{4r^2-(3s-2x)^2} - s\sqrt{4r^2-(s+2x)^2} -$$
$$2x\sqrt{4r^2-(s+2x)^2} - 6s\sqrt{4r^2-(3s-2y)^2}\Bigg)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 +$$
$$8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2 + 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 +$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 - 4\pi r^2 + 16sr -$$
$$20s^2 + 8sx + 2\sqrt{4r^2-(3s-2x)^2}\,x +$$
$$8sy - 16xy + 4\sqrt{4r^2-(3s-2y)^2}\,y -$$
$$3s\sqrt{4r^2-(3s-2x)^2} - s\sqrt{4r^2-(s+2x)^2} -$$
$$2x\sqrt{4r^2-(s+2x)^2} - 6s\sqrt{4r^2-(3s-2y)^2}\Bigg)$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y) < 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2} \geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 +$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(}\right.$$
$$8yr + 18s^2 + 2\sqrt{4r^2-(3s-}$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 + 4sr +$$
$$4sx + 8xy + 3s\sqrt{4r^2-(3s}$$
$$2\pi r^2 + 6s^2 + 2\sqrt{4r^2-(3s-2}$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 + 12sr +$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.$$
$$2\left(\pi r^2 + 4yr + 3s^2 + 6sx\right) \wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 + 4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq$$
$$2\left(\pi r^2 + (s+2x)(s+2y)\right)$$
$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x) < 4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2} < 4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y) < 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2} \geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 +$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(}\right.$$
$$8yr + 18s^2 + 2\sqrt{4r^2-(3s-}$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 + 4sr +$$
$$4sx + 8xy + 3s\sqrt{4r^2-(3s}$$
$$2\pi r^2 + 6s^2 + 2\sqrt{4r^2-(3s-2}$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 + 12sr +$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+\right.$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$

$$8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$12s^2-8sx+2\sqrt{4r^2-(3s-2x)^2}\,x-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$8sy+16xy+4\sqrt{4r^2-(3s-2y)^2}\,y-$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$3s\sqrt{4r^2-(3s-2x)^2}-s\sqrt{4r^2-(s+2x)^2}-$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$\left.2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+\right.$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-16s^2-$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$

$$2\sqrt{4r^2-(3s-2x)^2}\,x+3s\sqrt{4r^2-(3s-2x)^2}+$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\quad}\right)r^2+$$

$$s\sqrt{4r^2-(s+2y)^2}-2y\sqrt{4r^2-(s+2y)^2}\Bigg)$$

$$\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-\pi r^2+4sr-4s^2+$$

$$\frac{1}{4}s\sqrt{4r^2-(s+2x)^2}+\frac{1}{2}x\sqrt{4r^2-(s+2x)^2}-$$

$$\frac{1}{4}s\sqrt{4r^2-(s+2y)^2}-\frac{1}{2}y\sqrt{4r^2-(s+2y)^2}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

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$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right) r^2 + \cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right) r^2 + \tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right) r^2 + \tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 - \pi\,r^2 + 4\,s\,r - 4\,s^2 - \frac{1}{2}\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x + \frac{3}{4}\,s\sqrt{4\,r^2-(3\,s-2\,x)^2} - \frac{1}{4}\,s\sqrt{4\,r^2-(s+2\,y)^2} - \frac{1}{2}\,y\sqrt{4\,r^2-(s+2\,y)^2}$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 + 4\,(s+2$$
$$(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2} <$$
$$2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$
$$\sqrt{4\,r^2-(3\,s-2\,x)^2}\;(3\,s-2\,x) \geq 4\,r$$
$$(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2} < 4\,r^2$$
$$\sqrt{4\,r^2-(3\,s-2\,y)^2}\;(3\,s-2\,y) \geq 4$$
$$(s+2\,y)\sqrt{4\,r^2-(s+2\,y)^2} < 4\,r^2$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right) r^2 +$$
$$3\,s\left(4\,r+4\,x+4\,y+\sqrt{4\,r^2-(\right.$$
$$8\,y\,r+18\,s^2+2\sqrt{4\,r^2-(3\,s-$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right) r^2 + 4\,s\,r +$$
$$4\,s\,x+8\,x\,y+3\,s\sqrt{4\,r^2-(3\,s$$
$$2\,\pi\,r^2+6\,s^2+2\sqrt{4\,r^2-(3\,s-2$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 + 12\,s\,r +$$
$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2\right.$$
$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 + 4\,(s+2$$
$$(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2} <$$
$$2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$

$$\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right) r^2 + \cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right) r^2 + \cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right) r^2 + \tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right) r^2 + \tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 - \pi\,r^2 + 4\,s\,r - 4\,s^2 - \frac{1}{4}\,s\sqrt{4\,r^2-(s+2\,y)^2} - \frac{1}{2}\,y\sqrt{4\,r^2-(s+2\,y)^2}$$

$$\sqrt{4\,r^2-(3\,s-2\,x)^2}\;(3\,s-2\,x) < 4\,r$$
$$(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2} < 4\,r^2$$
$$\sqrt{4\,r^2-(3\,s-2\,y)^2}\;(3\,s-2\,y) \geq 4$$
$$(s+2\,y)\sqrt{4\,r^2-(s+2\,y)^2} < 4\,r^2$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right) r^2 +$$
$$3\,s\left(4\,r+4\,x+4\,y+\sqrt{4\,r^2-(\right.$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-16s^2-2\sqrt{4r^2-(3s-2x)^2}\,x+2\sqrt{4r^2-(3s-2y)^2}\,y+3s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-3s\sqrt{4r^2-(3s-2y)^2}-s\sqrt{4r^2-(s+2y)^2}-2y\sqrt{4r^2-(s+2y)^2}\right)$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-16s^2+2\sqrt{4r^2-(3s-2y)^2}\,y+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-3s\sqrt{4r^2-(3s-2y)^2}-s\sqrt{4r^2-(s+2y)^2}-2y\sqrt{4r^2-(s+2y)^2}\right)$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-16s^2-2\sqrt{4r^2-(3s-2x)^2}\,x+2\sqrt{4r^2-(3s-2y)^2}\,y+3s\sqrt{4r^2-(3s-2x)^2}-3s\sqrt{4r^2-(3s-2y)^2}-s\sqrt{4r^2-(s+2y)^2}-2y\sqrt{4r^2-(s+2y)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4\,s\,x + 8\,x\,y + 3\,s\,\sqrt{4\,r^2 - (3\,s$$

$$2\,\pi\,r^2 + 6\,s^2 + 2\,\sqrt{4\,r^2 - (3\,s - 2$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 + 12\,s\,r +$$

$$(s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2$$

$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right) \wedge$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 + 4\,(s + 2$$

$$(s + 2\,x)\,\sqrt{4\,r^2 - (s + 2\,x)^2} <$$

$$2\left(\pi\,r^2 + (s + 2\,x)\,(s + 2\,y)\right)$$

$$\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right) r^2 + \cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right) r^2 + \cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right) r^2 +$$

$$\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;(3\,s - 2\,x) < 4\,r$$

$$\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right) r^2 + \tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right) r^2 +$$

$$(s + 2\,x)\,\sqrt{4\,r^2 - (s + 2\,x)^2} < 4\,r^2$$

$$\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;(3\,s - 2\,y) < 4$$

$$\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 - \pi\,r^2 + 4\,s\,r - 4\,s^2 +$$

$$(s + 2\,y)\,\sqrt{4\,r^2 - (s + 2\,y)^2} < 4\,r^2$$

$$\frac{1}{2}\,\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;y - \frac{3}{4}\,s\,\sqrt{4\,r^2 - (3\,s - 2\,y)^2} -$$

$$4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right) r^2 +$$

$$\frac{1}{4}\,s\,\sqrt{4\,r^2 - (s + 2\,y)^2} - \frac{1}{2}\,y\,\sqrt{4\,r^2 - (s + 2\,y)^2}$$

$$3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4\,r^2 - (\right.$$

$$8\,y\,r + 18\,s^2 + 2\,\sqrt{4\,r^2 - (3\,s -$$

$$4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right) r^2 + 4\,s\,r +$$

$$4\,s\,x + 8\,x\,y + 3\,s\,\sqrt{4\,r^2 - (3\,s$$

$$2\,\pi\,r^2 + 6\,s^2 + 2\,\sqrt{4\,r^2 - (3\,s - 2$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 + 12\,s\,r +$$

$$(s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2$$

$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right) \wedge$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 + 4\,(s + 2$$

$$(s + 2\,x)\,\sqrt{4\,r^2 - (s + 2\,x)^2} <$$

$$2\left(\pi\,r^2 + (s + 2\,x)\,(s + 2\,y)\right)$$

$$\frac{1}{8}\left(8\,\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right) r^2 + 4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right) r^2 +\right.$$

$$\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;(3\,s - 2\,x) \geq 4\,r$$

$$(s + 2\,x)\,\sqrt{4\,r^2 - (s + 2\,x)^2} \geq 4\,r^2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+8sr+16yr-8s^2-2\sqrt{4r^2-(3s-2x)^2}\,x-16sy+3s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\Bigg)$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2(s+2x)\sqrt{4r^2-(s+2x)^2}<2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+24sr-16yr-24s^2-2\sqrt{4r^2-(3s-2x)^2}\,x+16sy+3s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\Bigg)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$\left(\sqrt{4r^2-(s+2x)^2}\right)$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+\right.$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4r$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$

$$20s^2+8sx-2\sqrt{4r^2-(3s-2x)^2}\ x+$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$8sy-16xy+3s\sqrt{4r^2-(3s-2x)^2}\ +$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ <4r^2$$

$$s\sqrt{4r^2-(s+2x)^2}\ +2x\sqrt{4r^2-(s+2x)^2}\ -$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$\left.2s\sqrt{4r^2-(s+2y)^2}\ -4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ <$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+\right.$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4r$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$

$$12s^2-8sx-2\sqrt{4r^2-(3s-2x)^2}\ x-$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ <4r^2$$

$$8\,s\,y + 16\,x\,y + 3\,s\,\sqrt{4\,r^2 - (3\,s - 2\,x)^2} +$$
$$s\,\sqrt{4\,r^2 - (s + 2\,x)^2} + 2\,x\,\sqrt{4\,r^2 - (s + 2\,x)^2} -$$
$$2\,s\,\sqrt{4\,r^2 - (s + 2\,y)^2} - 4\,y\,\sqrt{4\,r^2 - (s + 2\,y)^2}\Bigg)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3\,s}{2} - x}{r}\right) r^2 + \right.$$
$$8\cos^{-1}\left(\frac{\frac{s}{2} + y}{r}\right) r^2 + 4\tan^{-1}\left(\frac{3\,s - 2\,x}{\sqrt{4\,r^2 - (3\,s - 2\,x)^2}}\right) r^2 +$$
$$4\tan^{-1}\left(\frac{s + 2\,x}{\sqrt{4\,r^2 - (s + 2\,x)^2}}\right) r^2 - 4\,\pi\,r^2 + 8\,s\,r +$$
$$16\,y\,r - 8\,s^2 + 2\,\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;x -$$
$$16\,s\,y - 3\,s\,\sqrt{4\,r^2 - (3\,s - 2\,x)^2} +$$
$$s\,\sqrt{4\,r^2 - (s + 2\,x)^2} + 2\,x\,\sqrt{4\,r^2 - (s + 2\,x)^2} -$$
$$2\,s\,\sqrt{4\,r^2 - (s + 2\,y)^2} - 4\,y\,\sqrt{4\,r^2 - (s + 2\,y)^2}\Bigg)$$

$$4\tan^{-1}\left(\frac{3\,s - 2\,x}{\sqrt{4\,r^2 - (3\,s - 2\,x)^2}}\right) r^2 +$$
$$3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4\,r^2 - (\right.$$
$$8\,y\,r + 18\,s^2 + 2\,\sqrt{4\,r^2 - (3\,s -$$
$$4\tan^{-1}\left(\frac{3\,s - 2\,x}{\sqrt{4\,r^2 - (3\,s - 2\,x)^2}}\right) r^2 + 4\,s\,r +$$
$$4\,s\,x + 8\,x\,y + 3\,s\,\sqrt{4\,r^2 - (3\,s$$
$$2\,\pi\,r^2 + 6\,s^2 + 2\,\sqrt{4\,r^2 - (3\,s - 2$$
$$4\tan^{-1}\left(\frac{s + 2\,x}{\sqrt{4\,r^2 - (s + 2\,x)^2}}\right) r^2 + 12\,s\,r +$$
$$(s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2\right.$$
$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right) \wedge$$
$$4\tan^{-1}\left(\frac{s + 2\,x}{\sqrt{4\,r^2 - (s + 2\,x)^2}}\right) r^2 + 4\,(s + 2$$
$$(s + 2\,x)\,\sqrt{4\,r^2 - (s + 2\,x)^2} \geq$$
$$2\left(\pi\,r^2 + (s + 2\,x)\,(s + 2\,y)\right)$$
$$\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;(3\,s - 2\,x) < 4\,r$$
$$(s + 2\,x)\,\sqrt{4\,r^2 - (s + 2\,x)^2} \geq 4\,r^2$$
$$\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;(3\,s - 2\,y) \geq 4$$
$$(s + 2\,y)\,\sqrt{4\,r^2 - (s + 2\,y)^2} < 4\,r^2$$
$$4\tan^{-1}\left(\frac{3\,s - 2\,x}{\sqrt{4\,r^2 - (3\,s - 2\,x)^2}}\right) r^2 +$$
$$3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4\,r^2 - (\right.$$
$$8\,y\,r + 18\,s^2 + 2\,\sqrt{4\,r^2 - (3\,s -$$
$$4\tan^{-1}\left(\frac{3\,s - 2\,x}{\sqrt{4\,r^2 - (3\,s - 2\,x)^2}}\right) r^2 + 4\,s\,r +$$
$$4\,s\,x + 8\,x\,y + 3\,s\,\sqrt{4\,r^2 - (3\,s$$
$$2\,\pi\,r^2 + 6\,s^2 + 2\,\sqrt{4\,r^2 - (3\,s - 2$$
$$4\tan^{-1}\left(\frac{s + 2\,x}{\sqrt{4\,r^2 - (s + 2\,x)^2}}\right) r^2 + 12\,s\,r +$$
$$(s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2\right.$$
$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right) \wedge$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+24sr-16yr-24s^2+2\sqrt{4r^2-(3s-2x)^2}\,x+16sy-3s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-20s^2+8sx+2\sqrt{4r^2-(3s-2x)^2}\,x+8sy-16xy-3s\sqrt{4r^2-(3s-2x)^2}+\right.$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\Big)$$

$$\frac{1}{8}\Big(8\cos^{-1}\Big(\frac{\frac{3s}{2}-x}{r}\Big)r^2+8\cos^{-1}\Big(\frac{\frac{s}{2}+y}{r}\Big)r^2+4\tan^{-1}\Big(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\Big)r^2+4\tan^{-1}\Big(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\Big)r^2-4\pi r^2+16sr-12s^2-8sx+2\sqrt{4r^2-(3s-2x)^2}\,x-8sy+16xy-3s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\Big)$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\Big(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\Big)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\Big(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\Big)r^2+12sr+$$
$$(s+2x)\Big(4y+\sqrt{4r^2-(s+2$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\Big(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\Big)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$
$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$
$$4\tan^{-1}\Big(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\Big)r^2+$$
$$3s\Big(4r+4x+4y+\sqrt{4r^2-($$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\Big(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\Big)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\Big(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\Big)r^2+12sr+$$
$$(s+2x)\Big(4y+\sqrt{4r^2-(s+2$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\Big(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\Big)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+\right.$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4r$$

$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ <4r^2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+8sr+$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$16yr-8s^2-2\sqrt{4r^2-(3s-2x)^2}\ x-$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ <4r^2$$

$$16sy+3s\sqrt{4r^2-(3s-2x)^2}\ -$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$s\sqrt{4r^2-(s+2x)^2}\ -2x\sqrt{4r^2-(s+2x)^2}\ -$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$2s\sqrt{4r^2-(s+2y)^2}\ -4y\sqrt{4r^2-(s+2y)^2}\left.\right)$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ <$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+\right.$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4r$$

$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ <4r^2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+24sr-$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$16yr-24s^2-2\sqrt{4r^2-(3s-2x)^2}\ x+$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ <4r^2$$

$$16sy+3s\sqrt{4r^2-(3s-2x)^2}\ -$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$s\sqrt{4r^2-(s+2x)^2}\ -2x\sqrt{4r^2-(s+2x)^2}\ -$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$2s\sqrt{4r^2-(s+2y)^2}\ -4y\sqrt{4r^2-(s+2y)^2}\left.\right)$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+\right.$$

$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-$$

$$20s^2+8sx-2\sqrt{4r^2-(3s-2x)^2}\,x+$$

$$8sy-16xy+3s\sqrt{4r^2-(3s-2x)^2}\,-$$

$$s\sqrt{4r^2-(s+2x)^2}\,-2x\sqrt{4r^2-(s+2x)^2}\,-$$

$$\left.2s\sqrt{4r^2-(s+2y)^2}\,-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;<4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+\right.\qquad\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)\geq 4r$$

$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-$$
$$12s^2-8sx-2\sqrt{4r^2-(3s-2x)^2}\,x-$$
$$8sy+16xy+3s\sqrt{4r^2-(3s-2x)^2}\,-$$
$$s\sqrt{4r^2-(s+2x)^2}\,-2x\sqrt{4r^2-(s+2x)^2}\,-$$
$$2s\sqrt{4r^2-(s+2y)^2}\,-4y\sqrt{4r^2-(s+2y)^2}\,\Bigg)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+$$
$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+8sr+$$
$$16yr-8s^2+2\sqrt{4r^2-(3s-2x)^2}\,x-$$
$$16sy-3s\sqrt{4r^2-(3s-2x)^2}\,-$$
$$s\sqrt{4r^2-(s+2x)^2}\,-2x\sqrt{4r^2-(s+2x)^2}\,-$$
$$2s\sqrt{4r^2-(s+2y)^2}\,-4y\sqrt{4r^2-(s+2y)^2}\,\Bigg)$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;<4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;<4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)<4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;<4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;<4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+24sr-16yr-24s^2+2\sqrt{4r^2-(3s-2x)^2}\,x+16sy-3s\sqrt{4r^2-(3s-2x)^2}-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$
$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+\right.$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-$$
$$20s^2+8sx+2\sqrt{4r^2-(3s-2x)^2}\;x+$$
$$8sy-16xy-3s\sqrt{4r^2-(3s-2x)^2}\;-$$
$$s\sqrt{4r^2-(s+2x)^2}\;-2x\sqrt{4r^2-(s+2x)^2}\;-$$
$$2s\sqrt{4r^2-(s+2y)^2}\;-4y\sqrt{4r^2-(s+2y)^2}\;\Bigg)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+$$
$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-$$
$$12s^2-8sx+2\sqrt{4r^2-(3s-2x)^2}\;x-$$
$$8sy+16xy-3s\sqrt{4r^2-(3s-2x)^2}\;-$$
$$s\sqrt{4r^2-(s+2x)^2}\;-2x\sqrt{4r^2-(s+2x)^2}\;-$$
$$2s\sqrt{4r^2-(s+2y)^2}\;-4y\sqrt{4r^2-(s+2y)^2}\;\Bigg)$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;<$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$
$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)<4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;<4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;<4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+8sr+16yr-8s^2-2\sqrt{4r^2-(3s-2x)^2}\,x-16sy+4\sqrt{4r^2-(3s-2y)^2}\,y+3s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 2\left(\pi r^2+(s+2x)(s+2y)\right)\wedge\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r^2+(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2+\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4r^2+(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2x)\sqrt{4r^2-(s+2x)^2}<2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+24sr-16yr-24s^2-2\sqrt{4r^2-(3s-2x)^2}\,x+\right.$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r^2+(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2+\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4r^2+(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$16\,s\,y + 4\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;y +$$
$$3\,s\sqrt{4\,r^2 - (3\,s - 2\,x)^2} + s\sqrt{4\,r^2 - (s + 2\,x)^2} +$$
$$2\,x\sqrt{4\,r^2 - (s + 2\,x)^2} - 6\,s\sqrt{4\,r^2 - (3\,s - 2\,y)^2} -$$
$$2\,s\sqrt{4\,r^2 - (s + 2\,y)^2} - 4\,y\sqrt{4\,r^2 - (s + 2\,y)^2}\Bigg)$$

$$3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4\,r^2 - (\right.$$
$$8\,y\,r + 18\,s^2 + 2\sqrt{4\,r^2 - (3\,s -$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 + 4\,s\,r +$$
$$4\,s\,x + 8\,x\,y + 3\,s\sqrt{4\,r^2 - (3\,s$$
$$2\,\pi\,r^2 + 6\,s^2 + 2\sqrt{4\,r^2 - (3\,s - 2$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 12\,s\,r +$$
$$(s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2\right.$$
$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right) \wedge$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 4\,(s + 2$$
$$(s + 2\,x)\sqrt{4\,r^2 - (s + 2\,x)^2} \geq$$
$$2\left(\pi\,r^2 + (s + 2\,x)\,(s + 2\,y)\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2 +$$
$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2 + 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 +$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 - 4\,\pi\,r^2 + 16\,s\,r -$$
$$20\,s^2 + 8\,s\,x - 2\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;x +$$
$$8\,s\,y - 16\,x\,y + 4\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;y +$$
$$3\,s\sqrt{4\,r^2 - (3\,s - 2\,x)^2} + s\sqrt{4\,r^2 - (s + 2\,x)^2} +$$
$$2\,x\sqrt{4\,r^2 - (s + 2\,x)^2} - 6\,s\sqrt{4\,r^2 - (3\,s - 2\,y)^2} -$$
$$2\,s\sqrt{4\,r^2 - (s + 2\,y)^2} - 4\,y\sqrt{4\,r^2 - (s + 2\,y)^2}\Bigg)$$

$$\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;(3\,s - 2\,x) \geq 4\,r$$
$$(s + 2\,x)\sqrt{4\,r^2 - (s + 2\,x)^2} \geq 4\,r^2$$
$$\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;(3\,s - 2\,y) < 4$$
$$(s + 2\,y)\sqrt{4\,r^2 - (s + 2\,y)^2} < 4\,r^2$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 +$$
$$3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4\,r^2 - (\right.$$
$$8\,y\,r + 18\,s^2 + 2\sqrt{4\,r^2 - (3\,s -$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 + 4\,s\,r +$$
$$4\,s\,x + 8\,x\,y + 3\,s\sqrt{4\,r^2 - (3\,s$$
$$2\,\pi\,r^2 + 6\,s^2 + 2\sqrt{4\,r^2 - (3\,s - 2$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 12\,s\,r +$$
$$(s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2\right.$$
$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right) \wedge$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 4\,(s + 2$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-12s^2-8sx-2\sqrt{4r^2-(3s-2x)^2}\,x-8sy+16xy+4\sqrt{4r^2-(3s-2y)^2}\,y+3s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+8sr+16yr-8s^2+2\sqrt{4r^2-(3s-2x)^2}\,x-16sy+4\sqrt{4r^2-(3s-2y)^2}\,y-3s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-\right.$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\right.$$

$$2\,s\,\sqrt{4\,r^2-(s+2\,y)^2}\;-4\,y\,\sqrt{4\,r^2-(s+2\,y)^2}\;\Bigg)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\!\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2+8\cos^{-1}\!\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+$$

$$8\cos^{-1}\!\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\!\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$

$$4\tan^{-1}\!\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-4\,\pi\,r^2+24\,s\,r-$$

$$16\,y\,r-24\,s^2+2\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+$$

$$16\,s\,y+4\,\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y-$$

$$3\,s\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;+s\,\sqrt{4\,r^2-(s+2\,x)^2}\;+$$

$$2\,x\,\sqrt{4\,r^2-(s+2\,x)^2}\;-6\,s\,\sqrt{4\,r^2-(3\,s-2\,y)^2}\;-$$

$$2\,s\,\sqrt{4\,r^2-(s+2\,y)^2}\;-4\,y\,\sqrt{4\,r^2-(s+2\,y)^2}\;\Bigg)$$

$$4\tan^{-1}\!\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$

$$3\,s\left(4\,r+4\,x+4\,y+\sqrt{4\,r^2-(\right.$$

$$8\,y\,r+18\,s^2+2\,\sqrt{4\,r^2-(3\,s-}$$

$$4\tan^{-1}\!\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$

$$4\,s\,x+8\,x\,y+3\,s\,\sqrt{4\,r^2-(3\,s}$$

$$2\,\pi\,r^2+6\,s^2+2\,\sqrt{4\,r^2-(3\,s-2}$$

$$4\tan^{-1}\!\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$

$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2\right.$$

$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge$$

$$4\tan^{-1}\!\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$

$$(s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2}\;<$$

$$2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$

$$\sqrt{4\,r^2-(3\,s-2\,x)^2}\;(3\,s-2\,x)<4\,r$$

$$(s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2}\;\geq 4\,r^2$$

$$\sqrt{4\,r^2-(3\,s-2\,y)^2}\;(3\,s-2\,y)<4$$

$$(s+2\,y)\,\sqrt{4\,r^2-(s+2\,y)^2}\;<4\,r^2$$

$$4\tan^{-1}\!\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$

$$3\,s\left(4\,r+4\,x+4\,y+\sqrt{4\,r^2-(\right.$$

$$8\,y\,r+18\,s^2+2\,\sqrt{4\,r^2-(3\,s-}$$

$$4\tan^{-1}\!\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$

$$4\,s\,x+8\,x\,y+3\,s\,\sqrt{4\,r^2-(3\,s}$$

$$2\,\pi\,r^2+6\,s^2+2\,\sqrt{4\,r^2-(3\,s-2}$$

$$4\tan^{-1}\!\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$

$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2\right.$$

$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge$$

$$4\tan^{-1}\!\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$

$$(s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2}\;\geq$$

$$2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\!\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2+8\cos^{-1}\!\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+$$

$$\sqrt{4\,r^2-(3\,s-2\,x)^2}\;(3\,s-2\,x)<4\,r$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+\right.$$

$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-$$

$$12s^2-8sx+2\sqrt{4r^2-(3s-2x)^2}\,x-$$

$$8sy+16xy+4\sqrt{4r^2-(3s-2y)^2}\,y-$$

$$3s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+$$

$$2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-$$

$$\left.2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+8sr+16yr-8s^2-2\sqrt{4r^2-(3s-2x)^2}\,x-16sy+4\sqrt{4r^2-(3s-2y)^2}\,y+3s\sqrt{4r^2-(3s-2x)^2}-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ <4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ <4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ <$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ <4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)<4$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+24sr-16yr-24s^2-2\sqrt{4r^2-(3s-2x)^2}\,x+16sy+4\sqrt{4r^2-(3s-2y)^2}\,y+3s\sqrt{4r^2-(3s-2x)^2}-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\Bigg)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-20s^2+8sx-2\sqrt{4r^2-(3s-2x)^2}\,x+8sy-16xy+4\sqrt{4r^2-(3s-2y)^2}\,y+3s\sqrt{4r^2-(3s-2x)^2}-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\Bigg)$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(}\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(}\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-12s^2-8sx-2\sqrt{4r^2-(3s-2x)^2}\,x-8sy+16xy+4\sqrt{4r^2-(3s-2y)^2}\,y+3s\sqrt{4r^2-(3s-2x)^2}-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+8sr+16yr-8s^2+2\sqrt{4r^2-(3s-2x)^2}\,x-\right.$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2x)^2}\right)+2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2x)\sqrt{4r^2-(s+2x)^2}<2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4r(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4r(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$
\begin{aligned}
&16\,s\,y+4\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y-\\
&3\,s\sqrt{4\,r^2-(3\,s-2\,x)^2}\;-s\sqrt{4\,r^2-(s+2\,x)^2}\;-\\
&2\,x\sqrt{4\,r^2-(s+2\,x)^2}\;-6\,s\sqrt{4\,r^2-(3\,s-2\,y)^2}\;-\\
&2\,s\sqrt{4\,r^2-(s+2\,y)^2}\;-4\,y\sqrt{4\,r^2-(s+2\,y)^2}\;\Bigg)
\end{aligned}
$$

$$
\begin{aligned}
&\tfrac{1}{8}\Bigg(8\cos^{-1}\!\left(\tfrac{\frac{3\,s}{2}-x}{r}\right)r^2+8\cos^{-1}\!\left(\tfrac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\!\left(\tfrac{\frac{3\,s}{2}-y}{r}\right)r^2+\\
&\quad 8\cos^{-1}\!\left(\tfrac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\!\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+\\
&\quad 4\tan^{-1}\!\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-4\,\pi\,r^2+24\,s\,r-\\
&\quad 16\,y\,r-24\,s^2+2\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+\\
&\quad 16\,s\,y+4\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y-\\
&\quad 3\,s\sqrt{4\,r^2-(3\,s-2\,x)^2}\;-s\sqrt{4\,r^2-(s+2\,x)^2}\;-\\
&\quad 2\,x\sqrt{4\,r^2-(s+2\,x)^2}\;-6\,s\sqrt{4\,r^2-(3\,s-2\,y)^2}\;-\\
&\quad 2\,s\sqrt{4\,r^2-(s+2\,y)^2}\;-4\,y\sqrt{4\,r^2-(s+2\,y)^2}\;\Bigg)
\end{aligned}
$$

$$
\begin{aligned}
&3\,s\Big(4\,r+4\,x+4\,y+\sqrt{4\,r^2-(\\
&8\,y\,r+18\,s^2+2\sqrt{4\,r^2-(3\,s-\\
&4\tan^{-1}\!\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+\\
&4\,s\,x+8\,x\,y+3\,s\sqrt{4\,r^2-(3\,s\\
&2\,\pi\,r^2+6\,s^2+2\sqrt{4\,r^2-(3\,s-2\\
&4\tan^{-1}\!\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+\\
&(s+2\,x)\Big(4\,y+\sqrt{4\,r^2-(s+2\\
&2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge\\
&4\tan^{-1}\!\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2\\
&(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;<\\
&2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)\\
&\sqrt{4\,r^2-(3\,s-2\,x)^2}\;(3\,s-2\,x)<4\,r\\
&(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;<4\,r^2\\
&\sqrt{4\,r^2-(3\,s-2\,y)^2}\;(3\,s-2\,y)<4\\
&(s+2\,y)\sqrt{4\,r^2-(s+2\,y)^2}\;<4\,r^2\\
&4\tan^{-1}\!\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+\\
&3\,s\Big(4\,r+4\,x+4\,y+\sqrt{4\,r^2-(\\
&8\,y\,r+18\,s^2+2\sqrt{4\,r^2-(3\,s-\\
&4\tan^{-1}\!\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+\\
&4\,s\,x+8\,x\,y+3\,s\sqrt{4\,r^2-(3\,s\\
&2\,\pi\,r^2+6\,s^2+2\sqrt{4\,r^2-(3\,s-2\\
&4\tan^{-1}\!\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+\\
&(s+2\,x)\Big(4\,y+\sqrt{4\,r^2-(s+2\\
&2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge\\
&4\tan^{-1}\!\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2
\end{aligned}
$$

$$\left(\sqrt{4r^2-(s+2x)^2}\right)$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+\right.$$
$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-$$
$$20s^2+8sx+2\sqrt{4r^2-(3s-2x)^2}\,x+$$
$$8sy-16xy+4\sqrt{4r^2-(3s-2y)^2}\,y-$$
$$3s\sqrt{4r^2-(3s-2x)^2}-s\sqrt{4r^2-(s+2x)^2}-$$
$$2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-$$
$$\left.2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+\right.$$
$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-$$
$$12s^2-8sx+2\sqrt{4r^2-(3s-2x)^2}\,x-$$
$$8sy+16xy+4\sqrt{4r^2-(3s-2y)^2}\,y-$$
$$3s\sqrt{4r^2-(3s-2x)^2}-s\sqrt{4r^2-(s+2x)^2}-$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-$$
$$2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\Bigg)$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\Bigg(8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+$$
$$8yr-26s^2+12sx-4\sqrt{4r^2-(3s-2x)^2}\,x-$$
$$4sy-8xy+6s\sqrt{4r^2-(3s-2x)^2}+$$
$$s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}\Bigg)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-8yr-30s^2+4sx-4\sqrt{4r^2-(3s-2x)^2}\,x+4sy+8xy+6s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+8yr-26s^2+12sx-4sy-8xy+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$
\begin{cases}
\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+\right. & 2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r^2 \\
\quad 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr- & 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+ \\
\quad 8yr-30s^2+4sx+4sy+8xy+ & (s+2x)\left(4y+\sqrt{4r^2-(s+2x)^2}\right)<4r^2 \\
\quad \left.s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}\right) & 2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge \\
 & 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2x)\sqrt{4r^2-(s+2x)^2}< \\
 & 2\left(\pi r^2+(s+2x)(s+2y)\right) \\
\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+\right. & \sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r^2 \\
\quad 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr- & (s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2 \\
\quad 8yr-30s^2+4sx+4sy+8xy+ & \sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4r^2 \\
\quad \left.s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}\right) & (s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2 \\
 & 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+ \\
 & 3s\left(4r+4x+4y+\sqrt{4r^2-(3s-2x)^2}\right)< \\
 & 8yr+18s^2+2\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)< \\
 & 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+ \\
 & 4sx+8xy+3s\sqrt{4r^2-(3s-2x)^2}< \\
 & 2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)< \\
 & 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+ \\
 & (s+2x)\left(4y+\sqrt{4r^2-(s+2x)^2}\right)< \\
 & 2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge \\
 & 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2x)\sqrt{4r^2-(s+2x)^2}\geq \\
 & 2\left(\pi r^2+(s+2x)(s+2y)\right) \\
\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+\right. & \sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r^2 \\
\quad 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+ & (s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2 \\
 & \sqrt{}
\end{cases}
$$

$$\left(\sqrt{4r^2-(s+2x)^2}\right)$$

$$8yr - 26s^2 + 12sx - 4\sqrt{4r^2-(3s-2x)^2}\,x - 4sy - 8xy + 6s\sqrt{4r^2-(3s-2x)^2} - s\sqrt{4r^2-(s+2x)^2} - 2x\sqrt{4r^2-(s+2x)^2}\Bigg)$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y) \geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2} \geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 +$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr + 18s^2 + 2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 + 4sr +$$

$$4sx + 8xy + 3s\sqrt{4r^2-(3s$$

$$2\pi r^2 + 6s^2 + 2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 + 12sr +$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2 + 4yr + 3s^2 + 6sx\right) \wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 + 4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2} <$$

$$2\left(\pi r^2 + (s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 + 8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 + 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 - 6\pi r^2 + 28sr - 8yr - 30s^2 + 4sx - 4\sqrt{4r^2-(3s-2x)^2}\,x + 4sy + 8xy + 6s\sqrt{4r^2-(3s-2x)^2} - s\sqrt{4r^2-(s+2x)^2} - 2x\sqrt{4r^2-(s+2x)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x) \geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2} < 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y) \geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2} \geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 +$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr + 18s^2 + 2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 + 4sr +$$

$$4sx + 8xy + 3s\sqrt{4r^2-(3s$$

$$2\pi r^2 + 6s^2 + 2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 + 12sr +$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+\right.$$

$$8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-$$

$$6\pi r^2+20sr+8yr-26s^2+12sx-4sy-8xy-$$

$$\left.s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+\right.$$

$$8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-$$

$$6\pi r^2+28sr-8yr-30s^2+4sx+4sy+8xy-$$

$$\left.s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+8yr-26s^2+12sx-4\sqrt{4r^2-(3s-2x)^2}\,x-4sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\,y+6s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-8yr-30s^2+4sx-4\sqrt{4r^2-(3s-2x)^2}\,x+4sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\,y+6s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+8yr-26s^2+12sx-4sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\,y+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$
$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s}$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$
$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8\,y\,r + 18\,s^2 + 2\sqrt{4\,r^2 - (3\,s -$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 + 4\,s\,r +$$

$$4\,s\,x + 8\,x\,y + 3\,s\sqrt{4\,r^2 - (3\,s$$

$$2\,\pi\,r^2 + 6\,s^2 + 2\sqrt{4\,r^2 - (3\,s - 2$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 12\,s\,r +$$

$$(s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2$$

$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right) \wedge$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 4\,(s + 2$$

$$(s + 2\,x)\sqrt{4\,r^2 - (s + 2\,x)^2} <$$

$$2\left(\pi\,r^2 + (s + 2\,x)\,(s + 2\,y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2 + \right.$$

$$8\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 + 4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 -$$

$$6\,\pi\,r^2 + 28\,s\,r - 8\,y\,r - 30\,s^2 + 4\,s\,x + 4\,s\,y + 8\,x\,y +$$

$$\left.4\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;y + s\sqrt{4\,r^2 - (s + 2\,x)^2} + \right.$$

$$\left.2\,x\sqrt{4\,r^2 - (s + 2\,x)^2} - 6\,s\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\right)$$

$$\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;(3\,s - 2\,x) < 4\,r$$

$$(s + 2\,x)\sqrt{4\,r^2 - (s + 2\,x)^2} \geq 4\,r^2$$

$$\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;(3\,s - 2\,y) < 4$$

$$(s + 2\,y)\sqrt{4\,r^2 - (s + 2\,y)^2} \geq 4\,r^2$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 +$$

$$3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4\,r^2 - (\right.$$

$$8\,y\,r + 18\,s^2 + 2\sqrt{4\,r^2 - (3\,s -$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 + 4\,s\,r +$$

$$4\,s\,x + 8\,x\,y + 3\,s\sqrt{4\,r^2 - (3\,s$$

$$2\,\pi\,r^2 + 6\,s^2 + 2\sqrt{4\,r^2 - (3\,s - 2$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 12\,s\,r +$$

$$(s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2$$

$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right) \wedge$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 4\,(s + 2$$

$$(s + 2\,x)\sqrt{4\,r^2 - (s + 2\,x)^2} \geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+\right.$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4r$$

$$8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ <4r^2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)<4$$

$$8yr-26s^2+12sx-4\sqrt{4r^2-(3s-2x)^2}\ x-$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2$$

$$4sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\ y+$$

$$6s\sqrt{4r^2-(3s-2x)^2}\ -s\sqrt{4r^2-(s+2x)^2}\ -$$

$$2x\sqrt{4r^2-(s+2x)^2}\ -6s\sqrt{4r^2-(3s-2y)^2}\left.\right)$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ <$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+\right.$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4r$$

$$8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ <4r^2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)<4$$

$$8yr-30s^2+4sx-4\sqrt{4r^2-(3s-2x)^2}\ x+$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2$$

$$4sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\ y+$$

$$6s\sqrt{4r^2-(3s-2x)^2}\ -s\sqrt{4r^2-(s+2x)^2}\ -$$

$$2x\sqrt{4r^2-(s+2x)^2}\ -6s\sqrt{4r^2-(3s-2y)^2}\left.\right)$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4\,s\,x + 8\,x\,y + 3\,s\,\sqrt{4\,r^2 - (3\,s$$

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$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 12\,s\,r +$$

$$(s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2$$

$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right) \wedge$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 4\,(s + 2$$

$$(s + 2\,x)\,\sqrt{4\,r^2 - (s + 2\,x)^2} \geq$$

$$2\left(\pi\,r^2 + (s + 2\,x)\,(s + 2\,y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2 + \right.$$

$$8\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 + 4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 -$$

$$6\,\pi\,r^2 + 20\,s\,r + 8\,y\,r - 26\,s^2 + 12\,s\,x - 4\,s\,y - 8\,x\,y +$$

$$4\,\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;y - s\,\sqrt{4\,r^2 - (s + 2\,x)^2} -$$

$$\left.2\,x\,\sqrt{4\,r^2 - (s + 2\,x)^2} - 6\,s\,\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\right)$$

$$\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;(3\,s - 2\,x) < 4\,r$$

$$(s + 2\,x)\,\sqrt{4\,r^2 - (s + 2\,x)^2} < 4\,r^2$$

$$\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;(3\,s - 2\,y) < 4$$

$$(s + 2\,y)\,\sqrt{4\,r^2 - (s + 2\,y)^2} \geq 4\,r^2$$

$$4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 +$$

$$3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4\,r^2 - (\right.$$

$$8\,y\,r + 18\,s^2 + 2\,\sqrt{4\,r^2 - (3\,s -$$

$$4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 + 4\,s\,r +$$

$$4\,s\,x + 8\,x\,y + 3\,s\,\sqrt{4\,r^2 - (3\,s$$

$$2\,\pi\,r^2 + 6\,s^2 + 2\,\sqrt{4\,r^2 - (3\,s - 2$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 12\,s\,r +$$

$$(s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2\right.$$

$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right) \wedge$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 4\,(s + 2$$

$$(s + 2\,x)\,\sqrt{4\,r^2 - (s + 2\,x)^2} <$$

$$2\left(\pi\,r^2 + (s + 2\,x)\,(s + 2\,y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2 + \right.$$

$$\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;(3\,s - 2\,x) < 4\,r$$

$$(s + 2\,x)\,\sqrt{4\,r^2 - (s + 2\,x)^2} < 4\,r^2$$

$$8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-$$
$$6\pi r^2+28sr-8yr-30s^2+4sx+4sy+8xy+$$
$$4\sqrt{4r^2-(3s-2y)^2}\;y-s\sqrt{4r^2-(s+2x)^2}\;-$$
$$2x\sqrt{4r^2-(s+2x)^2}\;-6s\sqrt{4r^2-(3s-2y)^2}\;\Bigg)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+\right.$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+$$
$$8yr-26s^2+12sx-4\sqrt{4r^2-(3s-2x)^2}\;x-$$
$$4sy-8xy+6s\sqrt{4r^2-(3s-2x)^2}\;+$$
$$s\sqrt{4r^2-(s+2x)^2}\;+2x\sqrt{4r^2-(s+2x)^2}\;-$$
$$\left.2s\sqrt{4r^2-(s+2y)^2}\;-4y\sqrt{4r^2-(s+2y)^2}\;\right)$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)<4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;\geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)\geq 4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq 4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;<4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$\left(\sqrt{4r^2-(s+2x)^2}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+\right.$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$8yr-30s^2+4sx-4\sqrt{4r^2-(3s-2x)^2}\ x+$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ <4r^2$$

$$4sy+8xy+6s\sqrt{4r^2-(3s-2x)^2}\ +$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$s\sqrt{4r^2-(s+2x)^2}\ +2x\sqrt{4r^2-(s+2x)^2}\ -$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$\left.2s\sqrt{4r^2-(s+2y)^2}\ -4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+\right.$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$

$$8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$6\pi r^2+20sr+8yr-26s^2+12sx-4sy-8xy+$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ <4r^2$$

$$s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\Bigg)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-8yr-30s^2+4sx+4sy+8xy+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s}$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$
$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)<4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s}$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+8yr-26s^2+12sx-4\sqrt{4r^2-(3s-2x)^2}\,x-4sy-8xy+6s\sqrt{4r^2-(3s-2x)^2}-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-8yr-30s^2+4sx-4\sqrt{4r^2-(3s-2x)^2}\,x+4sy+8xy+6s\sqrt{4r^2-(3s-2x)^2}-\right.$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ge$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\ge 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\ge 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\ge 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\ge 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\Big)$$

$$\frac{1}{8}\Big(8\cos^{-1}\Big(\frac{\frac{3s}{2}-x}{r}\Big)r^2+8\cos^{-1}\Big(\frac{\frac{s}{2}+x}{r}\Big)r^2+8\cos^{-1}\Big(\frac{\frac{s}{2}+y}{r}\Big)r^2+8\tan^{-1}\Big(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\Big)r^2+4\tan^{-1}\Big(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\Big)r^2-6\pi r^2+20sr+8yr-26s^2+12sx-4sy-8xy-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\Big)$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\Big(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\Big)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\Big(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\Big)r^2+12sr+$$

$$(s+2x)\Big(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\Big(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\Big)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\Big(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\Big)r^2+$$

$$3s\Big(4r+4x+4y+\sqrt{4r^2-($$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\Big(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\Big)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\Big(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\Big)r^2+12sr+$$

$$(s+2x)\Big(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\Big(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\Big)r^2+4(s+2$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-8yr-30s^2+4sx+4sy+8xy-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+8yr-26s^2+12sx-4\sqrt{4r^2-(3s-2x)^2}\,x-4sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\,y+6s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-\right.$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-8yr-30s^2+4sx-4\sqrt{4r^2-(3s-2x)^2}\,x+4sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\,y+6s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$\left(\sqrt{4r^2-(3s-2x)^2}\right)$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ <4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+\right.\quad\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)<4r$$

$$\Bigg(8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+8yr-26s^2+12sx-4sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\,y+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\Bigg)$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2(s+2x)\sqrt{4r^2-(s+2x)^2}<2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-8yr-30s^2+4sx+4sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\,y+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\Bigg)$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$
\begin{aligned}
&4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+\\
&(s+2x)\left(4y+\sqrt{4r^2-(s+2\\
&2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge\\
&4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2\\
&(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq\\
&2\left(\pi r^2+(s+2x)(s+2y)\right)
\end{aligned}
$$

$$
\begin{aligned}
&\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+\\
&\quad 8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+\\
&\quad 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+\\
&\quad 8yr-26s^2+12sx-4\sqrt{4r^2-(3s-2x)^2}\ x-\\
&\quad 4sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\ y+\\
&\quad 6s\sqrt{4r^2-(3s-2x)^2}\ -s\sqrt{4r^2-(s+2x)^2}\ -\\
&\quad 2x\sqrt{4r^2-(s+2x)^2}\ -6s\sqrt{4r^2-(3s-2y)^2}\ -\\
&\quad 2s\sqrt{4r^2-(s+2y)^2}\ -4y\sqrt{4r^2-(s+2y)^2}\Bigg)
\end{aligned}
$$

$$
\begin{aligned}
&\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4r\\
&(s+2x)\sqrt{4r^2-(s+2x)^2}\ <4r^2\\
&\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)<4\\
&(s+2y)\sqrt{4r^2-(s+2y)^2}\ <4r^2\\
&4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+\\
&3s\left(4r+4x+4y+\sqrt{4r^2-(\right.\\
&8yr+18s^2+2\sqrt{4r^2-(3s-}\\
&4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+\\
&4sx+8xy+3s\sqrt{4r^2-(3s}\\
&2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}\\
&4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+\\
&(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.\\
&2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge\\
&4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2\\
&(s+2x)\sqrt{4r^2-(s+2x)^2}\ <\\
&2\left(\pi r^2+(s+2x)(s+2y)\right)
\end{aligned}
$$

$$
\begin{aligned}
&\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+\\
&\quad 8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+
\end{aligned}
$$

$$
\begin{aligned}
&\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4r\\
&(s+2x)\sqrt{4r^2-(s+2x)^2}\ <4r^2\\
&\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)<4
\end{aligned}
$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-$$
$$8yr-30s^2+4sx-4\sqrt{4r^2-(3s-2x)^2}\;x+$$
$$4sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\;y+$$
$$6s\sqrt{4r^2-(3s-2x)^2}-s\sqrt{4r^2-(s+2x)^2}-$$
$$2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-$$
$$2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\Bigg)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+$$
$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+$$
$$8yr-26s^2+12sx-4sy-8xy+$$
$$4\sqrt{4r^2-(3s-2y)^2}\;y-s\sqrt{4r^2-(s+2x)^2}-$$
$$2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-$$
$$2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\Bigg)$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)<4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)<4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+\right.$$

$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-$$

$$8yr-30s^2+4sx+4sy+8xy+$$

$$4\sqrt{4r^2-(3s-2y)^2}\,y-s\sqrt{4r^2-(s+2x)^2}-$$

$$2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-$$

$$\left.2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+\right.$$

$$8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-$$

$$8yr-26s^2-4sx-2\sqrt{4r^2-(3s-2x)^2}\,x+$$

$$12sy-8xy+3s\sqrt{4r^2-(3s-2x)^2}+$$

$$\left.2s\sqrt{4r^2-(s+2x)^2}+4x\sqrt{4r^2-(s+2x)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$\frac{1}{8}\left(4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+8yr-14s^2-12sx-2\sqrt{4r^2-(3s-2x)^2}\,x-12sy+8xy+3s\sqrt{4r^2-(3s-2x)^2}+2s\sqrt{4r^2-(s+2x)^2}+4x\sqrt{4r^2-(s+2x)^2}\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-8yr-26s^2-4sx+2\sqrt{4r^2-(3s-2x)^2}\,x+12sy-8xy-3s\sqrt{4r^2-(3s-2x)^2}+2s\sqrt{4r^2-(s+2x)^2}+4x\sqrt{4r^2-(s+2x)^2}\right)$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<2\left(\pi r^2+(s+2x)(s+2y)\right)\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+8yr-14s^2-12sx+2\sqrt{4r^2-(3s-2x)^2}\,x-12sy+8xy-3s\sqrt{4r^2-(3s-2x)^2}+2s\sqrt{4r^2-(s+2x)^2}+4x\sqrt{4r^2-(s+2x)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-8yr-26s^2-4sx-2\sqrt{4r^2-(3s-2x)^2}\,x+12sy-8xy+3s\sqrt{4r^2-(3s-2x)^2}\right)$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}<2\left(\pi r^2+(s+2x)(s+2y)\right)$$
$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-($$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}<2\left(\pi r^2+(s+2x)(s+2y)\right)$$
$$\sqrt{$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+8yr-14s^2-12sx-2\sqrt{4r^2-(3s-2x)^2}\,x-12sy+8xy+3s\sqrt{4r^2-(3s-2x)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-8yr-26s^2-4sx+2\sqrt{4r^2-(3s-2x)^2}\,x+12sy-8xy-3s\sqrt{4r^2-(3s-2x)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2 + 6s^2 + 2\sqrt{4r^2 - (3s - 2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 + 12sr +$$

$$(s+2x)\left(4y + \sqrt{4r^2 - (s+2\right.$$

$$2\left(\pi r^2 + 4yr + 3s^2 + 6sx\right) \wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 + 4(s+2$$

$$(s+2x)\sqrt{4r^2 - (s+2x)^2} <$$

$$2\left(\pi r^2 + (s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2 + \right.$$

$$8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 + 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 +$$

$$8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 - 6\pi r^2 + 20sr +$$

$$8yr - 14s^2 - 12sx + 2\sqrt{4r^2 - (3s-2x)^2}\,x -$$

$$\left.12sy + 8xy - 3s\sqrt{4r^2 - (3s-2x)^2}\right)$$

$$\sqrt{4r^2 - (3s-2x)^2}\,(3s-2x) < 4r$$

$$(s+2x)\sqrt{4r^2 - (s+2x)^2} < 4r^2$$

$$\sqrt{4r^2 - (3s-2y)^2}\,(3s-2y) \geq 4$$

$$(s+2y)\sqrt{4r^2 - (s+2y)^2} \geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 +$$

$$3s\left(4r + 4x + 4y + \sqrt{4r^2 - (\right.$$

$$8yr + 18s^2 + 2\sqrt{4r^2 - (3s -$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 + 4sr +$$

$$4sx + 8xy + 3s\sqrt{4r^2 - (3s$$

$$2\pi r^2 + 6s^2 + 2\sqrt{4r^2 - (3s - 2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 + 12sr +$$

$$(s+2x)\left(4y + \sqrt{4r^2 - (s+2\right.$$

$$2\left(\pi r^2 + 4yr + 3s^2 + 6sx\right) \wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 + 4(s+2$$

$$(s+2x)\sqrt{4r^2 - (s+2x)^2} <$$

$$2\left(\pi r^2 + (s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2 + 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 + \right.$$

$$8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 - 6\pi r^2 + 28sr -$$

$$\sqrt{4r^2 - (3s-2x)^2}\,(3s-2x) \geq 4r$$

$$(s+2x)\sqrt{4r^2 - (s+2x)^2} \geq 4r^2$$

$$\sqrt{4r^2 - (3s-2y)^2}\,(3s-2y) < 4$$

$$8\,y\,r - 26\,s^2 - 4\,s\,x - 2\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;x + 12\,s\,y - 8\,x\,y + 4\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;y + 3\,s\sqrt{4\,r^2 - (3\,s - 2\,x)^2} + 2\,s\sqrt{4\,r^2 - (s + 2\,x)^2} + 4\,x\sqrt{4\,r^2 - (s + 2\,x)^2} - 6\,s\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\Bigg)$$

$$(s + 2\,y)\sqrt{4\,r^2 - (s + 2\,y)^2} \geq 4\,r^2$$

$$4\tan^{-1}\left(\frac{3\,s - 2\,x}{\sqrt{4\,r^2 - (3\,s - 2\,x)^2}}\right)r^2 +$$

$$3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4\,r^2 - (\right.$$

$$8\,y\,r + 18\,s^2 + 2\sqrt{4\,r^2 - (3\,s -$$

$$4\tan^{-1}\left(\frac{3\,s - 2\,x}{\sqrt{4\,r^2 - (3\,s - 2\,x)^2}}\right)r^2 + 4\,s\,r +$$

$$4\,s\,x + 8\,x\,y + 3\,s\sqrt{4\,r^2 - (3\,s$$

$$2\,\pi\,r^2 + 6\,s^2 + 2\sqrt{4\,r^2 - (3\,s - 2$$

$$4\tan^{-1}\left(\frac{s + 2\,x}{\sqrt{4\,r^2 - (s + 2\,x)^2}}\right)r^2 + 12\,s\,r +$$

$$(s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2\right.$$

$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right) \wedge$$

$$4\tan^{-1}\left(\frac{s + 2\,x}{\sqrt{4\,r^2 - (s + 2\,x)^2}}\right)r^2 + 4\,(s + 2$$

$$(s + 2\,x)\sqrt{4\,r^2 - (s + 2\,x)^2} <$$

$$2\left(\pi\,r^2 + (s + 2\,x)\,(s + 2\,y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3\,s}{2} - y}{r}\right)r^2 + 4\tan^{-1}\left(\frac{3\,s - 2\,x}{\sqrt{4\,r^2 - (3\,s - 2\,x)^2}}\right)r^2 + 8\tan^{-1}\left(\frac{s + 2\,x}{\sqrt{4\,r^2 - (s + 2\,x)^2}}\right)r^2 - 6\,\pi\,r^2 + 20\,s\,r + 8\,y\,r - 14\,s^2 - 12\,s\,x - 2\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;x - 12\,s\,y + 8\,x\,y + 4\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;y + 3\,s\sqrt{4\,r^2 - (3\,s - 2\,x)^2} + 2\,s\sqrt{4\,r^2 - (s + 2\,x)^2} + 4\,x\sqrt{4\,r^2 - (s + 2\,x)^2} - 6\,s\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\right)$$

$$\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;(3\,s - 2\,x) \geq 4\,r$$

$$(s + 2\,x)\sqrt{4\,r^2 - (s + 2\,x)^2} \geq 4\,r^2$$

$$\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;(3\,s - 2\,y) < 4$$

$$(s + 2\,y)\sqrt{4\,r^2 - (s + 2\,y)^2} \geq 4\,r^2$$

$$4\tan^{-1}\left(\frac{3\,s - 2\,x}{\sqrt{4\,r^2 - (3\,s - 2\,x)^2}}\right)r^2 +$$

$$3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4\,r^2 - (\right.$$

$$8\,y\,r + 18\,s^2 + 2\sqrt{4\,r^2 - (3\,s -$$

$$4\tan^{-1}\left(\frac{3\,s - 2\,x}{\sqrt{4\,r^2 - (3\,s - 2\,x)^2}}\right)r^2 + 4\,s\,r +$$

$$4\,s\,x + 8\,x\,y + 3\,s\sqrt{4\,r^2 - (3\,s$$

$$2\,\pi\,r^2 + 6\,s^2 + 2\sqrt{4\,r^2 - (3\,s - 2$$

$$4\tan^{-1}\left(\frac{s + 2\,x}{\sqrt{4\,r^2 - (s + 2\,x)^2}}\right)r^2 + 12\,s\,r +$$

$$
\begin{aligned}
&(s+2x)\left(4y+\sqrt{4r^2-(s+2\\
&2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge\\
&4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2\\
&(s+2x)\sqrt{4r^2-(s+2x)^2}<\\
&2\left(\pi r^2+(s+2x)(s+2y)\right)
\end{aligned}
$$

$$
\begin{aligned}
\frac{1}{8}\Bigg(&8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+\\
&8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+\\
&8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-\\
&8yr-26s^2-4sx+2\sqrt{4r^2-(3s-2x)^2}\;x+\\
&12sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\;y-\\
&3s\sqrt{4r^2-(3s-2x)^2}+2s\sqrt{4r^2-(s+2x)^2}+\\
&4x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\Bigg)
\end{aligned}
$$

$$
\begin{aligned}
&\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)<4r\\
&(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2\\
&\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)<4\\
&(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2\\
&4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+\\
&3s\left(4r+4x+4y+\sqrt{4r^2-(\right.\\
&8yr+18s^2+2\sqrt{4r^2-(3s-}\\
&4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+\\
&4sx+8xy+3s\sqrt{4r^2-(3s}\\
&2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}\\
&4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+\\
&(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.\\
&2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge\\
&4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2\\
&(s+2x)\sqrt{4r^2-(s+2x)^2}<\\
&2\left(\pi r^2+(s+2x)(s+2y)\right)
\end{aligned}
$$

$$
\begin{aligned}
\frac{1}{8}\Bigg(&8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+\\
&8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+\\
&8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+
\end{aligned}
$$

$$
\begin{aligned}
&\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)<4r\\
&(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2\\
&\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)<4\\
&(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2\\
&4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+
\end{aligned}
$$

$$8\,y\,r - 14\,s^2 - 12\,s\,x + 2\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;x -$$
$$12\,s\,y + 8\,x\,y + 4\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;y -$$
$$3\,s\sqrt{4\,r^2 - (3\,s - 2\,x)^2} + 2\,s\sqrt{4\,r^2 - (s + 2\,x)^2} +$$
$$4\,x\sqrt{4\,r^2 - (s + 2\,x)^2} - 6\,s\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\Bigg)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 +$$
$$8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2 + 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 +$$
$$8\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 - 6\,\pi\,r^2 + 28\,s\,r -$$
$$8\,y\,r - 26\,s^2 - 4\,s\,x - 2\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;x +$$
$$12\,s\,y - 8\,x\,y + 4\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;y +$$
$$3\,s\sqrt{4\,r^2 - (3\,s - 2\,x)^2} - 6\,s\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\Bigg)$$

$$\left(\sqrt{4\,r^2-(3\,s-2\,x)^2}\right)$$
$$3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4\,r^2 - (\right.$$
$$8\,y\,r + 18\,s^2 + 2\sqrt{4\,r^2 - (3\,s -}$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 + 4\,s\,r +$$
$$4\,s\,x + 8\,x\,y + 3\,s\sqrt{4\,r^2 - (3\,s}$$
$$2\,\pi\,r^2 + 6\,s^2 + 2\sqrt{4\,r^2 - (3\,s - 2}$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 12\,s\,r +$$
$$(s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2\right.$$
$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 4\,(s + 2$$
$$(s + 2\,x)\sqrt{4\,r^2 - (s + 2\,x)^2} <$$
$$2\left(\pi\,r^2 + (s + 2\,x)\,(s + 2\,y)\right)$$
$$\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;(3\,s - 2\,x) \geq 4\,r$$
$$(s + 2\,x)\sqrt{4\,r^2 - (s + 2\,x)^2} < 4\,r^2$$
$$\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;(3\,s - 2\,y) < 4$$
$$(s + 2\,y)\sqrt{4\,r^2 - (s + 2\,y)^2} \geq 4\,r^2$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 +$$
$$3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4\,r^2 - (\right.$$
$$8\,y\,r + 18\,s^2 + 2\sqrt{4\,r^2 - (3\,s -}$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 + 4\,s\,r +$$
$$4\,s\,x + 8\,x\,y + 3\,s\sqrt{4\,r^2 - (3\,s}$$
$$2\,\pi\,r^2 + 6\,s^2 + 2\sqrt{4\,r^2 - (3\,s - 2}$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 12\,s\,r +$$
$$(s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2\right.$$
$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 4\,(s + 2$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+\right.$$

$$8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+$$

$$8yr-14s^2-12sx-2\sqrt{4r^2-(3s-2x)^2}\;x-$$

$$12sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\;y+$$

$$\left.3s\sqrt{4r^2-(3s-2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+\right.$$

$$8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-$$

$$8yr-26s^2-4sx+2\sqrt{4r^2-(3s-2x)^2}\;x+$$

$$12sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\;y-$$

$$\left.3s\sqrt{4r^2-(3s-2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+8yr-14s^2-12sx+2\sqrt{4r^2-(3s-2x)^2}\,x-12sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\,y-3s\sqrt{4r^2-(3s-2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2x)\sqrt{4r^2-(s+2x)^2}<2\left(\pi r^2+(s+2x)(s+2y)\right)$$
$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)<4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-($$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2x)\sqrt{4r^2-(s+2x)^2}<2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-8yr-26s^2-4sx-2\sqrt{4r^2-(3s-2x)^2}\,x+12sy-8xy+3s\sqrt{4r^2-(3s-2x)^2}+2s\sqrt{4r^2-(s+2x)^2}+4x\sqrt{4r^2-(s+2x)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

if

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2(s+2x)\sqrt{4r^2-(s+2x)^2}<2\left(\pi r^2+(s+2x)(s+2y)\right)$$

otherwise

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+8yr-14s^2-12sx-2\sqrt{4r^2-(3s-2x)^2}\,x-12sy+8xy+3s\sqrt{4r^2-(3s-2x)^2}+2s\sqrt{4r^2-(s+2x)^2}+4x\sqrt{4r^2-(s+2x)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

if

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+\right.$$

$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-$$

$$8yr-26s^2-4sx+2\sqrt{4r^2-(3s-2x)^2}\;x+$$

$$12sy-8xy-3s\sqrt{4r^2-(3s-2x)^2}\;+$$

$$2s\sqrt{4r^2-(s+2x)^2}\;+4x\sqrt{4r^2-(s+2x)^2}\;-$$

$$\left.2s\sqrt{4r^2-(s+2y)^2}\;-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(}\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+\right.$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq 4r^2$$

$$8\cos^{-1}\left(\frac{\quad}{r}\right)r^2+4\tan^{-1}\left(\frac{\quad}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+$$

$$8yr-14s^2-12sx+2\sqrt{4r^2-(3s-2x)^2}\;x-$$

$$12sy+8xy-3s\sqrt{4r^2-(3s-2x)^2}\;+$$

$$2s\sqrt{4r^2-(s+2x)^2}\;+4x\sqrt{4r^2-(s+2x)^2}\;-$$

$$2s\sqrt{4r^2-(s+2y)^2}\;-4y\sqrt{4r^2-(s+2y)^2}\;\Bigg)$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+\right.$$

$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-$$

$$8yr-26s^2-4sx-2\sqrt{4r^2-(3s-2x)^2}\;x+$$

$$12sy-8xy+3s\sqrt{4r^2-(3s-2x)^2}\;-$$

$$2s\sqrt{4r^2-(s+2y)^2}\;-4y\sqrt{4r^2-(s+2y)^2}\;\Bigg)$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;<4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$
\begin{array}{l}
\left(\sqrt{4r^2-(s+2x)^2}\right)\\
(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.\\
2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge\\
4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2\\
(s+2x)\sqrt{4r^2-(s+2x)^2}<\\
2\left(\pi r^2+(s+2x)(s+2y)\right)
\end{array}
$$

$$
\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+\right.
$$

$$
\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4r
$$

$$
\begin{array}{l}
8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+\\
8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+\\
8yr-14s^2-12sx-2\sqrt{4r^2-(3s-2x)^2}\ x-\\
12sy+8xy+3s\sqrt{4r^2-(3s-2x)^2}\ -\\
\left.2s\sqrt{4r^2-(s+2y)^2}\ -4y\sqrt{4r^2-(s+2y)^2}\right)
\end{array}
$$

$$
\begin{array}{l}
(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2\\
\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4\\
(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2\\
4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+\\
3s\left(4r+4x+4y+\sqrt{4r^2-(\right.\\
8yr+18s^2+2\sqrt{4r^2-(3s-}\\
4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+\\
4sx+8xy+3s\sqrt{4r^2-(3s}\\
2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}\\
4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+\\
(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.\\
2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge\\
4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2\\
(s+2x)\sqrt{4r^2-(s+2x)^2}<\\
2\left(\pi r^2+(s+2x)(s+2y)\right)
\end{array}
$$

$$
\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+\right.
$$

$$
\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)<4r
$$

$$
\begin{array}{l}
8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+\\
8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-
\end{array}
$$

$$
\begin{array}{l}
(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2\\
\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4\\
(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2\\
(\qquad\qquad)
\end{array}
$$

$$8\,y\,r - 26\,s^2 - 4\,s\,x + 2\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;x + 12\,s\,y - 8\,x\,y - 3\,s\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\; - 2\,s\sqrt{4\,r^2 - (s + 2\,y)^2}\; - 4\,y\sqrt{4\,r^2 - (s + 2\,y)^2}\Bigg)$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 + 3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4\,r^2 - (\right.$$

$$8\,y\,r + 18\,s^2 + 2\sqrt{4\,r^2 - (3\,s -$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 + 4\,s\,r + 4\,s\,x + 8\,x\,y + 3\,s\sqrt{4\,r^2 - (3\,s$$

$$2\,\pi\,r^2 + 6\,s^2 + 2\sqrt{4\,r^2 - (3\,s - 2$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 12\,s\,r + (s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2\right.$$

$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 4\,(s + 2\,x)\sqrt{4\,r^2 - (s + 2\,x)^2}\; <$$

$$2\left(\pi\,r^2 + (s + 2\,x)\,(s + 2\,y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2 + 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 + 8\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 - 6\,\pi\,r^2 + 20\,s\,r + 8\,y\,r - 14\,s^2 - 12\,s\,x + 2\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;x - 12\,s\,y + 8\,x\,y - 3\,s\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\; - 2\,s\sqrt{4\,r^2 - (s + 2\,y)^2}\; - 4\,y\sqrt{4\,r^2 - (s + 2\,y)^2}\right)$$

$$\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;(3\,s - 2\,x) < 4\,r$$

$$(s + 2\,x)\sqrt{4\,r^2 - (s + 2\,x)^2}\; < 4\,r^2$$

$$\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;(3\,s - 2\,y) \geq 4$$

$$(s + 2\,y)\sqrt{4\,r^2 - (s + 2\,y)^2}\; < 4\,r^2$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 + 3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4\,r^2 - (\right.$$

$$8\,y\,r + 18\,s^2 + 2\sqrt{4\,r^2 - (3\,s -$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 + 4\,s\,r + 4\,s\,x + 8\,x\,y + 3\,s\sqrt{4\,r^2 - (3\,s$$

$$2\,\pi\,r^2 + 6\,s^2 + 2\sqrt{4\,r^2 - (3\,s - 2$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 12\,s\,r + (s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2\right.$$

$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right)\wedge$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-8yr-26s^2-4sx-2\sqrt{4r^2-(3s-2x)^2}\,x+12sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\,y+3s\sqrt{4r^2-(3s-2x)^2}+2s\sqrt{4r^2-(s+2x)^2}+4x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2x)\sqrt{4r^2-(s+2x)^2}<2\left(\pi r^2+(s+2x)(s+2y)\right)\wedge\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2\wedge\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4r(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2x)\sqrt{4r^2-(s+2x)^2}<2\left(\pi r^2+(s+2x)(s+2y)\right)\wedge\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4r(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2\wedge\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)<4r(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+8yr-14s^2-12sx-2\sqrt{4r^2-(3s-2x)^2}\,x-12sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\,y+\right.$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(}\right.$$

$$
\begin{cases}
3\,s\,\sqrt{4\,r^2-(3\,s-2\,x)^2}+2\,s\,\sqrt{4\,r^2-(s+2\,x)^2}+ & 8\,y\,r+18\,s^2+2\,\sqrt{4\,r^2-(3\,s-\\
4\,x\,\sqrt{4\,r^2-(s+2\,x)^2}-6\,s\,\sqrt{4\,r^2-(3\,s-2\,y)^2}- & 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+\\
2\,s\,\sqrt{4\,r^2-(s+2\,y)^2}-4\,y\,\sqrt{4\,r^2-(s+2\,y)^2}\Big) & 4\,s\,x+8\,x\,y+3\,s\,\sqrt{4\,r^2-(3\,s\\
 & 2\,\pi\,r^2+6\,s^2+2\,\sqrt{4\,r^2-(3\,s-2\\
 & 4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+\\
 & (s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2\\
 & 2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge\\
 & 4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2\\
 & (s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2}<\\
 & 2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)\\
\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+ & \sqrt{4\,r^2-(3\,s-2\,x)^2}\;(3\,s-2\,x)<4\,r\\
8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+ & (s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2}\;\geq 4\,r^2\\
8\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-6\,\pi\,r^2+28\,s\,r- & \sqrt{4\,r^2-(3\,s-2\,y)^2}\;(3\,s-2\,y)<4\\
8\,y\,r-26\,s^2-4\,s\,x+2\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+ & (s+2\,y)\,\sqrt{4\,r^2-(s+2\,y)^2}\;<4\,r^2\\
12\,s\,y-8\,x\,y+4\,\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y- & 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+\\
3\,s\,\sqrt{4\,r^2-(3\,s-2\,x)^2}+2\,s\,\sqrt{4\,r^2-(s+2\,x)^2}+ & 3\,s\left(4\,r+4\,x+4\,y+\sqrt{4\,r^2-(\right.\\
4\,x\,\sqrt{4\,r^2-(s+2\,x)^2}-6\,s\,\sqrt{4\,r^2-(3\,s-2\,y)^2}- & 8\,y\,r+18\,s^2+2\,\sqrt{4\,r^2-(3\,s-\\
2\,s\,\sqrt{4\,r^2-(s+2\,y)^2}-4\,y\,\sqrt{4\,r^2-(s+2\,y)^2}\Big) & 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+\\
 & 4\,s\,x+8\,x\,y+3\,s\,\sqrt{4\,r^2-(3\,s\\
 & 2\,\pi\,r^2+6\,s^2+2\,\sqrt{4\,r^2-(3\,s-2\\
 & 4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+\\
 & (s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2\\
 & 2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge\\
 & 4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2\\
 & (s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2}<
\end{cases}
$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+8yr-14s^2-12sx+2\sqrt{4r^2-(3s-2x)^2}\,x-12sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\,y-3s\sqrt{4r^2-(3s-2x)^2}+2s\sqrt{4r^2-(s+2x)^2}+4x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)<4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-8yr-26s^2-4sx-2\sqrt{4r^2-(3s-2x)^2}\,x+12sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\,y+3s\sqrt{4r^2-(3s-2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;<4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+\right.$$

$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+$$

$$8yr-14s^2-12sx-2\sqrt{4r^2-(3s-2x)^2}\;x-$$

$$12sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\;y+$$

$$3s\sqrt{4r^2-(3s-2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-$$

$$\left.2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)\geq 4r$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)<4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+\right.$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)<4r$$

$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-$$
$$8yr-26s^2-4sx+2\sqrt{4r^2-(3s-2x)^2}\;x+$$
$$12sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\;y-$$
$$3s\sqrt{4r^2-(3s-2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-$$
$$2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\Bigg)$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)<4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}<$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+\right.$$
$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+$$
$$8yr-14s^2-12sx+2\sqrt{4r^2-(3s-2x)^2}\;x-$$
$$12sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\;y-$$
$$3s\sqrt{4r^2-(3s-2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-$$
$$2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\Bigg)$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)<4r$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}<4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)<4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}<4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ <$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

Out[55]//TraditionalForm=

$$\text{ConditionalExpression}\Bigg[\begin{cases}\max\left(0,\ r^2\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)-\sqrt{r^2-\left(\frac{3s}{2}-x\right)^2}\ \left(\frac{3s}{2}-x\right)\right)+\max\left(0,\ r^2\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)-\left(\frac{s}{2}+x\right)\sqrt{r^2-\left(\frac{s}{2}+\right.\right. \\ \max\left(0,\ r^2\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)-\sqrt{r^2-\left(\frac{3s}{2}-y\right)^2}\ \left(\frac{3s}{2}-y\right)\right)+\max\left(0,\ r^2\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)-\left(\frac{s}{2}+y\right)\sqrt{r^2-\left(\frac{s}{2}\right.\right. \\ \max\left(0,\ \frac{1}{8}\left(-4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+2\pi r^2+\sqrt{4r^2-(3s-2x)^2}\ (2x-3s)\right)-\right. \\ \left.\frac{1}{4}(2r-3s+2x)(3s-2y)\right)- \\ \max\left(0,\ \frac{1}{8}\left(-4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+2\pi r^2+\sqrt{4r^2-(3s-2x)^2}\ (2x-3s)\right)-\right. \\ \left.\frac{1}{4}(2r-3s+2x)(s+2y)\right)-\max\left(0,\right. \\ \frac{1}{8}\left(-4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+2\pi r^2-(s+2x)\sqrt{4r^2-(s+2x)^2}\right)-\frac{1}{4}(2r-s-2x)(3s-2 \\ \max\left(0,\ \frac{1}{8}\left(-4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+2\pi r^2-(s+2x)\sqrt{4r^2-(s+2x)^2}\right)-\frac{1}{4}(2r-s-2x)(s\right. \\ 0\end{cases}$$

Out[56]//TraditionalForm=

$$\begin{cases}0 & \left(\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4\right. \\ & (s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq \\ & \sqrt{4r^2-(3s-2y)^2}\ (3s-2y \\ & (s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq \\ & 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4s \\ & 4sx+8xv+3s\sqrt{4r^2-}\end{cases}$$

$$2\pi r^2 + 6s^2 + 2\sqrt{4r^2 - (3$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 +$$

$$3s\left(4r + 4x + 4y + \sqrt{4r$$

$$2\pi r^2 + 8yr + 18s^2 + 2\sqrt{4$$

$$8xy \wedge 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right.$$

$$4(s+2y)r + (s+2x)\sqrt{4$$

$$2\left(\pi r^2 + (s+2x)(s+2y)\right) /$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 + 12s$$

$$(s+2x)\left(4y + \sqrt{4r^2 - (s$$

$$2\left(\pi r^2 + 4yr + 3s^2 + 6sx\right)$$

$$\frac{1}{8}\left(4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 - 2\pi r^2 + \right.$$

$$4sr + 8yr - 2s^2 - 4sx - 4sy - 8xy +$$

$$\left. s\sqrt{4r^2-(s+2x)^2} + 2x\sqrt{4r^2-(s+2x)^2}\right)$$

$$2r \geq s \wedge$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x) \geq 4$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y) \geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2} \geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 +$$

$$3s\left(4r + 4x + 4y + \sqrt{4r^2 - ($$

$$8yr + 18s^2 + 2\sqrt{4r^2 - (3s -$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 + 4sr +$$

$$4sx + 8xy + 3s\sqrt{4r^2 - (3s$$

$$2\pi r^2 + 6s^2 + 2\sqrt{4r^2 - (3s - 2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 + 12sr +$$

$$(s+2x)\left(4y + \sqrt{4r^2 - (s+2$$

$$2\left(\pi r^2 + 4yr + 3s^2 + 6sx\right)$$

$$\frac{1}{8}\left(4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+12sr-8yr-6s^2-12sx+4sy+8xy+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}\right)$$

$$2r\geq s\wedge\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s}$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{4}\left(4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+8sr-4s^2-8sx+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}\right)$$

$$2r\geq s\wedge\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s}$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$\frac{1}{8}\left(4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+4sr+\right.$$

$$2r\geq s\wedge$$

$$8\,y\,r - 6\,s^2 + 4\,s\,x - 2\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;x -$$
$$12\,s\,y + 8\,x\,y + 3\,s\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\Big)$$

$$\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;(3\,s - 2\,x) \geq 4$$
$$(s + 2\,x)\sqrt{4\,r^2 - (s + 2\,x)^2} \geq 4\,r^2$$
$$\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;(3\,s - 2\,y) \geq 4$$
$$(s + 2\,y)\sqrt{4\,r^2 - (s + 2\,y)^2} \geq 4\,r^2$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 +$$
$$3\,s\Big(4\,r + 4\,x + 4\,y + \sqrt{4\,r^2 - (}$$
$$8\,y\,r + 18\,s^2 + 2\sqrt{4\,r^2 - (3\,s -}$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 12\,s\,r +$$
$$(s + 2\,x)\Big(4\,y + \sqrt{4\,r^2 - (s + 2}$$
$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right) \land$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 4\,(s + 2$$
$$(s + 2\,x)\sqrt{4\,r^2 - (s + 2\,x)^2} \geq$$
$$2\left(\pi\,r^2 + (s + 2\,x)\,(s + 2\,y)\right)$$

$$\frac{1}{8}\left(4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 +\right.$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 - 4\,\pi\,r^2 + 8\,s\,r +$$
$$16\,y\,r - 8\,s^2 - 2\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;x -$$
$$16\,s\,y + 3\,s\sqrt{4\,r^2 - (3\,s - 2\,x)^2} +$$
$$\left. s\sqrt{4\,r^2 - (s + 2\,x)^2} + 2\,x\sqrt{4\,r^2 - (s + 2\,x)^2}\right)$$

$$2\,r \geq s \land$$
$$\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;(3\,s - 2\,x) \geq 4$$
$$(s + 2\,x)\sqrt{4\,r^2 - (s + 2\,x)^2} \geq 4\,r^2$$
$$\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;(3\,s - 2\,y) \geq 4$$
$$(s + 2\,y)\sqrt{4\,r^2 - (s + 2\,y)^2} \geq 4\,r^2$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 +$$
$$3\,s\Big(4\,r + 4\,x + 4\,y + \sqrt{4\,r^2 - (}$$
$$8\,y\,r + 18\,s^2 + 2\sqrt{4\,r^2 - (3\,s -}$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 12\,s\,r +$$
$$(s + 2\,x)\Big(4\,y + \sqrt{4\,r^2 - (s + 2}$$
$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right)$$

$$\frac{1}{8}\left(4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 +\right.$$

$$2\,r \geq s \land$$
$$\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;(3\,s - 2\,x) \geq 4$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-12s^2-8sx-2\sqrt{4r^2-(3s-2x)^2}\,x-8sy+16xy+3s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}\Bigg)$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$\sqrt{4r^2-(s+2x)^2}\geq 2\left(\pi r^2\right.$$

$$\frac{1}{8}\left(4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+8yr-14s^2-12sx-2\sqrt{4r^2-(3s-2x)^2}\,x-12sy+8xy+3s\sqrt{4r^2-(3s-2x)^2}+2s\sqrt{4r^2-(s+2x)^2}+4x\sqrt{4r^2-(s+2x)^2}\right)$$

$$2r\geq s\wedge$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$2\pi r^2+8yr+18s^2+2\sqrt{4r^2-$$

$$\frac{1}{8}\left(4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+12sr-8yr-18s^2+12sx-2\sqrt{4r^2-(3s-2x)^2}\,x+12sy-8xy+3s\sqrt{4r^2-(3s-2x)^2}\right)$$

$$2r\geq s\wedge$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$(s + 2x)\left(4y + \sqrt{4r^2 - (s + 2\right.$

$2\left(\pi r^2 + 4yr + 3s^2 + 6sx\right) \wedge$

$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 + 4(s + 2$

$\sqrt{4r^2 - (s + 2x)^2} \geq 2\left(\pi r^2\right.$

$\frac{1}{8}\left(4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 + 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 - 4\pi r^2 + 16sr - 20s^2 + 8sx - 2\sqrt{4r^2 - (3s - 2x)^2}\, x + 8sy - 16xy + 3s\sqrt{4r^2 - (3s - 2x)^2} + s\sqrt{4r^2 - (s + 2x)^2} + 2x\sqrt{4r^2 - (s + 2x)^2}\right)$

$2r \geq s \wedge$

$\sqrt{4r^2 - (3s - 2x)^2}\,(3s - 2x) \geq 4$

$(s + 2x)\sqrt{4r^2 - (s + 2x)^2} \geq 4r^2$

$\sqrt{4r^2 - (3s - 2y)^2}\,(3s - 2y) \geq 4$

$(s + 2y)\sqrt{4r^2 - (s + 2y)^2} \geq 4r^2$

$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 + 4sr +$

$4sx + 8xy + 3s\sqrt{4r^2 - (3s$

$2\pi r^2 + 6s^2 + 2\sqrt{4r^2 - (3s - 2$

$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 + 12sr +$

$(s + 2x)\left(4y + \sqrt{4r^2 - (s + 2\right.$

$2\left(\pi r^2 + 4yr + 3s^2 + 6sx\right)$

$\frac{1}{8}\left(4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 + 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 - 4\pi r^2 + 24sr - 16yr - 24s^2 - 2\sqrt{4r^2 - (3s - 2x)^2}\, x + 16sy + 3s\sqrt{4r^2 - (3s - 2x)^2} + s\sqrt{4r^2 - (s + 2x)^2} + 2x\sqrt{4r^2 - (s + 2x)^2}\right)$

$2r \geq s \wedge$

$\sqrt{4r^2 - (3s - 2x)^2}\,(3s - 2x) \geq 4$

$(s + 2x)\sqrt{4r^2 - (s + 2x)^2} \geq 4r^2$

$\sqrt{4r^2 - (3s - 2y)^2}\,(3s - 2y) \geq 4$

$(s + 2y)\sqrt{4r^2 - (s + 2y)^2} \geq 4r^2$

$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 + 4sr +$

$4sx + 8xy + 3s\sqrt{4r^2 - (3s$

$2\pi r^2 + 6s^2 + 2\sqrt{4r^2 - (3s - 2$

$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 + 4(s + 2$

$\sqrt{4r^2 - (s + 2x)^2} \geq 2\left(\pi r^2\right.$

$\frac{1}{8}\left(4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 +\right.$

$2r \geq s \wedge$

$$\left(\left(\sqrt{4r^2-(3s-2x)^2}\right)\right)$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4$$

$$8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$

$$8yr-26s^2-4sx-2\sqrt{4r^2-(3s-2x)^2}\ x+$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$12sy-8xy+3s\sqrt{4r^2-(3s-2x)^2}\ +$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2$$

$$2s\sqrt{4r^2-(s+2x)^2}\ +4x\sqrt{4r^2-(s+2x)^2}\Bigg)$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$\frac{1}{4}\left(4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-\right.$$

$$2r\geq s\wedge$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4$$

$$2\pi r^2+8sr-12s^2+8sx-$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$

$$\left.2\sqrt{4r^2-(3s-2x)^2}\ x+3s\sqrt{4r^2-(3s-2x)^2}\right)$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$\sqrt{4r^2-(s+2x)^2}\ \geq 2\left(\pi r^2\right.$$

$$\frac{1}{8}\left(8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+\right.$$

$$2r\geq s\wedge$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$

$$8yr-26s^2+12sx-4\sqrt{4r^2-(3s-2x)^2}\ x-$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$4sy-8xy+6s\sqrt{4r^2-(3s-2x)^2}\ +$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2$$

$$s\sqrt{4r^2-(s+2x)^2}\ +2x\sqrt{4r^2-(s+2x)^2}\Bigg)$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)$$

$$\frac{1}{8}\left(8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+\right.$$

$$2r\geq s\wedge$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$

$$8yr-30s^2+4sx-4\sqrt{4r^2-(3s-2x)^2}\ x+$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$4sy+8xy+6s\sqrt{4r^2-(3s-2x)^2}\ +$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2$$

$$s\sqrt{4r^2-(s+2x)^2}\ +2x\sqrt{4r^2-(s+2x)^2}\Bigg)$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$\sqrt{4r^2-(s+2x)^2}\ \geq 2\left(\pi r^2\right.$$

$$\frac{1}{4}\Bigg(4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$2r\geq s\wedge$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-16s^2-$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$

$$2\sqrt{4r^2-(3s-2x)^2}\ x+3s\sqrt{4r^2-(3s-2x)^2}\ +$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$s\sqrt{4r^2-(s+2x)^2}\ +2x\sqrt{4r^2-(s+2x)^2}\Bigg)$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2$$

$$r^2\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)-\frac{1}{4}(s+2y)\sqrt{4r^2-(s+2y)^2}$$

$$2r\geq s\wedge$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+4sr+8yr-2s^2-4sx-4sy-8xy+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right) \quad 2r\geq s\wedge$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+12sr-8yr-6s^2-12sx+4sy+8xy+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right) \quad 2r\geq s\wedge$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$\left(\sqrt{4r^2-(s+2x)^2}\right)$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-\right.$$
$$2\pi r^2+8sr-4s^2-8sx+$$
$$s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-$$
$$\left.s\sqrt{4r^2-(s+2y)^2}-2y\sqrt{4r^2-(s+2y)^2}\right)$$

$$2r\geq s\wedge$$
$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s}$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+\right.$$
$$4sr+8yr-6s^2+4sx-2\sqrt{4r^2-(3s-2x)^2}\ x-$$
$$12sy+8xy+3s\sqrt{4r^2-(3s-2x)^2}-$$
$$\left.2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$2r\geq s\wedge$$
$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{}\left(\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)\right.\quad\tan^{-1}\left(\frac{3s-2x}{}\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{2r}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+\right.$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+8sr+$$
$$16yr-8s^2-2\sqrt{4r^2-(3s-2x)^2}\;x-$$
$$16sy+3s\sqrt{4r^2-(3s-2x)^2}\;+$$
$$s\sqrt{4r^2-(s+2x)^2}\;+2x\sqrt{4r^2-(s+2x)^2}\;-$$
$$\left.2s\sqrt{4r^2-(s+2y)^2}\;-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$2r\geq s\wedge$$
$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)\geq 4$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq 4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+\right.$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-$$
$$12s^2-8sx-2\sqrt{4r^2-(3s-2x)^2}\;x-$$
$$8sy+16xy+3s\sqrt{4r^2-(3s-2x)^2}\;+$$
$$s\sqrt{4r^2-(s+2x)^2}\;+2x\sqrt{4r^2-(s+2x)^2}\;-$$
$$\left.2s\sqrt{4r^2-(s+2y)^2}\;-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$2r\geq s\wedge$$
$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)\geq 4$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq 4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+\right.$$
$$8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+$$
$$8yr-14s^2-12sx-2\sqrt{4r^2-(3s-2x)^2}\;x-$$
$$12sy+8xy+3s\sqrt{4r^2-(3s-2x)^2}\;+$$
$$2s\sqrt{4r^2-(s+2x)^2}\;+4x\sqrt{4r^2-(s+2x)^2}\;-$$
$$2s\sqrt{4r^2-(s+2y)^2}\;-4y\sqrt{4r^2-(s+2y)^2}\Big)$$

$$2r\geq s\wedge$$
$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)\geq 4$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq 4r^2$$
$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$2\,s\sqrt{4\,r^2-(s+2\,y)^2}\;-4\,y\sqrt{4\,r^2-(s+2\,y)^2}\;\Bigg)$$

$$2\,\pi\,r^2+8\,y\,r+18\,s^2+2\sqrt{4\,r^2-$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2-\right.$$
$$2\,\pi\,r^2+12\,s\,r-8\,y\,r-18\,s^2+12\,s\,x-$$
$$2\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+12\,s\,y-$$
$$8\,x\,y+3\,s\sqrt{4\,r^2-(3\,s-2\,x)^2}\;-$$
$$\left.2\,s\sqrt{4\,r^2-(s+2\,y)^2}\;-4\,y\sqrt{4\,r^2-(s+2\,y)^2}\right)$$

$$2\,r\geq s\wedge$$
$$\sqrt{4\,r^2-(3\,s-2\,x)^2}\;(3\,s-2\,x)\geq 4$$
$$(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;\geq 4\,r^2$$
$$\sqrt{4\,r^2-(3\,s-2\,y)^2}\;(3\,s-2\,y)\geq 4$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$
$$4\,s\,x+8\,x\,y+3\,s\sqrt{4\,r^2-(3\,s$$
$$2\,\pi\,r^2+6\,s^2+2\sqrt{4\,r^2-(3\,s-2$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$
$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2$$
$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$
$$(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;\geq$$
$$2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+\right.$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-4\,\pi\,r^2+16\,s\,r-$$
$$20\,s^2+8\,s\,x-2\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+$$
$$8\,s\,y-16\,x\,y+3\,s\sqrt{4\,r^2-(3\,s-2\,x)^2}\;+$$
$$s\sqrt{4\,r^2-(s+2\,x)^2}\;+2\,x\sqrt{4\,r^2-(s+2\,x)^2}\;-$$
$$\left.2\,s\sqrt{4\,r^2-(s+2\,y)^2}\;-4\,y\sqrt{4\,r^2-(s+2\,y)^2}\right)$$

$$2\,r\geq s\wedge$$
$$\sqrt{4\,r^2-(3\,s-2\,x)^2}\;(3\,s-2\,x)\geq 4$$
$$(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;\geq 4\,r^2$$
$$\sqrt{4\,r^2-(3\,s-2\,y)^2}\;(3\,s-2\,y)\geq 4$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$
$$4\,s\,x+8\,x\,y+3\,s\sqrt{4\,r^2-(3\,s$$
$$2\,\pi\,r^2+6\,s^2+2\sqrt{4\,r^2-(3\,s-2$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$
$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2$$
$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+\right.$$

$$2\,r\geq s\wedge$$
$$\sqrt{4\,r^2-(3\,s-2\,x)^2}\;(3\,s-2\,x)\geq 4$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+24sr-16yr-24s^2-2\sqrt{4r^2-(3s-2x)^2}\,x+16sy+3s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\Bigg) \quad (s+2x)\sqrt{4r^2-(s+2x)^2}\ge 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\ge 4$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$\sqrt{4r^2-(s+2x)^2}\ge 2\left(\pi r^2\right.$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-8yr-26s^2-4sx-2\sqrt{4r^2-(3s-2x)^2}\,x+12sy-8xy+3s\sqrt{4r^2-(3s-2x)^2}+2s\sqrt{4r^2-(s+2x)^2}+4x\sqrt{4r^2-(s+2x)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right) \quad 2r\ge s\wedge$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\ge 4$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ge 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\ge 4$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+8sr-12s^2+8sx-2\sqrt{4r^2-(3s-2x)^2}\,x+3s\sqrt{4r^2-(3s-2x)^2}-s\sqrt{4r^2-(s+2y)^2}-2y\sqrt{4r^2-(s+2y)^2}\right) \quad 2r\ge s\wedge$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\ge 4$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ge 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\ge 4$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ge$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+\right) \quad 2r\ge s\wedge$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\ge 4$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+8yr-26s^2+12sx-4\sqrt{4r^2-(3s-2x)^2}\,x-4sy-8xy+6s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\Bigg) \quad (s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr+8yr-30s^2+4sx-4\sqrt{4r^2-(3s-2x)^2}\,x+4sy+8xy+6s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right) \quad 2r\geq s\wedge$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-16s^2-2\sqrt{4r^2-(3s-2x)^2}\,x+3s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-s\sqrt{4r^2-(s+2y)^2}-2y\sqrt{4r^2-(s+2y)^2}\right) \quad 2r\geq s\wedge$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$

$$\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+\frac{1}{4}\sqrt{4r^2-(3s-2y)^2}\,(2y-3s) \quad 2r\geq s\wedge$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\right.}\right)r^2+4sr+$$

$$\left(\sqrt{4r^2-(3s-2x)^2}\right)$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+\right.$$
$$4sr+8yr-2s^2-4sx-4sy-8xy+$$
$$4\sqrt{4r^2-(3s-2y)^2}\ y+s\sqrt{4r^2-(s+2x)^2}\ +$$
$$\left.2x\sqrt{4r^2-(s+2x)^2}\ -6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$2r\geq s\wedge$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+\right.$$
$$12sr-8yr-6s^2-12sx+4sy+8xy+$$
$$4\sqrt{4r^2-(3s-2y)^2}\ y+s\sqrt{4r^2-(s+2x)^2}\ +$$
$$\left.2x\sqrt{4r^2-(s+2x)^2}\ -6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$2r\geq s\wedge$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-\right.$$

$$2\pi r^2+8sr-4s^2-8sx+$$

$$2\sqrt{4r^2-(3s-2y)^2}\ y+s\sqrt{4r^2-(s+2x)^2}\ +$$

$$\left.2x\sqrt{4r^2-(s+2x)^2}\ -3s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$2r\geq s\wedge$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+\right.$$

$$4sr+8yr-6s^2+4sx-2\sqrt{4r^2-(3s-2x)^2}\ x-$$

$$12sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\ y+$$

$$\left.3s\sqrt{4r^2-(3s-2x)^2}\ -6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$2r\geq s\wedge$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+8sr+16yr-8s^2-2\sqrt{4r^2-(3s-2x)^2}\,x-16sy+4\sqrt{4r^2-(3s-2y)^2}\,y+3s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$2r\geq s\wedge\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-12s^2-8sx-2\sqrt{4r^2-(3s-2x)^2}\,x-8sy+16xy+4\sqrt{4r^2-(3s-2y)^2}\,y+3s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$2r\geq s\wedge\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+8yr-14s^2-12sx-2\sqrt{4r^2-(3s-2x)^2}\;x-12sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\;y+3s\sqrt{4r^2-(3s-2x)^2}+2s\sqrt{4r^2-(s+2x)^2}+4x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$2r\geq s\wedge\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)\geq 4$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq 4r^2$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$2\pi r^2+8yr+18s^2+2\sqrt{4r^2-}$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+12sr-8yr-18s^2+12sx-2\sqrt{4r^2-(3s-2x)^2}\;x+12sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\;y+3s\sqrt{4r^2-(3s-2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$2r\geq s\wedge\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)\geq 4$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq 4r^2$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-20s^2+8sx-2\sqrt{4r^2-(3s-2x)^2}\;x+8sy-16xy+4\sqrt{4r^2-(3s-2y)^2}\;y+3s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+\right.$$

$$2r\geq s\wedge\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)\geq 4$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq 4r^2$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$2\,x\sqrt{4\,r^2-(s+2\,x)^2}\;-6\,s\sqrt{4\,r^2-(3\,s-2\,y)^2}\;\Bigg)\qquad 4\,s\,x+8\,x\,y+3\,s\sqrt{4\,r^2-(3\,s$$

$$2\,\pi\,r^2+6\,s^2+2\sqrt{4\,r^2-(3\,s-2$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$

$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2$$

$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+\right.\qquad 2\,r\geq s\wedge$$

$$\sqrt{4\,r^2-(3\,s-2\,x)^2}\;(3\,s-2\,x)\geq 4$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-4\,\pi\,r^2+24\,s\,r-\qquad (s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;\geq 4\,r^2$$

$$16\,y\,r-24\,s^2-2\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+\qquad (s+2\,y)\sqrt{4\,r^2-(s+2\,y)^2}\;\geq 4\,r^2$$

$$16\,s\,y+4\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y+\qquad 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$

$$3\,s\sqrt{4\,r^2-(3\,s-2\,x)^2}\;+s\sqrt{4\,r^2-(s+2\,x)^2}\;+\qquad 4\,s\,x+8\,x\,y+3\,s\sqrt{4\,r^2-(3\,s$$

$$\left.2\,x\sqrt{4\,r^2-(s+2\,x)^2}\;-6\,s\sqrt{4\,r^2-(3\,s-2\,y)^2}\;\right)\qquad 2\,\pi\,r^2+6\,s^2+2\sqrt{4\,r^2-(3\,s-2$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$

$$\sqrt{4\,r^2-(s+2\,x)^2}\;\geq 2\left(\pi\,r^2\right.$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+\right.\qquad 2\,r\geq s\wedge$$

$$\sqrt{4\,r^2-(3\,s-2\,x)^2}\;(3\,s-2\,x)\geq 4$$

$$8\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-6\,\pi\,r^2+28\,s\,r-\qquad (s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;\geq 4\,r^2$$

$$8\,y\,r-26\,s^2-4\,s\,x-2\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+\qquad (s+2\,y)\sqrt{4\,r^2-(s+2\,y)^2}\;\geq 4\,r^2$$

$$12\,s\,y-8\,x\,y+4\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y+\qquad 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$

$$3\,s\sqrt{4\,r^2-(3\,s-2\,x)^2}\;+2\,s\sqrt{4\,r^2-(s+2\,x)^2}\;+\qquad 4\,s\,x+8\,x\,y+3\,s\sqrt{4\,r^2-(3\,s$$

$$\left.4\,x\sqrt{4\,r^2-(s+2\,x)^2}\;-6\,s\sqrt{4\,r^2-(3\,s-2\,y)^2}\;\right)\qquad 2\,\pi\,r^2+6\,s^2+2\sqrt{4\,r^2-(3\,s-2$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2-\right.\qquad 2\,r\geq s\wedge$$

$$\sqrt{4\,r^2-(3\,s-2\,x)^2}\;(3\,s-2\,x)\geq 4$$

$$2\,\pi\,r^2+8\,s\,r-12\,s^2+8\,s\,x-\qquad (s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;\geq 4\,r^2$$

$$2\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+2\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y+\qquad (s+2\,y)\sqrt{4\,r^2-(s+2\,y)^2}\;\geq 4\,r^2$$

$$\left.3\,s\sqrt{4\,r^2-(3\,s-2\,x)^2}\;-3\,s\sqrt{4\,r^2-(3\,s-2\,y)^2}\;\right)\qquad 4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+\right.$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+$$
$$8yr-26s^2+12sx-4\sqrt{4r^2-(3s-2x)^2}\ x-$$
$$4sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\ y+$$
$$6s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+$$
$$\left.2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\right)$$
$$2r\geq s\wedge$$
$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+\right.$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-$$
$$8yr-30s^2+4sx-4\sqrt{4r^2-(3s-2x)^2}\ x+$$
$$4sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\ y+$$
$$6s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+$$
$$\left.2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\right)$$
$$2r\geq s\wedge$$
$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$\sqrt{4r^2-(s+2x)^2}\ \geq 2\left(\pi r^2\right.$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+\right.$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-16s^2-$$
$$2\sqrt{4r^2-(3s-2x)^2}\ x+2\sqrt{4r^2-(3s-2y)^2}\ y+$$
$$3s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+$$
$$\left.2x\sqrt{4r^2-(s+2x)^2}-3s\sqrt{4r^2-(3s-2y)^2}\right)$$
$$2r\geq s\wedge$$
$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq 4r^2$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+\right.$$
$$2\sqrt{4r^2-(3s-2y)^2}\ y-3s\sqrt{4r^2-(3s-2y)^2}\ -$$
$$2r\geq s\wedge$$
$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4$$

$$s\sqrt{4r^2-(s+2y)^2}-2y\sqrt{4r^2-(s+2y)^2}\Big)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+\right.$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+4sr+$$
$$8yr-2s^2-4sx-4sy-8xy+$$
$$4\sqrt{4r^2-(3s-2y)^2}\,y+s\sqrt{4r^2-(s+2x)^2}+$$
$$2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-$$
$$\left.2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$2r\geq s\wedge$$
$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+\right.$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+12sr-$$
$$8yr-6s^2-12sx+4sy+8xy+$$
$$4\sqrt{4r^2-(3s-2y)^2}\,y+s\sqrt{4r^2-(s+2x)^2}+$$
$$2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-$$
$$\left.2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$2r\geq s\wedge$$
$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+\right.$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+8sr-$$
$$4s^2-8sx+2\sqrt{4r^2-(3s-2y)^2}\,y+$$
$$s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-$$
$$3s\sqrt{4r^2-(3s-2y)^2}-$$
$$\left.s\sqrt{4r^2-(s+2y)^2}-2y\sqrt{4r^2-(s+2y)^2}\right)$$

$$2r\geq s\wedge$$
$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+\right.$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+4sr+$$
$$8yr-6s^2+4sx-2\sqrt{4r^2-(3s-2x)^2}\,x-$$
$$12sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\,y+$$

$$2r\geq s\wedge$$
$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3\,s\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;-6\,s\,\sqrt{4\,r^2-(3\,s-2\,y)^2}\;-$$
$$2\,s\,\sqrt{4\,r^2-(s+2\,y)^2}\;-4\,y\,\sqrt{4\,r^2-(s+2\,y)^2}\;\Bigg)$$

$$3\,s\left(4\,r+4\,x+4\,y+\sqrt{4\,r^2-(\right.$$
$$8\,y\,r+18\,s^2+2\,\sqrt{4\,r^2-(3\,s-$$
$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$
$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2\right.$$
$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge$$
$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$
$$(s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2}\;\geq$$
$$2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$

$$\frac{1}{8}\Bigg(8\,\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+$$
$$8\,\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$
$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-4\,\pi\,r^2+8\,s\,r+$$
$$16\,y\,r-8\,s^2-2\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x-$$
$$16\,s\,y+4\,\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y+$$
$$3\,s\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;+s\,\sqrt{4\,r^2-(s+2\,x)^2}\;+$$
$$2\,x\,\sqrt{4\,r^2-(s+2\,x)^2}\;-6\,s\,\sqrt{4\,r^2-(3\,s-2\,y)^2}\;-$$
$$2\,s\,\sqrt{4\,r^2-(s+2\,y)^2}\;-4\,y\,\sqrt{4\,r^2-(s+2\,y)^2}\;\Bigg)$$

$$2\,r\geq s\wedge$$
$$\sqrt{4\,r^2-(3\,s-2\,x)^2}\;(3\,s-2\,x)\geq 4$$
$$(s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2}\;\geq 4\,r^2$$
$$4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$
$$3\,s\left(4\,r+4\,x+4\,y+\sqrt{4\,r^2-(\right.$$
$$8\,y\,r+18\,s^2+2\,\sqrt{4\,r^2-(3\,s-$$
$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$
$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2\right.$$
$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)$$

$$\frac{1}{8}\Bigg(8\,\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+$$
$$8\,\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$
$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-4\,\pi\,r^2+16\,s\,r-$$
$$12\,s^2-8\,s\,x-2\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x-$$
$$8\,s\,y+16\,x\,y+4\,\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y+$$
$$3\,s\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;+s\,\sqrt{4\,r^2-(s+2\,x)^2}\;+$$
$$2\,x\,\sqrt{4\,r^2-(s+2\,x)^2}\;-6\,s\,\sqrt{4\,r^2-(3\,s-2\,y)^2}\;-$$
$$2\,s\,\sqrt{4\,r^2-(s+2\,y)^2}\;-4\,y\,\sqrt{4\,r^2-(s+2\,y)^2}\;\Bigg)$$

$$2\,r\geq s\wedge$$
$$\sqrt{4\,r^2-(3\,s-2\,x)^2}\;(3\,s-2\,x)\geq 4$$
$$(s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2}\;\geq 4\,r^2$$
$$4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$
$$3\,s\left(4\,r+4\,x+4\,y+\sqrt{4\,r^2-(\right.$$
$$8\,y\,r+18\,s^2+2\,\sqrt{4\,r^2-(3\,s-$$
$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$
$$(s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2}\;\geq$$
$$2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$

$$2\left(\pi r^2 + (s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2 + 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 + 8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 - 6\pi r^2 + 20sr + 8yr - 14s^2 - 12sx - 2\sqrt{4r^2-(3s-2x)^2}\,x - 12sy + 8xy + 4\sqrt{4r^2-(3s-2y)^2}\,y + 3s\sqrt{4r^2-(3s-2x)^2} + 2s\sqrt{4r^2-(s+2x)^2} + 4x\sqrt{4r^2-(s+2x)^2} - 6s\sqrt{4r^2-(3s-2y)^2} - 2s\sqrt{4r^2-(s+2y)^2} - 4y\sqrt{4r^2-(s+2y)^2}\right)$$

$2r \geq s \wedge$

$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x) \geq 4$

$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq 4r^2$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2 + 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 - 2\pi r^2 + 12sr - 8yr - 18s^2 + 12sx - 2\sqrt{4r^2-(3s-2x)^2}\,x + 12sy - 8xy + 4\sqrt{4r^2-(3s-2y)^2}\,y + 3s\sqrt{4r^2-(3s-2x)^2} - 6s\sqrt{4r^2-(3s-2y)^2} - 2s\sqrt{4r^2-(s+2y)^2} - 4y\sqrt{4r^2-(s+2y)^2}\right)$$

$2r \geq s \wedge$

$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x) \geq 4$

$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq 4r^2$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2 + 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 - 4\pi r^2 + 16sr -\right.$$

$2r \geq s \wedge$

$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x) \geq 4$

$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq 4r^2$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 +$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$2\pi r^2 + 8yr + 18s^2 + 2\sqrt{4r^2-}$$

$2r \geq s \wedge$

$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x) \geq 4$

$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq 4r^2$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 + 4sr +$$

$$4sx + 8xy + 3s\sqrt{4r^2-(3s}$$

$$2\pi r^2 + 6s^2 + 2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 + 12sr +$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2 + 4yr + 3s^2 + 6sx\right) \wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 + 4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq$$

$$2\left(\pi r^2 + (s+2x)(s+2y)\right)$$

$2r \geq s \wedge$

$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x) \geq 4$

$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq 4r^2$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 + 4sr +$$

$$20\,s^2+8\,s\,x-2\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+$$
$$8\,s\,y-16\,x\,y+4\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y+$$
$$3\,s\sqrt{4\,r^2-(3\,s-2\,x)^2}+s\sqrt{4\,r^2-(s+2\,x)^2}+$$
$$2\,x\sqrt{4\,r^2-(s+2\,x)^2}-6\,s\sqrt{4\,r^2-(3\,s-2\,y)^2}-$$
$$2\,s\sqrt{4\,r^2-(s+2\,y)^2}-4\,y\sqrt{4\,r^2-(s+2\,y)^2}\Big)$$

$$4\,s\,x+8\,x\,y+3\,s\sqrt{4\,r^2-(3\,s$$
$$2\,\pi\,r^2+6\,s^2+2\sqrt{4\,r^2-(3\,s-2$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$
$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2$$
$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+\right.$$
$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-4\,\pi\,r^2+24\,s\,r-$$
$$16\,y\,r-24\,s^2-2\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+$$
$$16\,s\,y+4\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y+$$
$$3\,s\sqrt{4\,r^2-(3\,s-2\,x)^2}+s\sqrt{4\,r^2-(s+2\,x)^2}+$$
$$2\,x\sqrt{4\,r^2-(s+2\,x)^2}-6\,s\sqrt{4\,r^2-(3\,s-2\,y)^2}-$$
$$\left.2\,s\sqrt{4\,r^2-(s+2\,y)^2}-4\,y\sqrt{4\,r^2-(s+2\,y)^2}\right)$$

$$2\,r\geq s\wedge$$
$$\sqrt{4\,r^2-(3\,s-2\,x)^2}\;(3\,s-2\,x)\geq 4$$
$$(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;\geq 4\,r^2$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$
$$4\,s\,x+8\,x\,y+3\,s\sqrt{4\,r^2-(3\,s$$
$$2\,\pi\,r^2+6\,s^2+2\sqrt{4\,r^2-(3\,s-2$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$
$$(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;\geq$$
$$2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+\right.$$
$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$
$$8\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-6\,\pi\,r^2+28\,s\,r-$$
$$8\,y\,r-26\,s^2-4\,s\,x-2\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+$$
$$12\,s\,y-8\,x\,y+4\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y+$$
$$3\,s\sqrt{4\,r^2-(3\,s-2\,x)^2}+2\,s\sqrt{4\,r^2-(s+2\,x)^2}+$$
$$4\,x\sqrt{4\,r^2-(s+2\,x)^2}-6\,s\sqrt{4\,r^2-(3\,s-2\,y)^2}-$$
$$\left.2\,s\sqrt{4\,r^2-(s+2\,y)^2}-4\,y\sqrt{4\,r^2-(s+2\,y)^2}\right)$$

$$2\,r\geq s\wedge$$
$$\sqrt{4\,r^2-(3\,s-2\,x)^2}\;(3\,s-2\,x)\geq 4$$
$$(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;\geq 4\,r^2$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$
$$4\,s\,x+8\,x\,y+3\,s\sqrt{4\,r^2-(3\,s$$
$$2\,\pi\,r^2+6\,s^2+2\sqrt{4\,r^2-(3\,s-2$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+\right.$$
$$\left.4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2-2\,\pi\,r^2+8\,s\,r-\right.$$

$$2\,r\geq s\wedge$$
$$\sqrt{4\,r^2-(3\,s-2\,x)^2}\;(3\,s-2\,x)\geq 4$$
$$(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;\geq 4\,r^2$$

$$12\,s^2+8\,s\,x-2\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+2\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y+3\,s\sqrt{4\,r^2-(3\,s-2\,x)^2}-3\,s\sqrt{4\,r^2-(3\,s-2\,y)^2}-s\sqrt{4\,r^2-(s+2\,y)^2}-2\,y\sqrt{4\,r^2-(s+2\,y)^2}\Bigg)$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2$$

$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge 4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;\geq 2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+8\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-6\,\pi\,r^2+20\,s\,r+8\,y\,r-26\,s^2+12\,s\,x-4\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x-4\,s\,y-8\,x\,y+4\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y+6\,s\sqrt{4\,r^2-(3\,s-2\,x)^2}+s\sqrt{4\,r^2-(s+2\,x)^2}+2\,x\sqrt{4\,r^2-(s+2\,x)^2}-6\,s\sqrt{4\,r^2-(3\,s-2\,y)^2}-2\,s\sqrt{4\,r^2-(s+2\,y)^2}-4\,y\sqrt{4\,r^2-(s+2\,y)^2}\Bigg)$$

$$2\,r\geq s\wedge\sqrt{4\,r^2-(3\,s-2\,x)^2}\;(3\,s-2\,x)\geq 4$$

$$(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;\geq 4\,r^2\wedge 4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2$$

$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+8\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-6\,\pi\,r^2+28\,s\,r+8\,y\,r-30\,s^2+4\,s\,x-4\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+4\,s\,y+8\,x\,y+4\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y+6\,s\sqrt{4\,r^2-(3\,s-2\,x)^2}+s\sqrt{4\,r^2-(s+2\,x)^2}+2\,x\sqrt{4\,r^2-(s+2\,x)^2}-6\,s\sqrt{4\,r^2-(3\,s-2\,y)^2}-2\,s\sqrt{4\,r^2-(s+2\,y)^2}-4\,y\sqrt{4\,r^2-(s+2\,y)^2}\Bigg)$$

$$2\,r\geq s\wedge\sqrt{4\,r^2-(3\,s-2\,x)^2}\;(3\,s-2\,x)\geq 4$$

$$(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;\geq 4\,r^2\wedge 4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;\geq 2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$

$$\frac{1}{4}\Bigg(4\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+\qquad 2\,r\geq s\wedge$$

$$4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right) r^2 + 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 +$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 - 4\pi r^2 + 16 s r - 16 s^2 -$$

$$2\sqrt{4r^2-(3s-2x)^2}\, x + 2\sqrt{4r^2-(3s-2y)^2}\, y +$$

$$3s\sqrt{4r^2-(3s-2x)^2} + s\sqrt{4r^2-(s+2x)^2} +$$

$$2x\sqrt{4r^2-(s+2x)^2} - 3s\sqrt{4r^2-(3s-2y)^2} -$$

$$s\sqrt{4r^2-(s+2y)^2} - 2y\sqrt{4r^2-(s+2y)^2}\Bigg)$$

(right column, cut off:) $\sqrt{4r^2-(3s-2x)^2}\ (3s-2x) \geq$ … ; $(s+2x)\sqrt{4r^2-(s+2x)^2} \geq 4r^2$ …

$$r^2\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right) - \frac{1}{4}(s+2x)\sqrt{4r^2-(s+2x)^2}$$

$2r \geq s \wedge$

$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x) \geq$ …

$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y) \geq$ …

$(s+2y)\sqrt{4r^2-(s+2y)^2} \geq 4r^2$ …

$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 +$

$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$ …

$8yr+18s^2+2\sqrt{4r^2-(3s-}$ …

$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 + 4sr +$ …

$4sx+8xy+3s\sqrt{4r^2-(3s}$ …

$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$ …

$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 + 12sr +$ …

$(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.$ …

$2\left(\pi r^2+4yr+3s^2+6sx\right) \wedge$

$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 + 4(s+2$ …

$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq$ …

$2\left(\pi r^2+(s+2x)(s+2y)\right)$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right) r^2 + 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 - 2\pi r^2 +\right.$$

$$4sr+8yr-2s^2-4sx-4sy-8xy-$$

$2r \geq s \wedge$

$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x) \geq$ …

$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y) \geq$ …

$$s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}\Big)$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+\right.$$

$$12sr-8yr-6s^2-12sx+4sy+8xy-$$

$$\left.s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}\right)$$

$$2r\geq s\wedge$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-$$

$$\frac{\pi r^2}{2}+2sr-s^2-2sx$$

$$2r\geq s\wedge$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4$$

$$\sqrt{4\,r^2-(3\,s-2\,y)^2}\;\;(3\,s-2\,y)\geq 4$$

$$(s+2\,y)\,\sqrt{4\,r^2-(s+2\,y)^2}\;\geq 4\,r^2$$

$$4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$

$$3\,s\left(4\,r+4\,x+4\,y+\sqrt{4\,r^2-(\right.$$

$$8\,y\,r+18\,s^2+2\,\sqrt{4\,r^2-(3\,s-$$

$$4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$

$$4\,s\,x+8\,x\,y+3\,s\,\sqrt{4\,r^2-(3\,s$$

$$2\,\pi\,r^2+6\,s^2+2\,\sqrt{4\,r^2-(3\,s-2$$

$$\frac{1}{8}\left(8\,\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2-2\,\pi\,r^2+\right.\qquad 2\,r\geq s\wedge$$

$$\sqrt{4\,r^2-(3\,s-2\,x)^2}\;\;(3\,s-2\,x)\geq 4$$

$$4\,s\,r+8\,y\,r-6\,s^2+4\,s\,x-2\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;\;x-$$

$$\sqrt{4\,r^2-(3\,s-2\,y)^2}\;\;(3\,s-2\,y)\geq 4$$

$$12\,s\,y+8\,x\,y+3\,s\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;\;-$$

$$(s+2\,y)\,\sqrt{4\,r^2-(s+2\,y)^2}\;\geq 4\,r^2$$

$$2\,s\,\sqrt{4\,r^2-(s+2\,x)^2}\;\;-4\,x\,\sqrt{4\,r^2-(s+2\,x)^2}\;\;\left.\right)$$

$$4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$

$$3\,s\left(4\,r+4\,x+4\,y+\sqrt{4\,r^2-(\right.$$

$$8\,y\,r+18\,s^2+2\,\sqrt{4\,r^2-(3\,s-$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$

$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2\right.$$

$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$

$$(s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2}\;\geq$$

$$2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$

$$\frac{1}{8}\left(8\,\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+\right.\qquad 2\,r\geq s\wedge$$

$$\sqrt{4\,r^2-(3\,s-2\,x)^2}\;\;(3\,s-2\,x)\geq 4$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-4\,\pi\,r^2+8\,s\,r+$$

$$\sqrt{4\,r^2-(3\,s-2\,y)^2}\;\;(3\,s-2\,y)\geq 4$$

$$16\,y\,r-8\,s^2-2\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;\;x-$$

$$(s+2\,y)\,\sqrt{4\,r^2-(s+2\,y)^2}\;\geq 4\,r^2$$

$$16\,s\,y+3\,s\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;\;-$$

$$4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\right.}\right)r^2+$$

$$s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}\Big)$$

$$\left(\sqrt{4r^2-(3s-2x)^2}\right)$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+\right.$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-$$

$$12s^2-8sx-2\sqrt{4r^2-(3s-2x)^2}\,x-$$

$$8sy+16xy+3s\sqrt{4r^2-(3s-2x)^2}\,-$$

$$\left.s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}\right)$$

$$2r\geq s\wedge$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)\geq 4$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+\right.$$

$$8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+$$

$$8yr-14s^2-12sx-2\sqrt{4r^2-(3s-2x)^2}\,x-$$

$$\left.12sy+8xy+3s\sqrt{4r^2-(3s-2x)^2}\right)$$

$$2r\geq s\wedge$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)\geq 4$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$2\pi r^2+8yr+18s^2+2\sqrt{4r^2-}$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-\right.$$

$$2\pi r^2+12sr-8yr-18s^2+12sx-$$

$$2\sqrt{4r^2-(3s-2x)^2}\,x+12sy-$$

$$2r\geq s\wedge$$

$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)\geq 4$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$

$$8\,x\,y+3\,s\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;-\;2\,s\,\sqrt{4\,r^2-(s+2\,x)^2}\;-4\,x\,\sqrt{4\,r^2-(s+2\,x)^2}\Bigg)$$

$$(s+2\,y)\,\sqrt{4\,r^2-(s+2\,y)^2}\;\geq 4\,r^2$$

$$4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$

$$4\,s\,x+8\,x\,y+3\,s\,\sqrt{4\,r^2-(3\,s$$

$$2\,\pi\,r^2+6\,s^2+2\,\sqrt{4\,r^2-(3\,s-2$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$

$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2$$

$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$

$$(s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2}\;\geq$$

$$2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$

$$\frac{1}{8}\left(8\,\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+\right.$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-4\,\pi\,r^2+16\,s\,r-$$

$$20\,s^2+8\,s\,x-2\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+$$

$$8\,s\,y-16\,x\,y+3\,s\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;-$$

$$\left.s\,\sqrt{4\,r^2-(s+2\,x)^2}\;-2\,x\,\sqrt{4\,r^2-(s+2\,x)^2}\right)$$

$$2\,r\geq s\wedge$$

$$\sqrt{4\,r^2-(3\,s-2\,x)^2}\;(3\,s-2\,x)\geq 4$$

$$\sqrt{4\,r^2-(3\,s-2\,y)^2}\;(3\,s-2\,y)\geq 4$$

$$(s+2\,y)\,\sqrt{4\,r^2-(s+2\,y)^2}\;\geq 4\,r^2$$

$$4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$

$$4\,s\,x+8\,x\,y+3\,s\,\sqrt{4\,r^2-(3\,s$$

$$2\,\pi\,r^2+6\,s^2+2\,\sqrt{4\,r^2-(3\,s-2$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$

$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2$$

$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)$$

$$\frac{1}{8}\left(8\,\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+\right.$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-4\,\pi\,r^2+24\,s\,r-$$

$$16\,y\,r-24\,s^2-2\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+$$

$$16\,s\,y+3\,s\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;-$$

$$\left.s\,\sqrt{4\,r^2-(s+2\,x)^2}\;-2\,x\,\sqrt{4\,r^2-(s+2\,x)^2}\right)$$

$$2\,r\geq s\wedge$$

$$\sqrt{4\,r^2-(3\,s-2\,x)^2}\;(3\,s-2\,x)\geq 4$$

$$\sqrt{4\,r^2-(3\,s-2\,y)^2}\;(3\,s-2\,y)\geq 4$$

$$(s+2\,y)\,\sqrt{4\,r^2-(s+2\,y)^2}\;\geq 4\,r^2$$

$$4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$

$$4\,s\,x+8\,x\,y+3\,s\,\sqrt{4\,r^2-(3\,s$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-8yr-26s^2-4sx-2\sqrt{4r^2-(3s-2x)^2}\,x+12sy-8xy+3s\sqrt{4r^2-(3s-2x)^2}\right)$$

$$2r\geq s\wedge\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4$$
$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+8sr-12s^2+8sx-2\sqrt{4r^2-(3s-2x)^2}\,x+3s\sqrt{4r^2-(3s-2x)^2}-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}\right)$$

$$2r\geq s\wedge\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4$$
$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+8yr-26s^2+12sx-4\sqrt{4r^2-(3s-2x)^2}\,x-4sy-8xy+6s\sqrt{4r^2-(3s-2x)^2}-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}\right)$$

$$2r\geq s\wedge\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4$$
$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-8yr-30s^2+4sx-4\sqrt{4r^2-(3s-2x)^2}\,x+4sy+8xy+6s\sqrt{4r^2-(3s-2x)^2}-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}\right)$$

$$\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-\pi r^2+4sr-4s^2-\frac{1}{2}\sqrt{4r^2-(3s-2x)^2}\,x+\frac{3}{4}s\sqrt{4r^2-(3s-2x)^2}$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-s\sqrt{4r^2-(s+2y)^2}-2y\sqrt{4r^2-(s+2y)^2}\right)$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)$$

$$2r\geq s\wedge$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$\sqrt{4r^2-(s+2x)^2}\ \geq 2\left(\pi r^2\right.$$

$$2r\geq s\wedge$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2$$

$$2r\geq s\wedge$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+\right.$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+4sr+$$
$$8yr-2s^2-4sx-4sy-8xy-$$
$$s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-$$
$$\left.2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$2r\geq s\wedge$$
$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4$$
$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+\right.$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+12sr-$$
$$8yr-6s^2-12sx+4sy+8xy-$$
$$s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-$$
$$\left.2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$2r\geq s\wedge$$
$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4$$
$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right) r^2 + \cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right) r^2 + \tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 - \frac{\pi r^2}{2} + 2sr - s^2 - 2sx - \frac{1}{4}s\sqrt{4r^2-(s+2y)^2} - \frac{1}{2}y\sqrt{4r^2-(s+2y)^2}$$

$$2r \geq s \wedge \sqrt{4r^2-(3s-2x)^2}\ (3s-2x) \geq 4$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y) \geq 4$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 + 3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr + 18s^2 + 2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 + 4sr + 4sx + 8xy + 3s\sqrt{4r^2-(3s$$

$$2\pi r^2 + 6s^2 + 2\sqrt{4r^2-(3s-2}$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right) r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right) r^2 + 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 - 2\pi r^2 + 4sr + 8yr - 6s^2 + 4sx - 2\sqrt{4r^2-(3s-2x)^2}\ x - 12sy + 8xy + 3s\sqrt{4r^2-(3s-2x)^2} - 2s\sqrt{4r^2-(s+2x)^2} - 4x\sqrt{4r^2-(s+2x)^2} - 2s\sqrt{4r^2-(s+2y)^2} - 4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$2r \geq s \wedge \sqrt{4r^2-(3s-2x)^2}\ (3s-2x) \geq 4$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y) \geq 4$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 + 3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr + 18s^2 + 2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 + 12sr + (s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2 + 4yr + 3s^2 + 6sx\right) \wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 + 4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq 2\left(\pi r^2 + (s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right) r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right) r^2 + 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 + 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 - 4\pi r^2 + 8sr + \right.$$

$$2r \geq s \wedge \sqrt{4r^2-(3s-2x)^2}\ (3s-2x) \geq 4$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y) \geq 4$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 +$$

$$16\,y\,r - 8\,s^2 - 2\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;x - 16\,s\,y + 3\,s\sqrt{4\,r^2 - (3\,s - 2\,x)^2} - s\sqrt{4\,r^2 - (s + 2\,x)^2} - 2\,x\sqrt{4\,r^2 - (s + 2\,x)^2} - 2\,s\sqrt{4\,r^2 - (s + 2\,y)^2} - 4\,y\sqrt{4\,r^2 - (s + 2\,y)^2}\Bigg)$$

$$3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4\,r^2 - (\right.$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2 + 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 + 4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 - 4\,\pi\,r^2 + 16\,s\,r - 12\,s^2 - 8\,s\,x - 2\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;x - 8\,s\,y + 16\,x\,y + 3\,s\sqrt{4\,r^2 - (3\,s - 2\,x)^2} - s\sqrt{4\,r^2 - (s + 2\,x)^2} - 2\,x\sqrt{4\,r^2 - (s + 2\,x)^2} - 2\,s\sqrt{4\,r^2 - (s + 2\,y)^2} - 4\,y\sqrt{4\,r^2 - (s + 2\,y)^2}\right)$$

$$2\,r \geq s \wedge \sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;(3\,s - 2\,x) \geq 4$$

$$\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;(3\,s - 2\,y) \geq 4$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 +$$

$$3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4\,r^2 - (\right.$$

$$8\,y\,r + 18\,s^2 + 2\sqrt{4\,r^2 - (3\,s -$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 4\,(s + 2$$

$$(s + 2\,x)\sqrt{4\,r^2 - (s + 2\,x)^2} \geq$$

$$2\left(\pi\,r^2 + (s + 2\,x)\,(s + 2\,y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2 + 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 + 8\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 - 6\,\pi\,r^2 + 20\,s\,r + 8\,y\,r - 14\,s^2 - 12\,s\,x - 2\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;x - 12\,s\,y + 8\,x\,y + 3\,s\sqrt{4\,r^2 - (3\,s - 2\,x)^2} - 2\,s\sqrt{4\,r^2 - (s + 2\,y)^2} - 4\,y\sqrt{4\,r^2 - (s + 2\,y)^2}\right)$$

$$2\,r \geq s \wedge \sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;(3\,s - 2\,x) \geq 4$$

$$\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;(3\,s - 2\,y) \geq 4$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 +$$

$$3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4\,r^2 - (\right.$$

$$2\,\pi\,r^2 + 8\,y\,r + 18\,s^2 + 2\sqrt{4\,r^2 -$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2 + 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 - 2\,\pi\,r^2 + 12\,s\,r - 8\,y\,r - 18\,s^2 + 12\,s\,x - 2\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;x + 12\,s\,y - 8\,x\,y + 3\,s\sqrt{4\,r^2 - (3\,s - 2\,x)^2} -\right.$$

$$2\,r \geq s \wedge \sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;(3\,s - 2\,x) \geq 4$$

$$\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;(3\,s - 2\,y) \geq 4$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 + 4\,s\,r +$$

$$2\,s\,\sqrt{4\,r^2-(s+2\,x)^2}\;-4\,x\,\sqrt{4\,r^2-(s+2\,x)^2}\;-$$
$$2\,s\,\sqrt{4\,r^2-(s+2\,y)^2}\;-4\,y\,\sqrt{4\,r^2-(s+2\,y)^2}\;\Bigg)$$

$$4\,s\,x+8\,x\,y+3\,s\,\sqrt{4\,r^2-(3\,s$$
$$2\,\pi\,r^2+6\,s^2+2\,\sqrt{4\,r^2-(3\,s-2$$
$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$
$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2$$
$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge$$
$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$
$$(s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2}\;\geq$$
$$2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$

$$\frac{1}{8}\Bigg(8\,\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+$$

$$8\,\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-4\,\pi\,r^2+16\,s\,r-$$

$$20\,s^2+8\,s\,x-2\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+$$

$$8\,s\,y-16\,x\,y+3\,s\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;-$$

$$s\,\sqrt{4\,r^2-(s+2\,x)^2}\;-2\,x\,\sqrt{4\,r^2-(s+2\,x)^2}\;-$$

$$2\,s\,\sqrt{4\,r^2-(s+2\,y)^2}\;-4\,y\,\sqrt{4\,r^2-(s+2\,y)^2}\;\Bigg)$$

$$2\,r\geq s\wedge$$
$$\sqrt{4\,r^2-(3\,s-2\,x)^2}\;\;(3\,s-2\,x)\geq 4$$
$$\sqrt{4\,r^2-(3\,s-2\,y)^2}\;\;(3\,s-2\,y)\geq 4$$
$$4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$
$$4\,s\,x+8\,x\,y+3\,s\,\sqrt{4\,r^2-(3\,s$$
$$2\,\pi\,r^2+6\,s^2+2\,\sqrt{4\,r^2-(3\,s-2$$
$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$
$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2$$
$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)$$

$$\frac{1}{8}\Bigg(8\,\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+$$

$$8\,\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-4\,\pi\,r^2+24\,s\,r-$$

$$16\,y\,r-24\,s^2-2\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+$$

$$16\,s\,y+3\,s\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;-$$

$$s\,\sqrt{4\,r^2-(s+2\,x)^2}\;-2\,x\,\sqrt{4\,r^2-(s+2\,x)^2}\;-$$

$$2\,s\,\sqrt{4\,r^2-(s+2\,y)^2}\;-4\,y\,\sqrt{4\,r^2-(s+2\,y)^2}\;\Bigg)$$

$$2\,r\geq s\wedge$$
$$\sqrt{4\,r^2-(3\,s-2\,x)^2}\;\;(3\,s-2\,x)\geq 4$$
$$\sqrt{4\,r^2-(3\,s-2\,y)^2}\;\;(3\,s-2\,y)\geq 4$$
$$4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$
$$4\,s\,x+8\,x\,y+3\,s\,\sqrt{4\,r^2-(3\,s$$
$$2\,\pi\,r^2+6\,s^2+2\,\sqrt{4\,r^2-(3\,s-2$$
$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$
$$(s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2}\;\geq$$
$$2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-8yr-26s^2-4sx-2\sqrt{4r^2-(3s-2x)^2}\,x+12sy-8xy+3s\sqrt{4r^2-(3s-2x)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$2r\geq s\land \sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq \text{4}\ \sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq \text{4}\ 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s}\ 2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+8sr-12s^2+8sx-2\sqrt{4r^2-(3s-2x)^2}\,x+3s\sqrt{4r^2-(3s-2x)^2}-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-s\sqrt{4r^2-(s+2y)^2}-2y\sqrt{4r^2-(s+2y)^2}\right)$$

$$2r\geq s\land \sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq \text{4}\ \sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq \text{4}\ 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.\ 2\left(\pi r^2+4yr+3s^2+6sx\right)\land\ 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2\ (s+2x)\sqrt{4r^2-(s+2x)^2}\geq\ 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+8yr-26s^2+12sx-4\sqrt{4r^2-(3s-2x)^2}\,x-4sy-8xy+6s\sqrt{4r^2-(3s-2x)^2}-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$2r\geq s\land \sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq \text{4}\ \sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq \text{4}\ 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.\ 2\left(\pi r^2+4yr+3s^2+6sx\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{\ }\right)r^2+\right.\qquad 2r\geq s\land$$

$8\Big($ $\quad (\ r\ )$

$$8\cos^{-1}\!\left(\frac{\frac{s}{2}+y}{r}\right) r^2 + 8\tan^{-1}\!\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 +$$

$$4\tan^{-1}\!\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 - 6\pi r^2 + 28 s r -$$

$$8 y r - 30 s^2 + 4 s x - 4\sqrt{4r^2-(3s-2x)^2}\, x +$$

$$4 s y + 8 x y + 6 s\sqrt{4r^2-(3s-2x)^2} -$$

$$s\sqrt{4r^2-(s+2x)^2} - 2x\sqrt{4r^2-(s+2x)^2} -$$

$$2s\sqrt{4r^2-(s+2y)^2} - 4y\sqrt{4r^2-(s+2y)^2}\Big)$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x) \geq 4$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y) \geq 4$$

$$4\tan^{-1}\!\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 + 4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq$$

$$2\left(\pi r^2 + (s+2x)(s+2y)\right)$$

$$\cos^{-1}\!\left(\frac{\frac{s}{2}+x}{r}\right) r^2 + \cos^{-1}\!\left(\frac{\frac{s}{2}+y}{r}\right) r^2 + \tan^{-1}\!\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 +$$

$$\tan^{-1}\!\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 - \pi r^2 + 4 s r - 4 s^2 -$$

$$\frac{1}{2}\sqrt{4r^2-(3s-2x)^2}\, x + \frac{3}{4} s\sqrt{4r^2-(3s-2x)^2} -$$

$$\frac{1}{4} s\sqrt{4r^2-(s+2y)^2} - \frac{1}{2} y\sqrt{4r^2-(s+2y)^2}$$

$$2r \geq s \land$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x) \geq 4$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y) \geq 4$$

$$\frac{1}{4}\left(4\cos^{-1}\!\left(\frac{\frac{s}{2}+x}{r}\right) r^2 + 4\cos^{-1}\!\left(\frac{\frac{3s}{2}-y}{r}\right) r^2 +\right.$$

$$2\sqrt{4r^2-(3s-2y)^2}\, y - s\sqrt{4r^2-(s+2x)^2} -$$

$$\left.2x\sqrt{4r^2-(s+2x)^2} - 3s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$2r \geq s \land$$

$$\sqrt{4r^2-(3s-2x)^2}\,(3s-2x) \geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2} \geq 4r^2$$

$$4\tan^{-1}\!\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 +$$

$$3s\Big(4r + 4x + 4y + \sqrt{4r^2-(}$$

$$8 y r + 18 s^2 + 2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\!\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 + 4 s r +$$

$$4 s x + 8 x y + 3 s\sqrt{4r^2-(3s}$$

$$2\pi r^2 + 6 s^2 + 2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\!\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 + 12 s r +$$

$$(s+2x)\Big(4y + \sqrt{4r^2-(s+2}$$

$$2\left(\pi r^2 + 4 y r + 3 s^2 + 6 s x\right) \land$$

$$4\tan^{-1}\!\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 + 4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+4sr+8yr-2s^2-4sx-4sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\,y-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$2r\geq s\wedge\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+12sr-8yr-6s^2-12sx+4sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\,y-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$2r\geq s\wedge\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$2\left(\pi r^2 + (s+2x)(s+2y)\right)$$

$$\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right) r^2 + \cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right) r^2 + \tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 - \frac{\pi r^2}{2} + 2sr - s^2 - 2sx + \frac{1}{2}\sqrt{4r^2-(3s-2y)^2}\; y - \frac{3}{4}s\sqrt{4r^2-(3s-2y)^2}$$

$$2r \geq s \wedge \sqrt{4r^2-(3s-2x)^2}\;(3s-2x) \geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2} \geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 + 3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr + 18s^2 + 2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 + 4sr +$$

$$4sx + 8xy + 3s\sqrt{4r^2-(3s$$

$$2\pi r^2 + 6s^2 + 2\sqrt{4r^2-(3s-2$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right) r^2 + 8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right) r^2 + 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 - 2\pi r^2 + 4sr + 8yr - 6s^2 + 4sx - 2\sqrt{4r^2-(3s-2x)^2}\; x - 12sy + 8xy + 4\sqrt{4r^2-(3s-2y)^2}\; y + 3s\sqrt{4r^2-(3s-2x)^2} - 2s\sqrt{4r^2-(s+2x)^2} - 4x\sqrt{4r^2-(s+2x)^2} - 6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$2r \geq s \wedge \sqrt{4r^2-(3s-2x)^2}\;(3s-2x) \geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2} \geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 + 3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr + 18s^2 + 2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 + 12sr +$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2 + 4yr + 3s^2 + 6sx\right) \wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 + 4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq$$

$$2\left(\pi r^2 + (s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right) r^2 + 8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right) r^2 + 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 + 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 - 4\pi r^2 + 8sr +\right.$$

$$2r \geq s \wedge \sqrt{4r^2-(3s-2x)^2}\;(3s-2x) \geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2} \geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 +$$

$$\left(\sqrt{4r^2-(s+2x)^2}\right)$$

$$16yr - 8s^2 - 2\sqrt{4r^2-(3s-2x)^2}\,x - 16sy + 4\sqrt{4r^2-(3s-2y)^2}\,y + 3s\sqrt{4r^2-(3s-2x)^2} - s\sqrt{4r^2-(s+2x)^2} - 2x\sqrt{4r^2-(s+2x)^2} - 6s\sqrt{4r^2-(3s-2y)^2}\Bigg)$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr + 18s^2 + 2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 + 12sr +$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2 + 4yr + 3s^2 + 6sx\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2 + 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 + 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 - 4\pi r^2 + 16sr - 12s^2 - 8sx - 2\sqrt{4r^2-(3s-2x)^2}\,x - 8sy + 16xy + 4\sqrt{4r^2-(3s-2y)^2}\,y + 3s\sqrt{4r^2-(3s-2x)^2} - s\sqrt{4r^2-(s+2x)^2} - 2x\sqrt{4r^2-(s+2x)^2} - 6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$2r \geq s \wedge \sqrt{4r^2-(3s-2x)^2}\,(3s-2x) \geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2} \geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 +$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr + 18s^2 + 2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 + 4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq$$

$$2\left(\pi r^2 + (s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2 + 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 + 8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 - 6\pi r^2 + 20sr + 8yr - 14s^2 - 12sx - 2\sqrt{4r^2-(3s-2x)^2}\,x - 12sy + 8xy + 4\sqrt{4r^2-(3s-2y)^2}\,y + 3s\sqrt{4r^2-(3s-2x)^2} - 6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$2r \geq s \wedge \sqrt{4r^2-(3s-2x)^2}\,(3s-2x) \geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2} \geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 +$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$2\pi r^2 + 8yr + 18s^2 + 2\sqrt{4r^2-}$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2 + 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 - 2\pi r^2 + 12sr - 8yr - 18s^2 + 12sx - 2\sqrt{4r^2-(3s-2x)^2}\,x +\right.$$

$$2r \geq s \wedge \sqrt{4r^2-(3s-2x)^2}\,(3s-2x) \geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2} \geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 + 4sr +$$

$$12\,s\,y - 8\,x\,y + 4\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;y +$$
$$3\,s\sqrt{4\,r^2 - (3\,s - 2\,x)^2} - 2\,s\sqrt{4\,r^2 - (s + 2\,x)^2} -$$
$$4\,x\sqrt{4\,r^2 - (s + 2\,x)^2} - 6\,s\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\Bigg)$$

$$\Big(\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\Big)$$
$$4\,s\,x + 8\,x\,y + 3\,s\sqrt{4\,r^2 - (3\,s$$
$$2\,\pi\,r^2 + 6\,s^2 + 2\sqrt{4\,r^2 - (3\,s - 2$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 12\,s\,r +$$
$$(s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2$$
$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 4\,(s + 2$$
$$(s + 2\,x)\sqrt{4\,r^2 - (s + 2\,x)^2} \geq$$
$$2\left(\pi\,r^2 + (s + 2\,x)\,(s + 2\,y)\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 +$$
$$8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2 + 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 +$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 - 4\,\pi\,r^2 + 16\,s\,r -$$
$$20\,s^2 + 8\,s\,x - 2\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;x +$$
$$8\,s\,y - 16\,x\,y + 4\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;y +$$
$$3\,s\sqrt{4\,r^2 - (3\,s - 2\,x)^2} - s\sqrt{4\,r^2 - (s + 2\,x)^2} -$$
$$2\,x\sqrt{4\,r^2 - (s + 2\,x)^2} - 6\,s\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\Bigg)$$

$$2\,r \geq s\wedge$$
$$\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;(3\,s - 2\,x) \geq 4$$
$$(s + 2\,y)\sqrt{4\,r^2 - (s + 2\,y)^2} \geq 4\,r^2$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 + 4\,s\,r +$$
$$4\,s\,x + 8\,x\,y + 3\,s\sqrt{4\,r^2 - (3\,s$$
$$2\,\pi\,r^2 + 6\,s^2 + 2\sqrt{4\,r^2 - (3\,s - 2$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 12\,s\,r +$$
$$(s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2$$
$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 +$$
$$8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2 + 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 +$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 - 4\,\pi\,r^2 + 24\,s\,r -$$
$$16\,y\,r - 24\,s^2 - 2\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;x +$$
$$16\,s\,y + 4\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;y +$$
$$3\,s\sqrt{4\,r^2 - (3\,s - 2\,x)^2} - s\sqrt{4\,r^2 - (s + 2\,x)^2} -$$
$$2\,x\sqrt{4\,r^2 - (s + 2\,x)^2} - 6\,s\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\Bigg)$$

$$2\,r \geq s\wedge$$
$$\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;(3\,s - 2\,x) \geq 4$$
$$(s + 2\,y)\sqrt{4\,r^2 - (s + 2\,y)^2} \geq 4\,r^2$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 + 4\,s\,r +$$
$$4\,s\,x + 8\,x\,y + 3\,s\sqrt{4\,r^2 - (3\,s$$
$$2\,\pi\,r^2 + 6\,s^2 + 2\sqrt{4\,r^2 - (3\,s - 2$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 4\,(s + 2$$
$$(s + 2\,x)\sqrt{4\,r^2 - (s + 2\,x)^2} \geq$$
$$2\left(\pi\,r^2 + (s + 2\,x)\,(s + 2\,y)\right)$$

$$2\left(\pi r^2 + (s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2 + 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 + 8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 - 6\pi r^2 + 28sr - 8yr - 26s^2 - 4sx - 2\sqrt{4r^2-(3s-2x)^2}\,x + 12sy - 8xy + 4\sqrt{4r^2-(3s-2y)^2}\,y + 3s\sqrt{4r^2-(3s-2x)^2} - 6s\sqrt{4r^2-(3s-2y)^2}\right) \quad 2r \geq s \wedge \sqrt{4r^2-(3s-2x)^2}\,(3s-2x) \geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2} \geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 + 4sr + 4sx + 8xy + 3s\sqrt{4r^2-(3s$$

$$2\pi r^2 + 6s^2 + 2\sqrt{4r^2-(3s-2$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 + 4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2 + 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 - 2\pi r^2 + 8sr - 12s^2 + 8sx - 2\sqrt{4r^2-(3s-2x)^2}\,x + 2\sqrt{4r^2-(3s-2y)^2}\,y + 3s\sqrt{4r^2-(3s-2x)^2} - s\sqrt{4r^2-(s+2x)^2} - 2x\sqrt{4r^2-(s+2x)^2} - 3s\sqrt{4r^2-(3s-2y)^2}\right) \quad 2r \geq s \wedge \sqrt{4r^2-(3s-2x)^2}\,(3s-2x) \geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2} \geq 4r^2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 + 12sr + (s+2x)\left(4y + \sqrt{4r^2-(s+2$$

$$2\left(\pi r^2 + 4yr + 3s^2 + 6sx\right) \wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 + 4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq$$

$$2\left(\pi r^2 + (s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2 + 8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 + 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 - 6\pi r^2 + 20sr + 8yr - 26s^2 + 12sx - 4\sqrt{4r^2-(3s-2x)^2}\,x - 4sy - 8xy + 4\sqrt{4r^2-(3s-2y)^2}\,y + 6s\sqrt{4r^2-(3s-2x)^2} - s\sqrt{4r^2-(s+2x)^2} - 2x\sqrt{4r^2-(s+2x)^2} - 6s\sqrt{4r^2-(3s-2y)^2}\right) \quad 2r \geq s \wedge \sqrt{4r^2-(3s-2x)^2}\,(3s-2x) \geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2} \geq 4r^2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 + 12sr + (s+2x)\left(4y + \sqrt{4r^2-(s+2$$

$$2\left(\pi r^2 + 4yr + 3s^2 + 6sx\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 + \right) \quad 2r \geq s \wedge$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+\right. \qquad 2r\geq s\wedge$$

$$8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+ \qquad \sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr- \qquad (s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$8yr-30s^2+4sx-4\sqrt{4r^2-(3s-2x)^2}\ x+ \qquad 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$4sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\ y+ \qquad (s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$

$$6s\sqrt{4r^2-(3s-2x)^2}-s\sqrt{4r^2-(s+2x)^2}- \qquad 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\Big)$$

$$\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+ \qquad 2r\geq s\wedge$$

$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4$$

$$\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-\pi r^2+4sr-4s^2- \qquad (s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$\frac{1}{2}\sqrt{4r^2-(3s-2x)^2}\ x+\frac{1}{2}\sqrt{4r^2-(3s-2y)^2}\ y+$$

$$\frac{3}{4}s\sqrt{4r^2-(3s-2x)^2}-\frac{3}{4}s\sqrt{4r^2-(3s-2y)^2}$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+ \qquad 2r\geq s\wedge$$

$$2\sqrt{4r^2-(3s-2y)^2}\ y-s\sqrt{4r^2-(s+2x)^2}- \qquad \sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4$$

$$2x\sqrt{4r^2-(s+2x)^2}-3s\sqrt{4r^2-(3s-2y)^2}- \qquad 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$s\sqrt{4r^2-(s+2y)^2}-2y\sqrt{4r^2-(s+2y)^2}\Big) \qquad 3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+\right.$$
$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-$$
$$2\pi r^2+4sr+8yr-2s^2-4sx-4sy-8xy+$$
$$4\sqrt{4r^2-(3s-2y)^2}\,y-s\sqrt{4r^2-(s+2x)^2}-$$
$$2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-$$
$$\left.2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$2r\geq s\wedge$$
$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+\right.$$
$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+$$
$$12sr-8yr-6s^2-12sx+4sy+8xy+$$
$$4\sqrt{4r^2-(3s-2y)^2}\,y-s\sqrt{4r^2-(s+2x)^2}-$$
$$2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-$$
$$\left.2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$2r\geq s\wedge$$
$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+\right.$$
$$4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\right.$$

$$2r\geq s\wedge$$
$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4$$

$$4\cos^{-1}\left(\frac{\quad}{r}\right)r^2+4\tan^{-1}\left(\frac{\quad}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-$$

$$2\pi r^2+8sr-4s^2-8sx+$$
$$2\sqrt{4r^2-(3s-2y)^2}\;y-3s\sqrt{4r^2-(3s-2y)^2}\;-$$
$$s\sqrt{4r^2-(s+2y)^2}\;-2y\sqrt{4r^2-(s+2y)^2}\;\Bigg)$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+4sr+$$
$$8yr-6s^2+4sx-2\sqrt{4r^2-(3s-2x)^2}\;x-$$
$$12sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\;y+$$
$$3s\sqrt{4r^2-(3s-2x)^2}\;-2s\sqrt{4r^2-(s+2x)^2}\;-$$
$$4x\sqrt{4r^2-(s+2x)^2}\;-6s\sqrt{4r^2-(3s-2y)^2}\;-$$
$$2s\sqrt{4r^2-(s+2y)^2}\;-4y\sqrt{4r^2-(s+2y)^2}\;\Bigg)$$

$$2r\geq s\wedge$$
$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)\geq 4$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+$$
$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+8sr+$$
$$16yr-8s^2-2\sqrt{4r^2-(3s-2x)^2}\;x-$$
$$16sy+4\sqrt{4r^2-(3s-2y)^2}\;y+$$
$$3s\sqrt{4r^2-(3s-2x)^2}\;-s\sqrt{4r^2-(s+2x)^2}\;-$$
$$2x\sqrt{4r^2-(s+2x)^2}\;-6s\sqrt{4r^2-(3s-2y)^2}\;-$$
$$\sqrt{\quad}\qquad\sqrt{\quad}\Bigg)$$

$$2r\geq s\wedge$$
$$\sqrt{4r^2-(3s-2x)^2}\;(3s-2x)\geq 4$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)$$

$$2\,s\,\sqrt{4\,r^2-(s+2\,y)^2}\;-4\,y\,\sqrt{4\,r^2-(s+2\,y)^2}\;\Bigg)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+ \qquad 2\,r\geq s\wedge$$

$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-4\,\pi\,r^2+16\,s\,r-$$

$$12\,s^2-8\,s\,x-2\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x-$$

$$8\,s\,y+16\,x\,y+4\,\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y+$$

$$3\,s\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;-s\,\sqrt{4\,r^2-(s+2\,x)^2}\;-$$

$$2\,x\,\sqrt{4\,r^2-(s+2\,x)^2}\;-6\,s\,\sqrt{4\,r^2-(3\,s-2\,y)^2}\;-$$

$$2\,s\,\sqrt{4\,r^2-(s+2\,y)^2}\;-4\,y\,\sqrt{4\,r^2-(s+2\,y)^2}\;\Bigg)$$

$$\sqrt{4\,r^2-(3\,s-2\,x)^2}\;\;(3\,s-2\,x)\geq 4$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$

$$3\,s\left(4\,r+4\,x+4\,y+\sqrt{4\,r^2-(\right.$$

$$8\,y\,r+18\,s^2+2\,\sqrt{4\,r^2-(3\,s-$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$

$$(s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2}\;\geq$$

$$2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+ \qquad 2\,r\geq s\wedge$$

$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$

$$8\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-6\,\pi\,r^2+20\,s\,r+$$

$$8\,y\,r-14\,s^2-12\,s\,x-2\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x-$$

$$12\,s\,y+8\,x\,y+4\,\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y+$$

$$3\,s\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;-6\,s\,\sqrt{4\,r^2-(3\,s-2\,y)^2}\;-$$

$$2\,s\,\sqrt{4\,r^2-(s+2\,y)^2}\;-4\,y\,\sqrt{4\,r^2-(s+2\,y)^2}\;\Bigg)$$

$$\sqrt{4\,r^2-(3\,s-2\,x)^2}\;\;(3\,s-2\,x)\geq 4$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$

$$3\,s\left(4\,r+4\,x+4\,y+\sqrt{4\,r^2-(\right.$$

$$2\,\pi\,r^2+8\,y\,r+18\,s^2+2\,\sqrt{4\,r^2-$$

ConditionalExpression$\Bigg[\Bigg\{$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+ \qquad 2\,r\geq s\wedge$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2-2\,\pi\,r^2+12\,s\,r-$$

$$8\,y\,r-18\,s^2+12\,s\,x-2\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+$$

$$12\,s\,y-8\,x\,y+4\,\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y+$$

$$3\,s\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;-2\,s\,\sqrt{4\,r^2-(s+2\,x)^2}\;-$$

$$4\,x\,\sqrt{4\,r^2-(s+2\,x)^2}\;-6\,s\,\sqrt{4\,r^2-(3\,s-2\,y)^2}\;-$$

$$2\,s\,\sqrt{4\,r^2-(s+2\,y)^2}\;-4\,y\,\sqrt{4\,r^2-(s+2\,y)^2}\;\Bigg)$$

$$\sqrt{4\,r^2-(3\,s-2\,x)^2}\;\;(3\,s-2\,x)\geq 4$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$

$$4\,s\,x+8\,x\,y+3\,s\,\sqrt{4\,r^2-(3\,s}$$

$$2\,\pi\,r^2+6\,s^2+2\,\sqrt{4\,r^2-(3\,s-2}$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$

$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+\right.$$
$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-$$
$$20s^2+8sx-2\sqrt{4r^2-(3s-2x)^2}\ x+$$
$$8sy-16xy+4\sqrt{4r^2-(3s-2y)^2}\ y+$$
$$3s\sqrt{4r^2-(3s-2x)^2}\ -s\sqrt{4r^2-(s+2x)^2}\ -$$
$$2x\sqrt{4r^2-(s+2x)^2}\ -6s\sqrt{4r^2-(3s-2y)^2}\ -$$
$$\left.2s\sqrt{4r^2-(s+2y)^2}\ -4y\sqrt{4r^2-(s+2y)^2}\right)$$
$$2r\geq s\wedge$$
$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+\right.$$
$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+24sr-$$
$$16yr-24s^2-2\sqrt{4r^2-(3s-2x)^2}\ x+$$
$$16sy+4\sqrt{4r^2-(3s-2y)^2}\ y+$$
$$3s\sqrt{4r^2-(3s-2x)^2}\ -s\sqrt{4r^2-(s+2x)^2}\ -$$
$$2x\sqrt{4r^2-(s+2x)^2}\ -6s\sqrt{4r^2-(3s-2y)^2}\ -$$
$$\left.2s\sqrt{4r^2-(s+2y)^2}\ -4y\sqrt{4r^2-(s+2y)^2}\right)$$
$$2r\geq s\wedge$$
$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+\right.$$
$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$8\tan^{-1}\left(\frac{s+2x}{\sqrt{}}\right)r^2-6\pi r^2+28sr-$$
$$2r\geq s\wedge$$
$$\sqrt{4r^2-(3s-2x)^2}\ (3s-2x)\geq 4$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$\left(\sqrt{4r^2-(s+2x)^2}\right)$$

$$8yr-26s^2-4sx-2\sqrt{4r^2-(3s-2x)^2}\,x+12sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\,y+3s\sqrt{4r^2-(3s-2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\Bigg)$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$\frac{1}{4}\Bigg(4\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+8sr-12s^2+8sx-2\sqrt{4r^2-(3s-2x)^2}\,x+2\sqrt{4r^2-(3s-2y)^2}\,y+3s\sqrt{4r^2-(3s-2x)^2}-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-3s\sqrt{4r^2-(3s-2y)^2}-s\sqrt{4r^2-(s+2y)^2}-2y\sqrt{4r^2-(s+2y)^2}\Bigg)$$

$$2r\geq s\wedge\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+8yr-26s^2+12sx-4\sqrt{4r^2-(3s-2x)^2}\,x-4sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\,y+6s\sqrt{4r^2-(3s-2x)^2}-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\Bigg)$$

$$2r\geq s\wedge\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-$$

$$2r\geq s\wedge\sqrt{4r^2-(3s-2x)^2}\,(3s-2x)\geq 4$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$

$$\left(\sqrt{4r^2-(s+2x)^2}\right)$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$8yr-30s^2+4sx-4\sqrt{4r^2-(3s-2x)^2}\,x+$$
$$4sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\,y+$$
$$6s\sqrt{4r^2-(3s-2x)^2}-s\sqrt{4r^2-(s+2x)^2}-$$
$$2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-$$
$$2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\Bigg)$$

$$\frac{1}{4}\Bigg(4\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+$$

$$2r\geq s\wedge\sqrt{4r^2-(3s-2x)^2}\,(3s-$$

$$4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-16s^2-$$
$$2\sqrt{4r^2-(3s-2x)^2}\,x+2\sqrt{4r^2-(3s-2y)^2}\,y+$$
$$3s\sqrt{4r^2-(3s-2x)^2}-3s\sqrt{4r^2-(3s-2y)^2}-$$
$$s\sqrt{4r^2-(s+2y)^2}-2y\sqrt{4r^2-(s+2y)^2}\Bigg)$$

$$\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+\frac{1}{4}\sqrt{4r^2-(3s-2x)^2}\,(2x-3s)$$

$$2r\geq s\wedge(s+2x)\sqrt{4r^2-(s+2x)^2}$$

$$\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{}}\right)r^2+4(s+2$$

$$\left(\sqrt{4r^2-(s+2x)^2}\right)$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+\right.$$

$$4sr+8yr-2s^2-4sx+4\sqrt{4r^2-(3s-2x)^2}\,x-$$

$$4sy-8xy-6s\sqrt{4r^2-(3s-2x)^2}\,+$$

$$\left.s\sqrt{4r^2-(s+2x)^2}\,+2x\sqrt{4r^2-(s+2x)^2}\right)$$

$$2r\geq s\wedge(s+2x)\sqrt{4r^2-(s+2x)^2}$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-\right.$$

$$2\pi r^2+12sr-8yr-6s^2-12sx+$$

$$4\sqrt{4r^2-(3s-2x)^2}\,x+4sy+$$

$$8xy-6s\sqrt{4r^2-(3s-2x)^2}\,+$$

$$\left.s\sqrt{4r^2-(s+2x)^2}\,+2x\sqrt{4r^2-(s+2x)^2}\right)$$

$$2r\geq s\wedge(s+2x)\sqrt{4r^2-(s+2x)^2}$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+8sr-4s^2-8sx+2\sqrt{4r^2-(3s-2x)^2}\,x-3s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}\right)$$

$$2r\geq s\wedge(s+2x)\sqrt{4r^2-(s+2x)^2}\geq\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+4sr+8yr-6s^2+4sx+2\sqrt{4r^2-(3s-2x)^2}\,x-12sy+8xy-3s\sqrt{4r^2-(3s-2x)^2}\right)$$

$$2r\geq s\wedge(s+2x)\sqrt{4r^2-(s+2x)^2}\geq\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+8sr+\right.$$

$$2r\geq s\wedge(s+2x)\sqrt{4r^2-(s+2x)^2}\geq\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$16\,y\,r - 8\,s^2 + 2\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;x - 16\,s\,y - 3\,s\sqrt{4\,r^2 - (3\,s - 2\,x)^2} + s\sqrt{4\,r^2 - (s + 2\,x)^2} + 2\,x\sqrt{4\,r^2 - (s + 2\,x)^2}\Bigg)$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 + 3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4\,r^2 - (\right.$$

$$8\,y\,r + 18\,s^2 + 2\sqrt{4\,r^2 - (3\,s -$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 12\,s\,r +$$

$$(s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2\right.$$

$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2 + 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 + 4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 - 4\,\pi\,r^2 + 16\,s\,r - 12\,s^2 - 8\,s\,x + 2\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;x - 8\,s\,y + 16\,x\,y - 3\,s\sqrt{4\,r^2 - (3\,s - 2\,x)^2} + s\sqrt{4\,r^2 - (s + 2\,x)^2} + 2\,x\sqrt{4\,r^2 - (s + 2\,x)^2}\right)$$

$$2\,r \geq s \wedge (s + 2\,x)\sqrt{4\,r^2 - (s + 2\,x)^2}$$

$$\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;(3\,s - 2\,y) \geq 4$$

$$(s + 2\,y)\sqrt{4\,r^2 - (s + 2\,y)^2} \geq 4\,r^2$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 + 3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4\,r^2 - (\right.$$

$$8\,y\,r + 18\,s^2 + 2\sqrt{4\,r^2 - (3\,s -$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 4\,(s + 2$$

$$(s + 2\,x)\sqrt{4\,r^2 - (s + 2\,x)^2} \geq$$

$$2\left(\pi\,r^2 + (s + 2\,x)\,(s + 2\,y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2 + 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 + 8\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 - 6\,\pi\,r^2 + 20\,s\,r + 8\,y\,r - 14\,s^2 - 12\,s\,x + 2\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;x - 12\,s\,y + 8\,x\,y - 3\,s\sqrt{4\,r^2 - (3\,s - 2\,x)^2} + 2\,s\sqrt{4\,r^2 - (s + 2\,x)^2} + 4\,x\sqrt{4\,r^2 - (s + 2\,x)^2}\right)$$

$$2\,r \geq s \wedge (s + 2\,x)\sqrt{4\,r^2 - (s + 2\,x)^2}$$

$$\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;(3\,s - 2\,y) \geq 4$$

$$(s + 2\,y)\sqrt{4\,r^2 - (s + 2\,y)^2} \geq 4\,r^2$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 + 3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4\,r^2 - (\right.$$

$$2\,\pi\,r^2 + 8\,y\,r + 18\,s^2 + 2\sqrt{4\,r^2 -$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2 + 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 - 2\,\pi\,r^2 + 12\,s\,r - 8\,y\,r - 18\,s^2 + 12\,s\,x + 2\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;x + 12\,s\,y - 8\,x\,y - 3\,s\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\right)$$

$$2\,r \geq s \wedge (s + 2\,x)\sqrt{4\,r^2 - (s + 2\,x)^2}$$

$$\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;(3\,s - 2\,y) \geq 4$$

$$(s + 2\,y)\sqrt{4\,r^2 - (s + 2\,y)^2} \geq 4\,r^2$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 + 4\,s\,r +$$

$$\left(\sqrt{4r^2-(3s-2x)^2}\right)$$

$$4\,s\,x+8\,x\,y+3\,s\,\sqrt{4\,r^2-(3\,s$$

$$2\,\pi\,r^2+6\,s^2+2\,\sqrt{4\,r^2-(3\,s-2$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$

$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2$$

$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$

$$(s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2}\;\geq$$

$$2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2+4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+\right.$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-4\,\pi\,r^2+16\,s\,r-$$

$$20\,s^2+8\,s\,x+2\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+$$

$$8\,s\,y-16\,x\,y-3\,s\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;+$$

$$\left.s\,\sqrt{4\,r^2-(s+2\,x)^2}\;+2\,x\,\sqrt{4\,r^2-(s+2\,x)^2}\right)$$

$$2\,r\geq s\wedge(s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2}$$

$$\sqrt{4\,r^2-(3\,s-2\,y)^2}\;\;(3\,s-2\,y)\geq 4$$

$$(s+2\,y)\,\sqrt{4\,r^2-(s+2\,y)^2}\;\geq 4\,r^2$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$

$$4\,s\,x+8\,x\,y+3\,s\,\sqrt{4\,r^2-(3\,s$$

$$2\,\pi\,r^2+6\,s^2+2\,\sqrt{4\,r^2-(3\,s-2$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$

$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2$$

$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2+4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+\right.$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-4\,\pi\,r^2+24\,s\,r-$$

$$16\,y\,r-24\,s^2+2\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+$$

$$16\,s\,y-3\,s\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;+$$

$$\left.s\,\sqrt{4\,r^2-(s+2\,x)^2}\;+2\,x\,\sqrt{4\,r^2-(s+2\,x)^2}\right)$$

$$2\,r\geq s\wedge(s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2}$$

$$\sqrt{4\,r^2-(3\,s-2\,y)^2}\;\;(3\,s-2\,y)\geq 4$$

$$(s+2\,y)\,\sqrt{4\,r^2-(s+2\,y)^2}\;\geq 4\,r^2$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$

$$4\,s\,x+8\,x\,y+3\,s\,\sqrt{4\,r^2-(3\,s$$

$$2\,\pi\,r^2+6\,s^2+2\,\sqrt{4\,r^2-(3\,s-2$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$

$$\sqrt{4\,r^2-(s+2\,x)^2}\;\geq 2\left(\pi\,r^2\right.$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-8yr-26s^2-4sx+2\sqrt{4r^2-(3s-2x)^2}\,x+12sy-8xy-3s\sqrt{4r^2-(3s-2x)^2}+2s\sqrt{4r^2-(s+2x)^2}+4x\sqrt{4r^2-(s+2x)^2}\right)$$

$$\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-\frac{\pi r^2}{2}+2sr-3s^2+2sx$$

$$2r\geq s\wedge(s+2x)\sqrt{4r^2-(s+2x)^2}\geq\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2\wedge 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$2r\geq s\wedge(s+2x)\sqrt{4r^2-(s+2x)^2}\geq\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2\wedge 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+8yr-26s^2+12sx-4sy-8xy+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}\right)$$

$$2r\geq s\wedge(s+2x)\sqrt{4r^2-(s+2x)^2}\geq\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2\wedge 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-8yr-30s^2+4sx+4sy+8xy+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}\right)$$

$$2r\geq s\wedge(s+2x)\sqrt{4r^2-(s+2x)^2}\geq\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2\wedge 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right) r^2 + \tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 + \tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 - \pi r^2 + 4sr - 4s^2 + \frac{1}{4} s\sqrt{4r^2-(s+2x)^2} + \frac{1}{2} x\sqrt{4r^2-(s+2x)^2}$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right) r^2 + 4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right) r^2 + 2\sqrt{4r^2-(3s-2x)^2}\, x - 3s\sqrt{4r^2-(3s-2x)^2} - s\sqrt{4r^2-(s+2y)^2} - 2y\sqrt{4r^2-(s+2y)^2}\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right) r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right) r^2 + 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 - 2\pi r^2 + 4sr + 8yr - 2s^2 - 4sx + 4\sqrt{4r^2-(3s-2x)^2}\, x - 4sy - 8xy - 6s\sqrt{4r^2-(3s-2x)^2} + s\sqrt{4r^2-(s+2x)^2} + 2x\sqrt{4r^2-(s+2x)^2} - 2s\sqrt{4r^2-(s+2y)^2} - 4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$\sqrt{4r^2-(s+2x)^2} \geq 2\left(\pi r^2$$

$$2r \geq s \wedge (s+2x)\sqrt{4r^2-(s+2x)^2}$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y) \geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2} \geq 4r^2$$

$$2r \geq s \wedge (s+2x)\sqrt{4r^2-(s+2x)^2}$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y) \geq 4$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 +$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 + 4sr +$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 + 12sr +$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 + 4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$2r \geq s \wedge (s+2x)\sqrt{4r^2-(s+2x)^2}$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y) \geq 4$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 +$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 + 4sr +$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+12sr-8yr-6s^2-12sx+4\sqrt{4r^2-(3s-2x)^2}\,x+4sy+8xy-6s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+8sr-4s^2-8sx+2\sqrt{4r^2-(3s-2x)^2}\,x-3s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-s\sqrt{4r^2-(s+2y)^2}-2y\sqrt{4r^2-(s+2y)^2}\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+\right.$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)$$

$$2r\geq s\wedge(s+2x)\sqrt{4r^2-(s+2x)^2}$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$2r\geq s\wedge(s+2x)\sqrt{4r^2-(s+2x)^2}$$

$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$2r\geq s\wedge(s+2x)\sqrt{4r^2-(s+2x)^2}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+4sr+8yr-6s^2+4sx+2\sqrt{4r^2-(3s-2x)^2}\,x-12sy+8xy-3s\sqrt{4r^2-(3s-2x)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\Bigg)$$

$$\sqrt{4r^2-(3s-2y)^2}\ \ (3s-2y)\geq 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+8sr+16yr-8s^2+2\sqrt{4r^2-(3s-2x)^2}\,x-16sy-3s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$2r\geq s\wedge(s+2x)\sqrt{4r^2-(s+2x)^2}\ \sqrt{4r^2-(3s-2y)^2}\ \ (3s-2y)\geq 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-12s^2-8sx+2\sqrt{4r^2-(3s-2x)^2}\,x-8sy+16xy-3s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-\right.$$

$$2r\geq s\wedge(s+2x)\sqrt{4r^2-(s+2x)^2}\ \sqrt{4r^2-(3s-2y)^2}\ \ (3s-2y)\geq 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$2\,s\,\sqrt{4\,r^2-(s+2\,y)^2}\;-4\,y\,\sqrt{4\,r^2-(s+2\,y)^2}\;\Bigg) \qquad (s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2}\;\geq 2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2+ \qquad 2\,r\geq s\wedge(s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2}$$

$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+ \qquad \sqrt{4\,r^2-(3\,s-2\,y)^2}\;(3\,s-2\,y)\geq 4$$

$$8\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-6\,\pi\,r^2+20\,s\,r+ \qquad 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$

$$8\,y\,r-14\,s^2-12\,s\,x+2\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x- \qquad 3\,s\left(4\,r+4\,x+4\,y+\sqrt{4\,r^2-(\right.$$

$$12\,s\,y+8\,x\,y-3\,s\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;+ \qquad 2\,\pi\,r^2+8\,y\,r+18\,s^2+2\,\sqrt{4\,r^2-}$$

$$2\,s\,\sqrt{4\,r^2-(s+2\,x)^2}\;+4\,x\,\sqrt{4\,r^2-(s+2\,x)^2}\;-$$

$$2\,s\,\sqrt{4\,r^2-(s+2\,y)^2}\;-4\,y\,\sqrt{4\,r^2-(s+2\,y)^2}\;\Bigg)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+ \qquad 2\,r\geq s\wedge(s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2}$$

$$\sqrt{4\,r^2-(3\,s-2\,y)^2}\;(3\,s-2\,y)\geq 4$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2-2\,\pi\,r^2+12\,s\,r- \qquad 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$

$$8\,y\,r-18\,s^2+12\,s\,x+2\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+ \qquad 4\,s\,x+8\,x\,y+3\,s\,\sqrt{4\,r^2-(3\,s}$$

$$12\,s\,y-8\,x\,y-3\,s\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;- \qquad 2\,\pi\,r^2+6\,s^2+2\,\sqrt{4\,r^2-(3\,s-2}$$

$$2\,s\,\sqrt{4\,r^2-(s+2\,y)^2}\;-4\,y\,\sqrt{4\,r^2-(s+2\,y)^2}\;\Bigg) \qquad 4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$

$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2\right.$$

$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$

$$(s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2}\;\geq$$

$$2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2+ \qquad 2\,r\geq s\wedge(s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2}$$

$$\sqrt{4\,r^2-(3\,s-2\,y)^2}\;(3\,s-2\,y)\geq 4$$

$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+ \qquad 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-4\,\pi\,r^2+16\,s\,r- \qquad 4\,s\,x+8\,x\,y+3\,s\,\sqrt{4\,r^2-(3\,s}$$

$$20\,s^2+8\,s\,x+2\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+8\,s\,y-16\,x\,y-3\,s\sqrt{4\,r^2-(3\,s-2\,x)^2}\;+s\sqrt{4\,r^2-(s+2\,x)^2}\;+2\,x\sqrt{4\,r^2-(s+2\,x)^2}\;-2\,s\sqrt{4\,r^2-(s+2\,y)^2}\;-4\,y\sqrt{4\,r^2-(s+2\,y)^2}\Bigg)$$

$$2\,\pi\,r^2+6\,s^2+2\sqrt{4\,r^2-(3\,s-2$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-4\,\pi\,r^2+24\,s\,r-16\,y\,r-24\,s^2+2\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+16\,s\,y-3\,s\sqrt{4\,r^2-(3\,s-2\,x)^2}\;+s\sqrt{4\,r^2-(s+2\,x)^2}\;+2\,x\sqrt{4\,r^2-(s+2\,x)^2}\;-2\,s\sqrt{4\,r^2-(s+2\,y)^2}\;-4\,y\sqrt{4\,r^2-(s+2\,y)^2}\right)$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2$$

$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+8\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-6\,\pi\,r^2+28\,s\,r-8\,y\,r-26\,s^2-4\,s\,x+2\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+12\,s\,y-8\,x\,y-3\,s\sqrt{4\,r^2-(3\,s-2\,x)^2}\;+2\,s\sqrt{4\,r^2-(s+2\,x)^2}\;+4\,x\sqrt{4\,r^2-(s+2\,x)^2}\;-2\,s\sqrt{4\,r^2-(s+2\,y)^2}\;-4\,y\sqrt{4\,r^2-(s+2\,y)^2}\right)$$

$$\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2+\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2-\frac{\pi\,r^2}{2}+2\,s\,r-3\,s^2+2\,s\,x-\frac{1}{4}\,s\sqrt{4\,r^2-(s+2\,y)^2}\;-\frac{1}{2}\,y\sqrt{4\,r^2-(s+2\,y)^2}$$

$$2\,r\geq s\wedge(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;\sqrt{4\,r^2-(3\,s-2\,y)^2}\;(3\,s-2\,y)\geq 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+4\,s\,x+8\,x\,y+3\,s\sqrt{4\,r^2-(3\,s$$

$$2\,\pi\,r^2+6\,s^2+2\sqrt{4\,r^2-(3\,s-2$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;\geq 2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$

$$2\,r\geq s\wedge(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;\sqrt{4\,r^2-(3\,s-2\,y)^2}\;(3\,s-2\,y)\geq 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+4\,s\,x+8\,x\,y+3\,s\sqrt{4\,r^2-(3\,s$$

$$2\,\pi\,r^2+6\,s^2+2\sqrt{4\,r^2-(3\,s-2$$

$$2\,r\geq s\wedge(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;\sqrt{4\,r^2-(3\,s-2\,y)^2}\;(3\,s-2\,y)\geq 4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2$$

$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+8yr-26s^2+12sx-4sy-8xy+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$2r\geq s\wedge(s+2x)\sqrt{4r^2-(s+2x)^2}\geq\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2x)^2}\right)\geq 2\left(\pi r^2+4yr+3s^2+6sx\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-8yr-30s^2+4sx+4sy+8xy+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$2r\geq s\wedge(s+2x)\sqrt{4r^2-(s+2x)^2}\geq\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-\pi r^2+4sr-4s^2+\frac{1}{4}s\sqrt{4r^2-(s+2x)^2}+\frac{1}{2}x\sqrt{4r^2-(s+2x)^2}-\frac{1}{4}s\sqrt{4r^2-(s+2y)^2}-\frac{1}{2}y\sqrt{4r^2-(s+2y)^2}$$

$$2r\geq s\wedge(s+2x)\sqrt{4r^2-(s+2x)^2}\geq\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+2\sqrt{4r^2-(3s-2x)^2}\,x+2\sqrt{4r^2-(3s-2y)^2}\,y-3s\sqrt{4r^2-(3s-2x)^2}-3s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-\;\;4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$
\begin{array}{l}
4\,s\,x+8\,x\,y+3\,s\,\sqrt{4\,r^2-(3\,s \\
2\,\pi\,r^2+6\,s^2+2\,\sqrt{4\,r^2-(3\,s-2 \\
4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+ \\
(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2 \\
2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge \\
4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2 \\
(s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2}\;\geq \\
2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)
\end{array}
$$

$$
\begin{array}{l}
\frac{1}{8}\left(8\,\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2+8\,\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+\right. \\
\quad 4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-2\,\pi\,r^2+4\,s\,r+ \\
\quad 8\,y\,r-2\,s^2-4\,s\,x+4\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x- \\
\quad 4\,s\,y-8\,x\,y+4\,\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y- \\
\quad 6\,s\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;+s\,\sqrt{4\,r^2-(s+2\,x)^2}\;+ \\
\quad \left.2\,x\,\sqrt{4\,r^2-(s+2\,x)^2}\;-6\,s\,\sqrt{4\,r^2-(3\,s-2\,y)^2}\right)
\end{array}
$$

$$
\begin{array}{l}
2\,r\geq s\wedge(s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2} \\
(s+2\,y)\,\sqrt{4\,r^2-(s+2\,y)^2}\;\geq 4\,r^2 \\
4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+ \\
3\,s\left(4\,r+4\,x+4\,y+\sqrt{4\,r^2-(\right. \\
8\,y\,r+18\,s^2+2\,\sqrt{4\,r^2-(3\,s- \\
4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+ \\
4\,s\,x+8\,x\,y+3\,s\,\sqrt{4\,r^2-(3\,s \\
2\,\pi\,r^2+6\,s^2+2\,\sqrt{4\,r^2-(3\,s-2 \\
4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+ \\
(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2 \\
2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)
\end{array}
$$

$$
\begin{array}{l}
\frac{1}{8}\left(8\,\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2+8\,\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+\right. \\
\quad 4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-2\,\pi\,r^2+12\,s\,r- \\
\quad 8\,y\,r-6\,s^2-12\,s\,x+4\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+ \\
\quad 4\,s\,y+8\,x\,y+4\,\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y- \\
\quad 6\,s\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;+s\,\sqrt{4\,r^2-(s+2\,x)^2}\;+ \\
\quad \left.2\,x\,\sqrt{4\,r^2-(s+2\,x)^2}\;-6\,s\,\sqrt{4\,r^2-(3\,s-2\,y)^2}\right)
\end{array}
$$

$$
\begin{array}{l}
2\,r\geq s\wedge(s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2} \\
(s+2\,y)\,\sqrt{4\,r^2-(s+2\,y)^2}\;\geq 4\,r^2 \\
4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+ \\
3\,s\left(4\,r+4\,x+4\,y+\sqrt{4\,r^2-(\right. \\
8\,y\,r+18\,s^2+2\,\sqrt{4\,r^2-(3\,s- \\
4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+
\end{array}
$$

$$4\,s\,x + 8\,x\,y + 3\,s\,\sqrt{4\,r^2 - (3\,s$$

$$2\,\pi\,r^2 + 6\,s^2 + 2\,\sqrt{4\,r^2 - (3\,s - 2$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 + 4\,(s + 2$$

$$(s + 2\,x)\,\sqrt{4\,r^2 - (s + 2\,x)^2} \geq$$

$$2\left(\pi\,r^2 + (s + 2\,x)\,(s + 2\,y)\right)$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right) r^2 + 4\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right) r^2 + \right.$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 - 2\,\pi\,r^2 + 8\,s\,r -$$

$$4\,s^2 - 8\,s\,x + 2\,\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\; x +$$

$$2\,\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\; y -$$

$$\left. 3\,s\,\sqrt{4\,r^2 - (3\,s - 2\,x)^2} + s\,\sqrt{4\,r^2 - (s + 2\,x)^2} + \right.$$

$$\left. 2\,x\,\sqrt{4\,r^2 - (s + 2\,x)^2} - 3\,s\,\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\right)$$

$$2\,r \geq s \wedge (s + 2\,x)\,\sqrt{4\,r^2 - (s + 2\,x)^2}$$

$$(s + 2\,y)\,\sqrt{4\,r^2 - (s + 2\,y)^2} \geq 4\,r^2$$

$$4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right) r^2 +$$

$$3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4\,r^2 - (\right.$$

$$8\,y\,r + 18\,s^2 + 2\,\sqrt{4\,r^2 - (3\,s -$$

$$4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right) r^2 + 4\,s\,r +$$

$$4\,s\,x + 8\,x\,y + 3\,s\,\sqrt{4\,r^2 - (3\,s$$

$$2\,\pi\,r^2 + 6\,s^2 + 2\,\sqrt{4\,r^2 - (3\,s - 2$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right) r^2 + 8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right) r^2 + \right.$$

$$4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right) r^2 - 2\,\pi\,r^2 + 4\,s\,r +$$

$$8\,y\,r - 6\,s^2 + 4\,s\,x + 2\,\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\; x -$$

$$12\,s\,y + 8\,x\,y + 4\,\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\; y -$$

$$\left. 3\,s\,\sqrt{4\,r^2 - (3\,s - 2\,x)^2} - 6\,s\,\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\right)$$

$$2\,r \geq s \wedge (s + 2\,x)\,\sqrt{4\,r^2 - (s + 2\,x)^2}$$

$$(s + 2\,y)\,\sqrt{4\,r^2 - (s + 2\,y)^2} \geq 4\,r^2$$

$$4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right) r^2 +$$

$$3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4\,r^2 - (\right.$$

$$8\,y\,r + 18\,s^2 + 2\,\sqrt{4\,r^2 - (3\,s -$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 + 12\,s\,r +$$

$$(s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2\right.$$

$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right) \wedge$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 + 4\,(s + 2$$

$$(s + 2\,x)\,\sqrt{4\,r^2 - (s + 2\,x)^2} \geq$$

$$2\left(\pi\,r^2 + (s + 2\,x)\,(s + 2\,y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right) r^2 + \right.$$

$$2\,r \geq s \wedge (s + 2\,x)\,\sqrt{4\,r^2 - (s + 2\,x)^2}$$

$$\begin{array}{ll}
8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+ & (s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2 \\
4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+8sr+ & 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+ \\
16yr-8s^2+2\sqrt{4r^2-(3s-2x)^2}\ x- & 3s\left(4r+4x+4y+\sqrt{4r^2-(\right. \\
16sy+4\sqrt{4r^2-(3s-2y)^2}\ y- & 8yr+18s^2+2\sqrt{4r^2-(3s- \\
3s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+ & 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+ \\
2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\Big) & (s+2x)\left(4y+\sqrt{4r^2-(s+2\right. \\
 & 2\left(\pi r^2+4yr+3s^2+6sx\right)
\end{array}$$

$$\begin{array}{ll}
\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+ & 2r\geq s\wedge(s+2x)\sqrt{4r^2-(s+2x)^2} \\
 & (s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2 \\
8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+ & 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+ \\
4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr- & 3s\left(4r+4x+4y+\sqrt{4r^2-(\right. \\
12s^2-8sx+2\sqrt{4r^2-(3s-2x)^2}\ x- & 8yr+18s^2+2\sqrt{4r^2-(3s- \\
8sy+16xy+4\sqrt{4r^2-(3s-2y)^2}\ y- & 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2 \\
3s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+ & (s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq \\
2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\Bigg) & 2\left(\pi r^2+(s+2x)(s+2y)\right)
\end{array}$$

$$\begin{array}{ll}
\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+ & 2r\geq s\wedge(s+2x)\sqrt{4r^2-(s+2x)^2} \\
 & (s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2 \\
8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+ & 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+ \\
8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+ & 3s\left(4r+4x+4y+\sqrt{4r^2-(\right. \\
8yr-14s^2-12sx+2\sqrt{4r^2-(3s-2x)^2}\ x- & 2\pi r^2+8yr+18s^2+2\sqrt{4r^2- \\
12sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\ y- & \\
3s\sqrt{4r^2-(3s-2x)^2}+2s\sqrt{4r^2-(s+2x)^2}+ & \\
4x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\Bigg) & \\
\end{array}$$

$$\begin{array}{ll}
\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+ & 2r\geq s\wedge(s+2x)\sqrt{4r^2-(s+2x)^2} \\
 & (s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2 \\
\left(\right. & \\
\end{array}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+12sr-8yr-18s^2+12sx+2\sqrt{4r^2-(3s-2x)^2}\,x+12sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\,y-3s\sqrt{4r^2-(3s-2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\Bigg)$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-20s^2+8sx+2\sqrt{4r^2-(3s-2x)^2}\,x+8sy-16xy+4\sqrt{4r^2-(3s-2y)^2}\,y-3s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\Bigg)$$

$$2r\geq s\wedge(s+2x)\sqrt{4r^2-(s+2x)^2}\geq(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+24sr-16yr-24s^2+2\sqrt{4r^2-(3s-2x)^2}\,x+16sy+4\sqrt{4r^2-(3s-2y)^2}\,y-3s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\Bigg)$$

$$2r\geq s\wedge(s+2x)\sqrt{4r^2-(s+2x)^2}\geq(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-8yr-26s^2-4sx+2\sqrt{4r^2-(3s-2x)^2}\,x+12sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\,y-3s\sqrt{4r^2-(3s-2x)^2}+2s\sqrt{4r^2-(s+2x)^2}+4x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$2r\geq s\wedge(s+2x)\sqrt{4r^2-(s+2x)^2}\,(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2\,4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s\,2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-\frac{\pi r^2}{2}+2sr-3s^2+2sx+\frac{1}{2}\sqrt{4r^2-(3s-2y)^2}\,y-\frac{3}{4}s\sqrt{4r^2-(3s-2y)^2}$$

$$2r\geq s\wedge(s+2x)\sqrt{4r^2-(s+2x)^2}\,(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2\,4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2\,2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2\,(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+8yr-26s^2+12sx-4sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\,y+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$2r\geq s\wedge(s+2x)\sqrt{4r^2-(s+2x)^2}\,(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2\,4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2\,2\left(\pi r^2+4yr+3s^2+6sx\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr-8yr-30s^2+4sx+4sy+8xy+\right.$$

$$2r\geq s\wedge(s+2x)\sqrt{4r^2-(s+2x)^2}\,(s+2y)\sqrt{4r^2-(s+2y)^2}\geq 4r^2\,4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$6\pi r^2 + 28 s r - 8 y r - 36 s^2 + 4 s x + 4 s y + 8 x y +$$
$$4\sqrt{4r^2-(3s-2y)^2}\,y + s\sqrt{4r^2-(s+2x)^2} + \qquad (s+2x)\sqrt{4r^2-(s+2x)^2} \geq$$
$$2x\sqrt{4r^2-(s+2x)^2} - 6s\sqrt{4r^2-(3s-2y)^2}\Big) \qquad 2\left(\pi r^2 + (s+2x)(s+2y)\right)$$

$$\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2 + \cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2 + \tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 + \qquad 2r \geq s \wedge (s+2x)\sqrt{4r^2-(s+2x)^2}$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2} \geq 4r^2$$
$$\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 - \pi r^2 + 4sr - 4s^2 +$$
$$\frac{1}{2}\sqrt{4r^2-(3s-2y)^2}\,y + \frac{1}{4}s\sqrt{4r^2-(s+2x)^2} +$$
$$\frac{1}{2}x\sqrt{4r^2-(s+2x)^2} - \frac{3}{4}s\sqrt{4r^2-(3s-2y)^2}$$

$$\frac{1}{4}\Big(4\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2 + 4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2 + 4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2 + \qquad 2r \geq s \wedge (s+2x)\sqrt{4r^2-(s+2x)^2}$$
$$2\sqrt{4r^2-(3s-2x)^2}\,x + 2\sqrt{4r^2-(3s-2y)^2}\,y - \qquad 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 +$$
$$3s\sqrt{4r^2-(3s-2x)^2} - 3s\sqrt{4r^2-(3s-2y)^2} - \qquad 3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$s\sqrt{4r^2-(s+2y)^2} - 2y\sqrt{4r^2-(s+2y)^2}\Big) \qquad 8yr + 18s^2 + 2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 + 4sr +$$
$$4sx + 8xy + 3s\sqrt{4r^2-(3s$$
$$2\pi r^2 + 6s^2 + 2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 + 12sr +$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$
$$2\left(\pi r^2 + 4yr + 3s^2 + 6sx\right) \wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 + 4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq$$
$$2\left(\pi r^2 + (s+2x)(s+2y)\right)$$

$$\frac{1}{8}\Big(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2 + \qquad 2r \geq s \wedge (s+2x)\sqrt{4r^2-(s+2x)^2}$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 - 2\pi r^2 + 4sr + \qquad 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 +$$
$$8yr - 2s^2 - 4sx + 4\sqrt{4r^2-(3s-2x)^2}\,x - \qquad 3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$4sy - 8xy + 4\sqrt{4r^2-(3s-2y)^2}\,y - \qquad 8yr + 18s^2 + 2\sqrt{4r^2-(3s-$$
$$6s\sqrt{4r^2-(3s-2x)^2} + s\sqrt{4r^2-(s+2x)^2} + \qquad 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 + 4sr +$$

$$2\,x\sqrt{4\,r^2-(s+2\,x)^2}\;-6\,s\sqrt{4\,r^2-(3\,s-2\,y)^2}\;-$$
$$2\,s\sqrt{4\,r^2-(s+2\,y)^2}\;-4\,y\sqrt{4\,r^2-(s+2\,y)^2}\;\Bigg)$$

$$\left(\sqrt{4\,r^2-(3\,s-2\,x)^2}\;\right)$$
$$4\,s\,x+8\,x\,y+3\,s\sqrt{4\,r^2-(3\,s$$
$$2\,\pi\,r^2+6\,s^2+2\sqrt{4\,r^2-(3\,s-2$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$
$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2$$
$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+\right.\qquad 2\,r\geq s\wedge(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-2\,\pi\,r^2+12\,s\,r-$$
$$8\,y\,r-6\,s^2-12\,s\,x+4\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+$$
$$4\,s\,y+8\,x\,y+4\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y-$$
$$6\,s\sqrt{4\,r^2-(3\,s-2\,x)^2}\;+s\sqrt{4\,r^2-(s+2\,x)^2}\;+$$
$$2\,x\sqrt{4\,r^2-(s+2\,x)^2}\;-6\,s\sqrt{4\,r^2-(3\,s-2\,y)^2}\;-$$
$$\left.2\,s\sqrt{4\,r^2-(s+2\,y)^2}\;-4\,y\sqrt{4\,r^2-(s+2\,y)^2}\;\right)$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$
$$3\,s\left(4\,r+4\,x+4\,y+\sqrt{4\,r^2-(\right.$$
$$8\,y\,r+18\,s^2+2\sqrt{4\,r^2-(3\,s-$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$
$$4\,s\,x+8\,x\,y+3\,s\sqrt{4\,r^2-(3\,s$$
$$2\,\pi\,r^2+6\,s^2+2\sqrt{4\,r^2-(3\,s-2$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$
$$(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;\geq$$
$$2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+\right.\qquad 2\,r\geq s\wedge(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}$$

$$4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-$$
$$2\,\pi\,r^2+8\,s\,r-4\,s^2-8\,s\,x+$$
$$2\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+2\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y-$$
$$3\,s\sqrt{4\,r^2-(3\,s-2\,x)^2}\;+s\sqrt{4\,r^2-(s+2\,x)^2}\;+$$
$$2\,x\sqrt{4\,r^2-(s+2\,x)^2}\;-3\,s\sqrt{4\,r^2-(3\,s-2\,y)^2}\;-$$
$$\left.s\sqrt{4\,r^2-(s+2\,y)^2}\;-2\,y\sqrt{4\,r^2-(s+2\,y)^2}\;\right)$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$
$$3\,s\left(4\,r+4\,x+4\,y+\sqrt{4\,r^2-(\right.$$
$$8\,y\,r+18\,s^2+2\sqrt{4\,r^2-(3\,s-$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$
$$4\,s\,x+8\,x\,y+3\,s\sqrt{4\,r^2-(3\,s$$
$$2\,\pi\,r^2+6\,s^2+2\sqrt{4\,r^2-(3\,s-2$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+\right.\qquad 2\,r\geq s\wedge(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2-2\,\pi\,r^2+4\,s\,r+\qquad 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$

$$\left(\sqrt{4r^2-(3s-2x)^2}\right)$$

$$8yr-6s^2+4sx+2\sqrt{4r^2-(3s-2x)^2}\,x-$$
$$12sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\,y-$$
$$3s\sqrt{4r^2-(3s-2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-$$
$$2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\Bigg)$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+$$
$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+8sr+$$
$$16yr-8s^2+2\sqrt{4r^2-(3s-2x)^2}\,x-$$
$$16sy+4\sqrt{4r^2-(3s-2y)^2}\,y-$$
$$3s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+$$
$$2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-$$
$$2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\Bigg)$$

$$2r\geq s\wedge(s+2x)\sqrt{4r^2-(s+2x)^2}$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+$$
$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-$$
$$12s^2-8sx+2\sqrt{4r^2-(3s-2x)^2}\,x-$$
$$8sy+16xy+4\sqrt{4r^2-(3s-2y)^2}\,y-$$
$$3s\sqrt{4r^2-(3s-2x)^2}+s\sqrt{4r^2-(s+2x)^2}+$$
$$2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-$$
$$2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\Bigg)$$

$$2r\geq s\wedge(s+2x)\sqrt{4r^2-(s+2x)^2}$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+8yr-14s^2-12sx+2\sqrt{4r^2-(3s-2x)^2}\,x-12sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\,y-3s\sqrt{4r^2-(3s-2x)^2}+2s\sqrt{4r^2-(s+2x)^2}+4x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$2r\geq s\wedge(s+2x)\sqrt{4r^2-(s+2x)^2}$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+12sr-8yr-18s^2+12sx+2\sqrt{4r^2-(3s-2x)^2}\,x+12sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\,y-3s\sqrt{4r^2-(3s-2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$2r\geq s\wedge(s+2x)\sqrt{4r^2-(s+2x)^2}$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-20s^2+8sx+2\sqrt{4r^2-(3s-2x)^2}\,x+8yr-16xy+4\sqrt{4r^2-(3s-2y)^2}\,y-\right.$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-20s^2+8sx+2\sqrt{4r^2-(3s-2x)^2}\,x+\right.$$

$$2r\geq s\wedge(s+2x)\sqrt{4r^2-(s+2x)^2}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$8\,s\,y - 16\,x\,y + 4\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;\;y -$$
$$3\,s\sqrt{4\,r^2 - (3\,s - 2\,x)^2} + s\sqrt{4\,r^2 - (s + 2\,x)^2} +$$
$$2\,x\sqrt{4\,r^2 - (s + 2\,x)^2} - 6\,s\sqrt{4\,r^2 - (3\,s - 2\,y)^2} -$$
$$2\,s\sqrt{4\,r^2 - (s + 2\,y)^2} - 4\,y\sqrt{4\,r^2 - (s + 2\,y)^2}\Bigg) \qquad (s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2\right.$$
$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3\,s}{2} - x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{3\,s}{2} - y}{r}\right)r^2 + \qquad 2\,r \geq s \wedge (s + 2\,x)\sqrt{4\,r^2 - (s + 2\,x)^2}$$
$$8\cos^{-1}\left(\frac{\frac{s}{2} + y}{r}\right)r^2 + 4\tan^{-1}\left(\frac{3\,s - 2\,x}{\sqrt{4\,r^2 - (3\,s - 2\,x)^2}}\right)r^2 + \qquad 4\tan^{-1}\left(\frac{3\,s - 2\,x}{\sqrt{4\,r^2 - (3\,s - 2\,x)^2}}\right)r^2 + 4\,s\,r +$$
$$4\tan^{-1}\left(\frac{s + 2\,x}{\sqrt{4\,r^2 - (s + 2\,x)^2}}\right)r^2 - 4\,\pi\,r^2 + 24\,s\,r - \qquad 4\,s\,x + 8\,x\,y + 3\,s\sqrt{4\,r^2 - (3\,s$$
$$16\,y\,r - 24\,s^2 + 2\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;\;x + \qquad 2\,\pi\,r^2 + 6\,s^2 + 2\sqrt{4\,r^2 - (3\,s - 2$$
$$16\,s\,y + 4\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;\;y - \qquad 4\tan^{-1}\left(\frac{s + 2\,x}{\sqrt{4\,r^2 - (s + 2\,x)^2}}\right)r^2 + 4\,(s + 2$$
$$3\,s\sqrt{4\,r^2 - (3\,s - 2\,x)^2} + s\sqrt{4\,r^2 - (s + 2\,x)^2} + \qquad (s + 2\,x)\sqrt{4\,r^2 - (s + 2\,x)^2} \geq$$
$$2\,x\sqrt{4\,r^2 - (s + 2\,x)^2} - 6\,s\sqrt{4\,r^2 - (3\,s - 2\,y)^2} - \qquad 2\left(\pi\,r^2 + (s + 2\,x)\,(s + 2\,y)\right)$$
$$2\,s\sqrt{4\,r^2 - (s + 2\,y)^2} - 4\,y\sqrt{4\,r^2 - (s + 2\,y)^2}\Bigg)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3\,s}{2} - x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{3\,s}{2} - y}{r}\right)r^2 + \qquad 2\,r \geq s \wedge (s + 2\,x)\sqrt{4\,r^2 - (s + 2\,x)^2}$$
$$8\cos^{-1}\left(\frac{\frac{s}{2} + y}{r}\right)r^2 + 4\tan^{-1}\left(\frac{3\,s - 2\,x}{\sqrt{4\,r^2 - (3\,s - 2\,x)^2}}\right)r^2 + \qquad 4\tan^{-1}\left(\frac{3\,s - 2\,x}{\sqrt{4\,r^2 - (3\,s - 2\,x)^2}}\right)r^2 + 4\,s\,r +$$
$$8\tan^{-1}\left(\frac{s + 2\,x}{\sqrt{4\,r^2 - (s + 2\,x)^2}}\right)r^2 - 6\,\pi\,r^2 + 28\,s\,r - \qquad 4\,s\,x + 8\,x\,y + 3\,s\sqrt{4\,r^2 - (3\,s$$
$$8\,y\,r - 26\,s^2 - 4\,s\,x + 2\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;\;x + \qquad 2\,\pi\,r^2 + 6\,s^2 + 2\sqrt{4\,r^2 - (3\,s - 2$$
$$12\,s\,y - 8\,x\,y + 4\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;\;y -$$
$$3\,s\sqrt{4\,r^2 - (3\,s - 2\,x)^2} + 2\,s\sqrt{4\,r^2 - (s + 2\,x)^2} +$$
$$4\,x\sqrt{4\,r^2 - (s + 2\,x)^2} - 6\,s\sqrt{4\,r^2 - (3\,s - 2\,y)^2} -$$
$$2\,s\sqrt{4\,r^2 - (s + 2\,y)^2} - 4\,y\sqrt{4\,r^2 - (s + 2\,y)^2}\Bigg)$$

$$\frac{1}{4}\Bigg(4\cos^{-1}\left(\frac{\frac{3\,s}{2} - x}{r}\right)r^2 + 4\cos^{-1}\left(\frac{\frac{3\,s}{2} - y}{r}\right)r^2 + \qquad 2\,r \geq s \wedge (s + 2\,x)\sqrt{4\,r^2 - (s + 2\,x)^2}$$
$$4\cos^{-1}\left(\frac{\frac{s}{2} + y}{r}\right)r^2 + 4\tan^{-1}\left(\frac{3\,s - 2\,x}{\sqrt{4\,r^2 - (3\,s - 2\,x)^2}}\right)r^2 - \qquad 4\tan^{-1}\left(\frac{s + 2\,x}{\sqrt{4\,r^2 - (s + 2\,x)^2}}\right)r^2 + 12\,s\,r +$$
$$2\,\pi\,r^2 + 8\,s\,r - 12\,s^2 + 8\,s\,x + \qquad (s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2\right.$$
$$2\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;\;y - 3\,s\sqrt{4\,r^2 - (3\,s - 2\,y)^2} - \qquad 2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right) \wedge$$

$$s\sqrt{4r^2-(s+2y)^2}-2y\sqrt{4r^2-(s+2y)^2}\Bigg) \qquad 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+ \qquad 2r\geq s\wedge(s+2x)\sqrt{4r^2-(s+2x)^2}$$
$$8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2- \qquad 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2x)^2}\right)\geq 2\left(\pi r^2+4yr+3s^2+6sx\right)$$
$$6\pi r^2+20sr+8yr-26s^2+12sx-4sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\,y+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\Bigg)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+ \qquad 2r\geq s\wedge(s+2x)\sqrt{4r^2-(s+2x)^2}$$
$$8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2- \qquad 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 2\left(\pi r^2+(s+2x)(s+2y)\right)$$
$$6\pi r^2+28sr-8yr-30s^2+4sx+4sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\,y+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\Bigg)$$

$$\frac{1}{4}\Bigg(4\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+ \qquad 2r\geq s\wedge(s+2x)\sqrt{4r^2-(s+2x)^2}$$
$$4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-16s^2+2\sqrt{4r^2-(3s-2y)^2}\,y+s\sqrt{4r^2-(s+2x)^2}+2x\sqrt{4r^2-(s+2x)^2}-3s\sqrt{4r^2-(3s-2y)^2}-s\sqrt{4r^2-(s+2y)^2}-2y\sqrt{4r^2-(s+2y)^2}\Bigg)$$

$$\frac{1}{4}\Bigg(4\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+ \qquad 2r\geq s\wedge$$
$$2\sqrt{4r^2-(3s-2x)^2}\,x-3s\sqrt{4r^2-(3s-2x)^2}- \qquad \sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4$$

$$s\sqrt{4r^2-(s+2x)^2}\ -2x\sqrt{4r^2-(s+2x)^2}\ \Big)$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+\right.$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+4sr+$$

$$8yr-2s^2-4sx+4\sqrt{4r^2-(3s-2x)^2}\ x-$$

$$4sy-8xy-6s\sqrt{4r^2-(3s-2x)^2}\ -$$

$$\left.s\sqrt{4r^2-(s+2x)^2}\ -2x\sqrt{4r^2-(s+2x)^2}\right)$$

$$2r\geq s\wedge$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2}\ \geq 4r^2$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+\right.$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+12sr-$$
$$8yr-6s^2-12sx+4\sqrt{4r^2-(3s-2x)^2}\;x+$$
$$4sy+8xy-6s\sqrt{4r^2-(3s-2x)^2}\;-$$
$$\left.s\sqrt{4r^2-(s+2x)^2}\;-2x\sqrt{4r^2-(s+2x)^2}\right)$$

$$2r\geq s\wedge$$
$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;\geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+$$
$$\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-\frac{\pi r^2}{2}+2sr-s^2-2sx+$$
$$\frac{1}{2}\sqrt{4r^2-(3s-2x)^2}\;x-\frac{3}{4}s\sqrt{4r^2-(3s-2x)^2}$$

$$2r\geq s\wedge$$
$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;\geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+\right.$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+4sr+$$
$$8yr-6s^2+4sx+2\sqrt{4r^2-(3s-2x)^2}\;x-$$
$$12sy+8xy-3s\sqrt{4r^2-(3s-2x)^2}\;-$$

$$2r\geq s\wedge$$
$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;\geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$2\,s\,\sqrt{4\,r^2-(s+2\,x)^2}\;-4\,x\,\sqrt{4\,r^2-(s+2\,x)^2}\;\Bigg)$$

$$3\,s\left(4\,r+4\,x+4\,y+\sqrt{4\,r^2-(\right.$$

$$8\,y\,r+18\,s^2+2\,\sqrt{4\,r^2-(3\,s-$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$

$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2\right.$$

$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$

$$(s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2}\;\geq$$

$$2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$

$$\frac{1}{8}\Bigg(8\,\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2+$$

$$2\,r\geq s\wedge$$

$$8\,\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$

$$\sqrt{4\,r^2-(3\,s-2\,y)^2}\;\;(3\,s-2\,y)\geq 4$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-4\,\pi\,r^2+8\,s\,r+$$

$$(s+2\,y)\,\sqrt{4\,r^2-(s+2\,y)^2}\;\geq 4\,r^2$$

$$16\,y\,r-8\,s^2+2\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;\;x-$$

$$4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$

$$16\,s\,y-3\,s\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;\;-$$

$$3\,s\left(4\,r+4\,x+4\,y+\sqrt{4\,r^2-(\right.$$

$$s\,\sqrt{4\,r^2-(s+2\,x)^2}\;-2\,x\,\sqrt{4\,r^2-(s+2\,x)^2}\;\Bigg)$$

$$8\,y\,r+18\,s^2+2\,\sqrt{4\,r^2-(3\,s-$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$

$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2\right.$$

$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)$$

$$\frac{1}{8}\Bigg(8\,\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2+$$

$$2\,r\geq s\wedge$$

$$8\,\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$

$$\sqrt{4\,r^2-(3\,s-2\,y)^2}\;\;(3\,s-2\,y)\geq 4$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-4\,\pi\,r^2+16\,s\,r-$$

$$(s+2\,y)\,\sqrt{4\,r^2-(s+2\,y)^2}\;\geq 4\,r^2$$

$$12\,s^2-8\,s\,x+2\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;\;x-$$

$$4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$

$$8\,s\,y+16\,x\,y-3\,s\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;\;-$$

$$3\,s\left(4\,r+4\,x+4\,y+\sqrt{4\,r^2-(\right.$$

$$s\,\sqrt{4\,r^2-(s+2\,x)^2}\;-2\,x\,\sqrt{4\,r^2-(s+2\,x)^2}\;\Bigg)$$

$$8\,y\,r+18\,s^2+2\,\sqrt{4\,r^2-(3\,s-$$

$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$

$$(s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2}\;\geq$$

$$2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+\right.$$
$$8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+20sr+$$
$$8yr-14s^2-12sx+2\sqrt{4r^2-(3s-2x)^2}\;x-$$
$$\left.12sy+8xy-3s\sqrt{4r^2-(3s-2x)^2}\right)$$

$$2r\geq s\wedge$$
$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;\geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$2\pi r^2+8yr+18s^2+2\sqrt{4r^2-}$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+\right.$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+12sr-$$
$$8yr-18s^2+12sx+2\sqrt{4r^2-(3s-2x)^2}\;x+$$
$$12sy-8xy-3s\sqrt{4r^2-(3s-2x)^2}\;-$$
$$\left.2s\sqrt{4r^2-(s+2x)^2}\;-4x\sqrt{4r^2-(s+2x)^2}\right)$$

$$2r\geq s\wedge$$
$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;\geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s}$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\;\geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+\right.$$
$$8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr-$$
$$20s^2+8sx+2\sqrt{4r^2-(3s-2x)^2}\;x+$$
$$8sy-16xy-3s\sqrt{4r^2-(3s-2x)^2}\;-$$
$$s\sqrt{4r^2-(s+2x)^2}\;-2x\sqrt{4r^2-(s+2x)^2}\Big)$$

$$2r\geq s\wedge$$
$$\sqrt{4r^2-(3s-2y)^2}\;(3s-2y)\geq 4$$
$$(s+2y)\sqrt{4r^2-(s+2y)^2}\;\geq 4r^2$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$
$$4sx+8xy+3s\sqrt{4r^2-(3s}$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$
$$4\tan^{-1}\left(\frac{s+2x}{\right.}\right)r^2+12sr+$$

$$\left(\sqrt{4\,r^2-(s+2\,x)^2}\right)$$

$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2\right.$$

$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2+\right.$$

$$8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-4\,\pi\,r^2+24\,s\,r-$$

$$16\,y\,r-24\,s^2+2\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+$$

$$16\,s\,y-3\,s\sqrt{4\,r^2-(3\,s-2\,x)^2}\;-$$

$$\left.s\sqrt{4\,r^2-(s+2\,x)^2}\;-2\,x\sqrt{4\,r^2-(s+2\,x)^2}\right)$$

$$2\,r\geq s\wedge$$

$$\sqrt{4\,r^2-(3\,s-2\,y)^2}\;(3\,s-2\,y)\geq 4$$

$$(s+2\,y)\sqrt{4\,r^2-(s+2\,y)^2}\;\geq 4\,r^2$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$

$$4\,s\,x+8\,x\,y+3\,s\sqrt{4\,r^2-(3\,s$$

$$2\,\pi\,r^2+6\,s^2+2\sqrt{4\,r^2-(3\,s-2$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$

$$(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;\geq$$

$$2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2+\right.$$

$$8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$

$$8\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-6\,\pi\,r^2+28\,s\,r-$$

$$8\,y\,r-26\,s^2-4\,s\,x+2\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+$$

$$\left.12\,s\,y-8\,x\,y-3\,s\sqrt{4\,r^2-(3\,s-2\,x)^2}\right)$$

$$2\,r\geq s\wedge$$

$$\sqrt{4\,r^2-(3\,s-2\,y)^2}\;(3\,s-2\,y)\geq 4$$

$$(s+2\,y)\sqrt{4\,r^2-(s+2\,y)^2}\;\geq 4\,r^2$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$

$$4\,s\,x+8\,x\,y+3\,s\sqrt{4\,r^2-(3\,s$$

$$2\,\pi\,r^2+6\,s^2+2\sqrt{4\,r^2-(3\,s-2$$

$$\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2+\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+$$

$$\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2-\frac{\pi\,r^2}{2}+2\,s\,r-3\,s^2+2\,s\,x-$$

$$\frac{1}{4}\,s\sqrt{4\,r^2-(s+2\,x)^2}\;-\frac{1}{2}\,x\sqrt{4\,r^2-(s+2\,x)^2}$$

$$2\,r\geq s\wedge$$

$$\sqrt{4\,r^2-(3\,s-2\,y)^2}\;(3\,s-2\,y)\geq 4$$

$$(s+2\,y)\sqrt{4\,r^2-(s+2\,y)^2}\;\geq 4\,r^2$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$

$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2\right.$$

$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$

$$(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;>$$

$$2\left(\pi r^2 + (s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 + 8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 + 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 - 6\pi r^2 + 20sr + 8yr - 26s^2 + 12sx - 4sy - 8xy - s\sqrt{4r^2-(s+2x)^2} - 2x\sqrt{4r^2-(s+2x)^2}\right) \quad 2r \geq s \wedge \sqrt{4r^2-(3s-2y)^2}\ (3s-2y) \geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2} \geq 4r^2 + 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 + 12sr + (s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2 + 4yr + 3s^2 + 6sx\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 + 8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 + 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 - 6\pi r^2 + 28sr - 8yr - 30s^2 + 4sx + 4sy + 8xy - s\sqrt{4r^2-(s+2x)^2} - 2x\sqrt{4r^2-(s+2x)^2}\right) \quad 2r \geq s \wedge \sqrt{4r^2-(3s-2y)^2}\ (3s-2y) \geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2} \geq 4r^2 + 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 + 4(s+2 (s+2x)\sqrt{4r^2-(s+2x)^2} \geq 2\left(\pi r^2 + (s+2x)(s+2y)\right)$$

$$\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2 + \cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 + \tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 + \tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 - \pi r^2 + 4sr - 4s^2 \quad 2r \geq s \wedge \sqrt{4r^2-(3s-2y)^2}\ (3s-2y) \geq 4$$

$$(s+2y)\sqrt{4r^2-(s+2y)^2} \geq 4r^2$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2 + 4\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 + 4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2 + 2\sqrt{4r^2-(3s-2x)^2}\ x - 3s\sqrt{4r^2-(3s-2x)^2} - s\sqrt{4r^2-(s+2x)^2} - 2x\sqrt{4r^2-(s+2x)^2} - s\sqrt{4r^2-(s+2y)^2} - 2y\sqrt{4r^2-(s+2y)^2}\right) \quad 2r \geq s \wedge \sqrt{4r^2-(3s-2y)^2}\ (3s-2y) \geq 4$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 + 3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr + 18s^2 + 2\sqrt{4r^2-(3s-} + 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 + 4sr + 4sx + 8xy + 3s\sqrt{4r^2-(3s}$$

$$2\pi r^2 + 6s^2 + 2\sqrt{4r^2-(3s-2} + 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 + 12sr +$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+\right.$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+4sr+$$

$$8yr-2s^2-4sx+4\sqrt{4r^2-(3s-2x)^2}\ x-$$

$$4sy-8xy-6s\sqrt{4r^2-(3s-2x)^2}\ -$$

$$s\sqrt{4r^2-(s+2x)^2}\ -2x\sqrt{4r^2-(s+2x)^2}\ -$$

$$\left.2s\sqrt{4r^2-(s+2y)^2}\ -4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$2r\geq s\wedge$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+\right.$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+12sr-$$

$$8yr-6s^2-12sx+4\sqrt{4r^2-(3s-2x)^2}\ x+$$

$$4sy+8xy-6s\sqrt{4r^2-(3s-2x)^2}\ -$$

$$s\sqrt{4r^2-(s+2x)^2}\ -2x\sqrt{4r^2-(s+2x)^2}\ -$$

$$\left.2s\sqrt{4r^2-(s+2y)^2}\ -4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$2r\geq s\wedge$$

$$\sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+8sr-4s^2-8sx+2\sqrt{4r^2-(3s-2x)^2}\,x-3s\sqrt{4r^2-(3s-2x)^2}-s\sqrt{4r^2-(s+2y)^2}-2y\sqrt{4r^2-(s+2y)^2}\right)$$

$$2r\geq s\wedge\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s}$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+4sr+8yr-6s^2+4sx+2\sqrt{4r^2-(3s-2x)^2}\,x-12sy+8xy-3s\sqrt{4r^2-(3s-2x)^2}-2s\sqrt{4r^2-(s+2x)^2}-4x\sqrt{4r^2-(s+2x)^2}-2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\right)$$

$$2r\geq s\wedge\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+8sr+\right.$$

$$2r\geq s\wedge\sqrt{4r^2-(3s-2y)^2}\,(3s-2y)\geq 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$16\,y\,r - 8\,s^2 + 2\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;x -$$
$$16\,s\,y - 3\,s\sqrt{4\,r^2 - (3\,s - 2\,x)^2} -$$
$$s\sqrt{4\,r^2 - (s + 2\,x)^2} - 2\,x\sqrt{4\,r^2 - (s + 2\,x)^2} -$$
$$2\,s\sqrt{4\,r^2 - (s + 2\,y)^2} - 4\,y\sqrt{4\,r^2 - (s + 2\,y)^2}\Bigg)$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 12\,s\,r +$$
$$(s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2$$
$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 +$$
$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2 + 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 +$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 - 4\,\pi\,r^2 + 16\,s\,r -$$
$$12\,s^2 - 8\,s\,x + 2\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;x -$$
$$8\,s\,y + 16\,x\,y - 3\,s\sqrt{4\,r^2 - (3\,s - 2\,x)^2} -$$
$$s\sqrt{4\,r^2 - (s + 2\,x)^2} - 2\,x\sqrt{4\,r^2 - (s + 2\,x)^2} -$$
$$2\,s\sqrt{4\,r^2 - (s + 2\,y)^2} - 4\,y\sqrt{4\,r^2 - (s + 2\,y)^2}\Bigg)$$

$$2\,r \geq s \wedge$$
$$\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;(3\,s - 2\,y) \geq 4$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 +$$
$$3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4\,r^2 - (\right.$$
$$8\,y\,r + 18\,s^2 + 2\sqrt{4\,r^2 - (3\,s -$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 4\,(s + 2$$
$$(s + 2\,x)\sqrt{4\,r^2 - (s + 2\,x)^2} \geq$$
$$2\left(\pi\,r^2 + (s + 2\,x)\,(s + 2\,y)\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 +$$
$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2 + 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 +$$
$$8\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 - 6\,\pi\,r^2 + 20\,s\,r +$$
$$8\,y\,r - 14\,s^2 - 12\,s\,x + 2\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;x -$$
$$12\,s\,y + 8\,x\,y - 3\,s\sqrt{4\,r^2 - (3\,s - 2\,x)^2} -$$
$$2\,s\sqrt{4\,r^2 - (s + 2\,y)^2} - 4\,y\sqrt{4\,r^2 - (s + 2\,y)^2}\Bigg)$$

$$2\,r \geq s \wedge$$
$$\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;(3\,s - 2\,y) \geq 4$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 +$$
$$3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4\,r^2 - (\right.$$
$$2\,\pi\,r^2 + 8\,y\,r + 18\,s^2 + 2\sqrt{4\,r^2 -$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2 +$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 - 2\,\pi\,r^2 + 12\,s\,r -$$
$$8\,y\,r - 18\,s^2 + 12\,s\,x + 2\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;x +$$
$$12\,s\,y - 8\,x\,y - 3\,s\sqrt{4\,r^2 - (3\,s - 2\,x)^2} -$$
$$2\,s\sqrt{4\,r^2 - (s + 2\,x)^2} - 4\,x\sqrt{4\,r^2 - (s + 2\,x)^2} -$$
$$2\,s\sqrt{4\,r^2 - (s + 2\,y)^2} - 4\,y\sqrt{4\,r^2 - (s + 2\,y)^2}\Bigg)$$

$$2\,r \geq s \wedge$$
$$\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;(3\,s - 2\,y) \geq 4$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 + 4\,s\,r +$$
$$4\,s\,x + 8\,x\,y + 3\,s\sqrt{4\,r^2 - (3\,s$$
$$2\,\pi\,r^2 + 6\,s^2 + 2\sqrt{4\,r^2 - (3\,s - 2$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 12\,s\,r +$$

$$
\begin{cases}
\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+\right. & 2r\geq s\wedge \\
\quad 8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+ & \sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4 \\
\quad 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+16sr- & 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+ \\
\quad 20s^2+8sx+2\sqrt{4r^2-(3s-2x)^2}\ x+ & 4sx+8xy+3s\sqrt{4r^2-(3s \\
\quad 8sy-16xy-3s\sqrt{4r^2-(3s-2x)^2}\ - & 2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2 \\
\quad s\sqrt{4r^2-(s+2x)^2}\ -2x\sqrt{4r^2-(s+2x)^2}\ - & 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+ \\
\quad \left.2s\sqrt{4r^2-(s+2y)^2}\ -4y\sqrt{4r^2-(s+2y)^2}\right) & (s+2x)\left(4y+\sqrt{4r^2-(s+2 \\
& 2\left(\pi r^2+4yr+3s^2+6sx\right) \\
\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+\right. & 2r\geq s\wedge \\
\quad 8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+ & \sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4 \\
\quad 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+24sr- & 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+ \\
\quad 16yr-24s^2+2\sqrt{4r^2-(3s-2x)^2}\ x+ & 4sx+8xy+3s\sqrt{4r^2-(3s \\
\quad 16sy-3s\sqrt{4r^2-(3s-2x)^2}\ - & 2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2 \\
\quad s\sqrt{4r^2-(s+2x)^2}\ -2x\sqrt{4r^2-(s+2x)^2}\ - & 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2 \\
\quad \left.2s\sqrt{4r^2-(s+2y)^2}\ -4y\sqrt{4r^2-(s+2y)^2}\right) & (s+2x)\sqrt{4r^2-(s+2x)^2}\ \geq \\
& 2\left(\pi r^2+(s+2x)(s+2y)\right) \\
\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+\right. & 2r\geq s\wedge \\
\quad 8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+ & \sqrt{4r^2-(3s-2y)^2}\ (3s-2y)\geq 4 \\
\quad 8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr- & 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+ \\
 & 4sx+8xy+3s\sqrt{4r^2-(3s
\end{cases}
$$

$$8\,y\,r - 26\,s^2 - 4\,s\,x + 2\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\;x + 12\,s\,y - 8\,x\,y - 3\,s\sqrt{4\,r^2 - (3\,s - 2\,x)^2}\; - 2\,s\sqrt{4\,r^2 - (s + 2\,y)^2}\; - 4\,y\sqrt{4\,r^2 - (s + 2\,y)^2}\Bigg) \qquad 2\,\pi\,r^2 + 6\,s^2 + 2\sqrt{4\,r^2 - (3\,s - 2$$

$$\frac{1}{4}\Bigg(4\cos^{-1}\left(\frac{\frac{3\,s}{2} - x}{r}\right)r^2 + 4\cos^{-1}\left(\frac{\frac{s}{2} + x}{r}\right)r^2 + 4\cos^{-1}\left(\frac{\frac{s}{2} + y}{r}\right)r^2 + 4\tan^{-1}\left(\frac{3\,s - 2\,x}{\sqrt{4\,r^2 - (3\,s - 2\,x)^2}}\right)r^2 - 2\,\pi\,r^2 + 8\,s\,r - 12\,s^2 + 8\,s\,x - s\sqrt{4\,r^2 - (s + 2\,x)^2}\; - 2\,x\sqrt{4\,r^2 - (s + 2\,x)^2}\; - s\sqrt{4\,r^2 - (s + 2\,y)^2}\; - 2\,y\sqrt{4\,r^2 - (s + 2\,y)^2}\Bigg) \qquad 2\,r \geq s \wedge \sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;(3\,s - 2\,y) \geq 4$$

$$4\tan^{-1}\left(\frac{s + 2\,x}{\sqrt{4\,r^2 - (s + 2\,x)^2}}\right)r^2 + 12\,s\,r + (s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2$$

$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right) \wedge 4\tan^{-1}\left(\frac{s + 2\,x}{\sqrt{4\,r^2 - (s + 2\,x)^2}}\right)r^2 + 4\,(s + 2$$

$$(s + 2\,x)\sqrt{4\,r^2 - (s + 2\,x)^2}\; \geq 2\left(\pi\,r^2 + (s + 2\,x)\,(s + 2\,y)\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3\,s}{2} - x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2} + x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2} + y}{r}\right)r^2 + 8\tan^{-1}\left(\frac{3\,s - 2\,x}{\sqrt{4\,r^2 - (3\,s - 2\,x)^2}}\right)r^2 + 4\tan^{-1}\left(\frac{s + 2\,x}{\sqrt{4\,r^2 - (s + 2\,x)^2}}\right)r^2 - 6\,\pi\,r^2 + 20\,s\,r + 8\,y\,r - 26\,s^2 + 12\,s\,x - 4\,s\,y - 8\,x\,y - s\sqrt{4\,r^2 - (s + 2\,x)^2}\; - 2\,x\sqrt{4\,r^2 - (s + 2\,x)^2}\; - 2\,s\sqrt{4\,r^2 - (s + 2\,y)^2}\; - 4\,y\sqrt{4\,r^2 - (s + 2\,y)^2}\Bigg) \qquad 2\,r \geq s \wedge \sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;(3\,s - 2\,y) \geq 4$$

$$4\tan^{-1}\left(\frac{s + 2\,x}{\sqrt{4\,r^2 - (s + 2\,x)^2}}\right)r^2 + 12\,s\,r + (s + 2\,x)\left(4\,y + \sqrt{4\,r^2 - (s + 2$$

$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3\,s}{2} - x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2} + x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2} + y}{r}\right)r^2 + 8\tan^{-1}\left(\frac{3\,s - 2\,x}{\sqrt{4\,r^2 - (3\,s - 2\,x)^2}}\right)r^2 + 4\tan^{-1}\left(\frac{s + 2\,x}{\sqrt{4\,r^2 - (s + 2\,x)^2}}\right)r^2 - 6\,\pi\,r^2 + 28\,s\,r - 8\,y\,r - 30\,s^2 + 4\,s\,x + 4\,s\,y + 8\,x\,y - s\sqrt{4\,r^2 - (s + 2\,x)^2}\; - 2\,x\sqrt{4\,r^2 - (s + 2\,x)^2}\; - 2\,s\sqrt{4\,r^2 - (s + 2\,y)^2}\; - 4\,y\sqrt{4\,r^2 - (s + 2\,y)^2}\Bigg) \qquad 2\,r \geq s \wedge \sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;(3\,s - 2\,y) \geq 4$$

$$4\tan^{-1}\left(\frac{s + 2\,x}{\sqrt{4\,r^2 - (s + 2\,x)^2}}\right)r^2 + 4\,(s + 2 (s + 2\,x)\sqrt{4\,r^2 - (s + 2\,x)^2}\; \geq 2\left(\pi\,r^2 + (s + 2\,x)\,(s + 2\,y)\right)$$

$$\cos^{-1}\left(\frac{\frac{3\,s}{2} - x}{r}\right)r^2 + \cos^{-1}\left(\frac{\frac{s}{2} + x}{r}\right)r^2 + \cos^{-1}\left(\frac{\frac{s}{2} + y}{r}\right)r^2 + \tan^{-1}\left(\frac{3\,s - 2\,x}{\sqrt{4\,r^2 - (3\,s - 2\,x)^2}}\right)r^2 + \qquad 2\,r \geq s \wedge \sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;(3\,s -$$

$$\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 - \pi r^2 + 4sr - 4s^2 -$$
$$\frac{1}{4} s\sqrt{4r^2-(s+2y)^2} - \frac{1}{2} y\sqrt{4r^2-(s+2y)^2}$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right) r^2 + 4\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right) r^2 + 4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right) r^2 + \right.$$
$$2\sqrt{4r^2-(3s-2x)^2}\, x + 2\sqrt{4r^2-(3s-2y)^2}\, y -$$
$$3s\sqrt{4r^2-(3s-2x)^2} - s\sqrt{4r^2-(s+2x)^2} -$$
$$\left. 2x\sqrt{4r^2-(s+2x)^2} - 3s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$2r \geq s \wedge (s+2y)\sqrt{4r^2-(s+2y)^2}$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 +$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 + 4sr +$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 + 12sr +$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$
$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 + 4(s+2$$
$$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq$$
$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right) r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right) r^2 + 8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right) r^2 + \right.$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 - 2\pi r^2 + 4sr +$$
$$8yr-2s^2-4sx+4\sqrt{4r^2-(3s-2x)^2}\, x -$$
$$4sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\, y -$$
$$6s\sqrt{4r^2-(3s-2x)^2} - s\sqrt{4r^2-(s+2x)^2} -$$
$$\left. 2x\sqrt{4r^2-(s+2x)^2} - 6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$2r \geq s \wedge (s+2y)\sqrt{4r^2-(s+2y)^2}$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 +$$
$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$
$$8yr+18s^2+2\sqrt{4r^2-(3s-$$
$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right) r^2 + 4sr +$$
$$4sx+8xy+3s\sqrt{4r^2-(3s$$
$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$
$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right) r^2 + 12sr +$$
$$(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+12sr-8yr-6s^2-12sx+4\sqrt{4r^2-(3s-2x)^2}\,x+4sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\,y-6s\sqrt{4r^2-(3s-2x)^2}-s\sqrt{4r^2-(s+2x)^2}-2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$2r\geq s\wedge(s+2y)\sqrt{4r^2-(s+2y)^2}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{4}\left(4\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+8sr-4s^2-8sx+2\sqrt{4r^2-(3s-2x)^2}\,x+2\sqrt{4r^2-(3s-2y)^2}\,y-3s\sqrt{4r^2-(3s-2x)^2}-3s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$2r\geq s\wedge(s+2y)\sqrt{4r^2-(s+2y)^2}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2-2\pi r^2+4sr+8yr-6s^2+4sx+2\sqrt{4r^2-(3s-2x)^2}\,x-12sy+8xy+4\sqrt{4r^2-(3s-2y)^2}\,y-3s\sqrt{4r^2-(3s-2x)^2}-2s\sqrt{4r^2-(s+2x)^2}-4x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$2r\geq s\wedge(s+2y)\sqrt{4r^2-(s+2y)^2}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+(s+2x)\left(4y+\sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$2\left(\pi r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right) \wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 + 4\,(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq$$

$$2\left(\pi r^2 + (s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 + \right.$$

$$8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2 + 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 +$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 - 4\pi r^2 + 8\,s\,r +$$

$$16\,y\,r - 8\,s^2 + 2\sqrt{4r^2-(3s-2x)^2}\;x -$$

$$16\,s\,y + 4\sqrt{4r^2-(3s-2y)^2}\;y -$$

$$3\,s\sqrt{4r^2-(3s-2x)^2} - s\sqrt{4r^2-(s+2x)^2} -$$

$$\left.2\,x\sqrt{4r^2-(s+2x)^2} - 6\,s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$2\,r \geq s \wedge (s+2y)\sqrt{4r^2-(s+2y)^2}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 +$$

$$3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4r^2-(\right.$$

$$8\,y\,r + 18\,s^2 + 2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 + 12\,s\,r +$$

$$(s+2x)\left(4\,y + \sqrt{4r^2-(s+2\right.$$

$$2\left(\pi r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 + \right.$$

$$8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2 + 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 +$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 - 4\pi r^2 + 16\,s\,r -$$

$$12\,s^2 - 8\,s\,x + 2\sqrt{4r^2-(3s-2x)^2}\;x -$$

$$8\,s\,y + 16\,x\,y + 4\sqrt{4r^2-(3s-2y)^2}\;y -$$

$$3\,s\sqrt{4r^2-(3s-2x)^2} - s\sqrt{4r^2-(s+2x)^2} -$$

$$\left.2\,x\sqrt{4r^2-(s+2x)^2} - 6\,s\sqrt{4r^2-(3s-2y)^2}\right)$$

$$2\,r \geq s \wedge (s+2y)\sqrt{4r^2-(s+2y)^2}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 +$$

$$3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4r^2-(\right.$$

$$8\,y\,r + 18\,s^2 + 2\sqrt{4r^2-(3s-$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 + 4\,(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2} \geq$$

$$2\left(\pi r^2 + (s+2x)(s+2y)\right)$$

$$\frac{1}{8}\left(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 + \right.$$

$$8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2 + 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 +$$

$$8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 - 6\pi r^2 + 20\,s\,r +$$

$$8\,y\,r - 14\,s^2 - 12\,s\,x + 2\sqrt{4r^2-(3s-2x)^2}\;x -$$

$$12\,s\,y + 8\,x\,y + 4\sqrt{4r^2-(3s-2y)^2}\;y -$$

$$2\,r \geq s \wedge (s+2y)\sqrt{4r^2-(s+2y)^2}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 +$$

$$3\,s\left(4\,r + 4\,x + 4\,y + \sqrt{4r^2-(\right.$$

$$2\,\pi r^2 + 8\,y\,r + 18\,s^2 + 2\sqrt{4r^2-$$

$$12\,s\,y + 8\,x\,y + 4\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\;\;y -$$
$$3\,s\sqrt{4\,r^2 - (3\,s - 2\,x)^2} - 6\,s\sqrt{4\,r^2 - (3\,s - 2\,y)^2}\Bigg)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2 + \qquad 2\,r \geq s \wedge (s+2\,y)\sqrt{4\,r^2-(s+2\,y)^2}$$
$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 - 2\,\pi\,r^2 + 12\,s\,r - \qquad 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 + 4\,s\,r +$$
$$8\,y\,r - 18\,s^2 + 12\,s\,x + 2\sqrt{4\,r^2-(3\,s-2\,x)^2}\;\;x + \qquad 4\,s\,x + 8\,x\,y + 3\,s\sqrt{4\,r^2-(3\,s$$
$$12\,s\,y - 8\,x\,y + 4\sqrt{4\,r^2-(3\,s-2\,y)^2}\;\;y - \qquad 2\,\pi\,r^2 + 6\,s^2 + 2\sqrt{4\,r^2-(3\,s-2$$
$$3\,s\sqrt{4\,r^2-(3\,s-2\,x)^2} - 2\,s\sqrt{4\,r^2-(s+2\,x)^2} - \qquad 4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 12\,s\,r +$$
$$4\,x\sqrt{4\,r^2-(s+2\,x)^2} - 6\,s\sqrt{4\,r^2-(3\,s-2\,y)^2}\Bigg) \qquad (s+2\,x)\left(4\,y + \sqrt{4\,r^2-(s+2$$
$$2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 4\,(s+2$$
$$(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2} \geq$$
$$2\left(\pi\,r^2 + (s+2\,x)\,(s+2\,y)\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 + \qquad 2\,r \geq s \wedge (s+2\,y)\sqrt{4\,r^2-(s+2\,y)^2}$$
$$8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2 + 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 + \qquad 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 + 4\,s\,r +$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 - 4\,\pi\,r^2 + 16\,s\,r - \qquad 4\,s\,x + 8\,x\,y + 3\,s\sqrt{4\,r^2-(3\,s$$
$$20\,s^2 + 8\,s\,x + 2\sqrt{4\,r^2-(3\,s-2\,x)^2}\;\;x + \qquad 2\,\pi\,r^2 + 6\,s^2 + 2\sqrt{4\,r^2-(3\,s-2$$
$$8\,s\,y - 16\,x\,y + 4\sqrt{4\,r^2-(3\,s-2\,y)^2}\;\;y - \qquad 4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 12\,s\,r +$$
$$3\,s\sqrt{4\,r^2-(3\,s-2\,x)^2} - s\sqrt{4\,r^2-(s+2\,x)^2} - \qquad (s+2\,x)\left(4\,y + \sqrt{4\,r^2-(s+2$$
$$2\,x\sqrt{4\,r^2-(s+2\,x)^2} - 6\,s\sqrt{4\,r^2-(3\,s-2\,y)^2}\Bigg) \qquad 2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 + \qquad 2\,r \geq s \wedge (s+2\,y)\sqrt{4\,r^2-(s+2\,y)^2}$$
$$8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2 + 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 + \qquad 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2 + 4\,s\,r +$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 - 4\,\pi\,r^2 + 24\,s\,r - \qquad 4\,s\,x + 8\,x\,y + 3\,s\sqrt{4\,r^2-(3\,s$$
$$16\,y\,r - 24\,s^2 + 2\sqrt{4\,r^2-(3\,s-2\,x)^2}\;\;x + \qquad 2\,\pi\,r^2 + 6\,s^2 + 2\sqrt{4\,r^2-(3\,s-2$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2 + 4\,(s+2$$

$$16\,s\,y+4\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y-3\,s\sqrt{4\,r^2-(3\,s-2\,x)^2}\;-s\sqrt{4\,r^2-(s+2\,x)^2}\;-2\,x\sqrt{4\,r^2-(s+2\,x)^2}\;-6\,s\sqrt{4\,r^2-(3\,s-2\,y)^2}\Bigg)$$

$$\left(\sqrt{4\,r^2-(s+2\,x)^2}\;\right)$$

$$(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;\geq 2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+8\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-6\,\pi\,r^2+28\,s\,r-8\,y\,r-26\,s^2-4\,s\,x+2\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+12\,s\,y-8\,x\,y+4\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y-3\,s\sqrt{4\,r^2-(3\,s-2\,x)^2}\;-6\,s\sqrt{4\,r^2-(3\,s-2\,y)^2}\Bigg)$$

$$2\,r\geq s\wedge(s+2\,y)\sqrt{4\,r^2-(s+2\,y)^2}$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+4\,s\,x+8\,x\,y+3\,s\sqrt{4\,r^2-(3\,s$$

$$2\,\pi\,r^2+6\,s^2+2\sqrt{4\,r^2-(3\,s-2$$

$$\frac{1}{4}\Bigg(4\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2-2\,\pi\,r^2+8\,s\,r-12\,s^2+8\,s\,x+2\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y-s\sqrt{4\,r^2-(s+2\,x)^2}\;-2\,x\sqrt{4\,r^2-(s+2\,x)^2}\;-3\,s\sqrt{4\,r^2-(3\,s-2\,y)^2}\Bigg)$$

$$2\,r\geq s\wedge(s+2\,y)\sqrt{4\,r^2-(s+2\,y)^2}$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2$$

$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge 4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$

$$(s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2}\;\geq 2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+8\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-6\,\pi\,r^2+20\,s\,r+8\,y\,r-26\,s^2+12\,s\,x-4\,s\,y-8\,x\,y+4\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y-s\sqrt{4\,r^2-(s+2\,x)^2}\;-2\,x\sqrt{4\,r^2-(s+2\,x)^2}\;-6\,s\sqrt{4\,r^2-(3\,s-2\,y)^2}\Bigg)$$

$$2\,r\geq s\wedge(s+2\,y)\sqrt{4\,r^2-(s+2\,y)^2}$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2$$

$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+\cdots$$

$$2\,r\geq s\wedge(s+2\,y)\sqrt{4\,r^2-(s+2\,y)^2}$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\cdots}\right)r^2+4\,(s+2$$

$$8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-\left(\sqrt{4r^2-(s+2x)^2}\right)$$

$$6\pi r^2+28sr-8yr-30s^2+4sx+4sy+8xy+$$

$$4\sqrt{4r^2-(3s-2y)^2}\,y-s\sqrt{4r^2-(s+2x)^2}\,-$$

$$2x\sqrt{4r^2-(s+2x)^2}\,-6s\sqrt{4r^2-(3s-2y)^2}\Bigg)$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+$$

$$\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-\pi r^2+4sr-4s^2+$$

$$\frac{1}{2}\sqrt{4r^2-(3s-2y)^2}\,y-\frac{3}{4}s\sqrt{4r^2-(3s-2y)^2}$$

$$2r\geq s\wedge(s+2y)\sqrt{4r^2-(s+2y)^2}$$

$$\frac{1}{4}\Bigg(4\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+$$

$$4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+$$

$$2\sqrt{4r^2-(3s-2x)^2}\,x+2\sqrt{4r^2-(3s-2y)^2}\,y-$$

$$3s\sqrt{4r^2-(3s-2x)^2}\,-s\sqrt{4r^2-(s+2x)^2}\,-$$

$$2x\sqrt{4r^2-(s+2x)^2}\,-3s\sqrt{4r^2-(3s-2y)^2}\,-$$

$$s\sqrt{4r^2-(s+2y)^2}\,-2y\sqrt{4r^2-(s+2y)^2}\Bigg)$$

$$2r\geq s\wedge 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$4sx+8xy+3s\sqrt{4r^2-(3s}$$

$$2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2}$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+12sr+$$

$$(s+2x)\left(4y+\sqrt{4r^2-(s+2}\right.$$

$$2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$(s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$

$$2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+$$

$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-2\pi r^2+$$

$$4sr+8yr-2s^2-4sx+4\sqrt{4r^2-(3s-2x)^2}\,x-$$

$$4sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\,y-$$

$$2r\geq s\wedge 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$3s\left(4r+4x+4y+\sqrt{4r^2-(}\right.$$

$$8yr+18s^2+2\sqrt{4r^2-(3s-}$$

$$4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+4sr+$$

$$6\,s\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;-s\,\sqrt{4\,r^2-(s+2\,x)^2}\;-$$
$$2\,x\,\sqrt{4\,r^2-(s+2\,x)^2}\;-6\,s\,\sqrt{4\,r^2-(3\,s-2\,y)^2}\;-$$
$$2\,s\,\sqrt{4\,r^2-(s+2\,y)^2}\;-4\,y\,\sqrt{4\,r^2-(s+2\,y)^2}\;\Bigg)$$

$$4\,s\,x+8\,x\,y+3\,s\,\sqrt{4\,r^2-(3\,s$$
$$2\,\pi\,r^2+6\,s^2+2\,\sqrt{4\,r^2-(3\,s-2$$
$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$
$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2$$
$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+$$
$$8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+$$
$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-2\,\pi\,r^2+12\,s\,r-$$
$$8\,y\,r-6\,s^2-12\,s\,x+4\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+$$
$$4\,s\,y+8\,x\,y+4\,\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y-$$
$$6\,s\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;-s\,\sqrt{4\,r^2-(s+2\,x)^2}\;-$$
$$2\,x\,\sqrt{4\,r^2-(s+2\,x)^2}\;-6\,s\,\sqrt{4\,r^2-(3\,s-2\,y)^2}\;-$$
$$2\,s\,\sqrt{4\,r^2-(s+2\,y)^2}\;-4\,y\,\sqrt{4\,r^2-(s+2\,y)^2}\;\Bigg)\quad 2\,r\geq s\wedge 4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$
$$3\,s\left(4\,r+4\,x+4\,y+\sqrt{4\,r^2-(\right.$$
$$8\,y\,r+18\,s^2+2\,\sqrt{4\,r^2-(3\,s-$$
$$4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$
$$4\,s\,x+8\,x\,y+3\,s\,\sqrt{4\,r^2-(3\,s$$
$$2\,\pi\,r^2+6\,s^2+2\,\sqrt{4\,r^2-(3\,s-2$$
$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$
$$(s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2}\;\geq$$
$$2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$

$$\frac{1}{4}\Bigg(4\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+$$
$$4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-$$
$$2\,\pi\,r^2+8\,s\,r-4\,s^2-8\,s\,x+$$
$$2\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x+2\,\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y-$$
$$3\,s\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;-3\,s\,\sqrt{4\,r^2-(3\,s-2\,y)^2}\;-$$
$$s\,\sqrt{4\,r^2-(s+2\,y)^2}\;-2\,y\,\sqrt{4\,r^2-(s+2\,y)^2}\;\Bigg)\quad 2\,r\geq s\wedge 4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$
$$3\,s\left(4\,r+4\,x+4\,y+\sqrt{4\,r^2-(\right.$$
$$8\,y\,r+18\,s^2+2\,\sqrt{4\,r^2-(3\,s-$$
$$4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+4\,s\,r+$$
$$4\,s\,x+8\,x\,y+3\,s\,\sqrt{4\,r^2-(3\,s$$
$$2\,\pi\,r^2+6\,s^2+2\,\sqrt{4\,r^2-(3\,s-2$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+$$
$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2-2\,\pi\,r^2+$$
$$4\,s\,r+8\,y\,r-6\,s^2+4\,s\,x+2\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x-$$
$$12\,s\,y+8\,x\,y+4\,\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y-$$
$$2\,r\geq s\wedge 4\,\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$
$$3\,s\left(4\,r+4\,x+4\,y+\sqrt{4\,r^2-(\right.$$
$$8\,y\,r+18\,s^2+2\,\sqrt{4\,r^2-(3\,s-$$
$$4\,\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$

$$3\,s\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;-2\,s\,\sqrt{4\,r^2-(s+2\,x)^2}\;-$$
$$4\,x\,\sqrt{4\,r^2-(s+2\,x)^2}\;-6\,s\,\sqrt{4\,r^2-(3\,s-2\,y)^2}\;-$$
$$2\,s\,\sqrt{4\,r^2-(s+2\,y)^2}\;-4\,y\,\sqrt{4\,r^2-(s+2\,y)^2}\;\Bigg)$$

$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2$$
$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)\wedge$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$
$$(s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2}\;\geq$$
$$2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+$$
$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-4\,\pi\,r^2+8\,s\,r+$$
$$16\,y\,r-8\,s^2+2\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x-$$
$$16\,s\,y+4\,\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y-$$
$$3\,s\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;-s\,\sqrt{4\,r^2-(s+2\,x)^2}\;-$$
$$2\,x\,\sqrt{4\,r^2-(s+2\,x)^2}\;-6\,s\,\sqrt{4\,r^2-(3\,s-2\,y)^2}\;-$$
$$2\,s\,\sqrt{4\,r^2-(s+2\,y)^2}\;-4\,y\,\sqrt{4\,r^2-(s+2\,y)^2}\;\Bigg)$$

$$2\,r\geq s\wedge 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$
$$3\,s\left(4\,r+4\,x+4\,y+\sqrt{4\,r^2-(\right.$$
$$8\,y\,r+18\,s^2+2\,\sqrt{4\,r^2-(3\,s-$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+12\,s\,r+$$
$$(s+2\,x)\left(4\,y+\sqrt{4\,r^2-(s+2\,x)^2}\right)+$$
$$2\left(\pi\,r^2+4\,y\,r+3\,s^2+6\,s\,x\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+$$
$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2-4\,\pi\,r^2+16\,s\,r-$$
$$12\,s^2-8\,s\,x+2\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x-$$
$$8\,s\,y+16\,x\,y+4\,\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y-$$
$$3\,s\,\sqrt{4\,r^2-(3\,s-2\,x)^2}\;-s\,\sqrt{4\,r^2-(s+2\,x)^2}\;-$$
$$2\,x\,\sqrt{4\,r^2-(s+2\,x)^2}\;-6\,s\,\sqrt{4\,r^2-(3\,s-2\,y)^2}\;-$$
$$2\,s\,\sqrt{4\,r^2-(s+2\,y)^2}\;-4\,y\,\sqrt{4\,r^2-(s+2\,y)^2}\;\Bigg)$$

$$2\,r\geq s\wedge 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$
$$3\,s\left(4\,r+4\,x+4\,y+\sqrt{4\,r^2-(\right.$$
$$8\,y\,r+18\,s^2+2\,\sqrt{4\,r^2-(3\,s-$$
$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right)r^2+4\,(s+2$$
$$(s+2\,x)\,\sqrt{4\,r^2-(s+2\,x)^2}\;\geq$$
$$2\left(\pi\,r^2+(s+2\,x)\,(s+2\,y)\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right)r^2+$$
$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$

$$2\,r\geq s\wedge 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right)r^2+$$
$$3\,s\left(4\,r+4\,x+4\,y+\sqrt{4\,r^2-(\right.$$

$$2\pi r^2 + 8\,y\,r + 18\,s^2 + 2\sqrt{4\,r^2 -$$

$$8\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 - 6\,\pi\,r^2 + 20\,s\,r +$$

$$8\,y\,r - 14\,s^2 - 12\,s\,x + 2\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x -$$

$$12\,s\,y + 8\,x\,y + 4\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y -$$

$$3\,s\sqrt{4\,r^2-(3\,s-2\,x)^2} - 6\,s\sqrt{4\,r^2-(3\,s-2\,y)^2} -$$

$$2\,s\sqrt{4\,r^2-(s+2\,y)^2} - 4\,y\sqrt{4\,r^2-(s+2\,y)^2}\Bigg)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right) r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right) r^2 + \qquad 2\,r \geq s \wedge 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right) r^2 +$$

$$8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right) r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right) r^2 + \qquad 4\,s\,x + 8\,x\,y + 3\,s\sqrt{4\,r^2-(3\,s$$

$$4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right) r^2 - 2\,\pi\,r^2 + 12\,s\,r - \qquad 2\,\pi\,r^2 + 6\,s^2 + 2\sqrt{4\,r^2-(3\,s-2$$

$$8\,y\,r - 18\,s^2 + 12\,s\,x + 2\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x + \qquad 4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 + 12\,s\,r +$$

$$12\,s\,y - 8\,x\,y + 4\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y - \qquad (s+2\,x)\left(4\,y + \sqrt{4\,r^2-(s+2$$

$$3\,s\sqrt{4\,r^2-(3\,s-2\,x)^2} - 2\,s\sqrt{4\,r^2-(s+2\,x)^2} - \qquad 2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right) \wedge$$

$$4\,x\sqrt{4\,r^2-(s+2\,x)^2} - 6\,s\sqrt{4\,r^2-(3\,s-2\,y)^2} - \qquad 4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 + 4\,(s+2$$

$$2\,s\sqrt{4\,r^2-(s+2\,y)^2} - 4\,y\sqrt{4\,r^2-(s+2\,y)^2}\Bigg) \qquad (s+2\,x)\sqrt{4\,r^2-(s+2\,x)^2} \geq$$

$$2\left(\pi\,r^2 + (s+2\,x)\,(s+2\,y)\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right) r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right) r^2 + 8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right) r^2 + \qquad 2\,r \geq s \wedge 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right) r^2 +$$

$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right) r^2 + 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right) r^2 + \qquad 4\,s\,x + 8\,x\,y + 3\,s\sqrt{4\,r^2-(3\,s$$

$$4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 - 4\,\pi\,r^2 + 16\,s\,r - \qquad 2\,\pi\,r^2 + 6\,s^2 + 2\sqrt{4\,r^2-(3\,s-2$$

$$20\,s^2 + 8\,s\,x + 2\sqrt{4\,r^2-(3\,s-2\,x)^2}\;x + \qquad 4\tan^{-1}\left(\frac{s+2\,x}{\sqrt{4\,r^2-(s+2\,x)^2}}\right) r^2 + 12\,s\,r +$$

$$8\,s\,y - 16\,x\,y + 4\sqrt{4\,r^2-(3\,s-2\,y)^2}\;y - \qquad (s+2\,x)\left(4\,y + \sqrt{4\,r^2-(s+2$$

$$3\,s\sqrt{4\,r^2-(3\,s-2\,x)^2} - s\sqrt{4\,r^2-(s+2\,x)^2} - \qquad 2\left(\pi\,r^2 + 4\,y\,r + 3\,s^2 + 6\,s\,x\right)$$

$$2\,x\sqrt{4\,r^2-(s+2\,x)^2} - 6\,s\sqrt{4\,r^2-(3\,s-2\,y)^2} -$$

$$2\,s\sqrt{4\,r^2-(s+2\,y)^2} - 4\,y\sqrt{4\,r^2-(s+2\,y)^2}\Bigg)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3\,s}{2}-x}{r}\right) r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right) r^2 + 8\cos^{-1}\left(\frac{\frac{3\,s}{2}-y}{r}\right) r^2 + \qquad 2\,r \geq s \wedge 4\tan^{-1}\left(\frac{3\,s-2\,x}{\sqrt{4\,r^2-(3\,s-2\,x)^2}}\right) r^2 +$$

$$\left(\frac{s}{2}+y\right) \qquad \left(\qquad\qquad\right) \qquad 4\,s\,x + 8\,x\,y + 3\,s\sqrt{4\,r^2-(3\,s$$

$$8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+ \qquad 15sx+6xy+3s\sqrt{4r^2-(3s$$

$$4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-4\pi r^2+24sr- \qquad 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$16yr-24s^2+2\sqrt{4r^2-(3s-2x)^2}\,x+ \qquad (s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$

$$16sy+4\sqrt{4r^2-(3s-2y)^2}\,y- \qquad 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$3s\sqrt{4r^2-(3s-2x)^2}-s\sqrt{4r^2-(s+2x)^2}-$$

$$2x\sqrt{4r^2-(s+2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-$$

$$2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\Bigg)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+ \qquad 2r\geq s\wedge 4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+$$

$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+ \qquad 4sx+8xy+3s\sqrt{4r^2-(3s$$

$$8\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2-6\pi r^2+28sr- \qquad 2\pi r^2+6s^2+2\sqrt{4r^2-(3s-2$$

$$8yr-26s^2-4sx+2\sqrt{4r^2-(3s-2x)^2}\,x+$$

$$12sy-8xy+4\sqrt{4r^2-(3s-2y)^2}\,y-$$

$$3s\sqrt{4r^2-(3s-2x)^2}-6s\sqrt{4r^2-(3s-2y)^2}-$$

$$2s\sqrt{4r^2-(s+2y)^2}-4y\sqrt{4r^2-(s+2y)^2}\Bigg)$$

$$\frac{1}{4}\Bigg(4\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+4\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+ \qquad 2r\geq s\wedge 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+$$

$$4\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+4\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2- \qquad 12sr+(s+2x)\left(4y+\sqrt{4r^2}\right.$$

$$2\pi r^2+8sr-12s^2+8sx+ \qquad 2\left(\pi r^2+4yr+3s^2+6sx\right)\wedge$$

$$2\sqrt{4r^2-(3s-2y)^2}\,y-s\sqrt{4r^2-(s+2x)^2}- \qquad 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+4(s+2$$

$$2x\sqrt{4r^2-(s+2x)^2}-3s\sqrt{4r^2-(3s-2y)^2}- \qquad (s+2x)\sqrt{4r^2-(s+2x)^2}\geq$$

$$s\sqrt{4r^2-(s+2y)^2}-2y\sqrt{4r^2-(s+2y)^2}\Bigg) \qquad 2\left(\pi r^2+(s+2x)(s+2y)\right)$$

$$\frac{1}{8}\Bigg(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2+8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2+ \qquad 2r\geq s\wedge 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2+$$

$$8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2+8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2+ \qquad 12sr+(s+2x)\left(4y+\sqrt{4r^2}\right.$$

$$4\tan^{-1}\left(\frac{s+2x}{\qquad}\right)r^2-6\pi r^2+20sr+ \qquad 2\left(\pi r^2+4yr+3s^2+6sx\right)$$

$$\begin{cases}
4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 - 6\pi r^2 + 28sr - & \\
8yr - 26s^2 + 12sx - 4sy - 8xy + & \\
4\sqrt{4r^2-(3s-2y)^2}\,y - s\sqrt{4r^2-(s+2x)^2} - & \\
2x\sqrt{4r^2-(s+2x)^2} - 6s\sqrt{4r^2-(3s-2y)^2} - & \\
2s\sqrt{4r^2-(s+2y)^2} - 4y\sqrt{4r^2-(s+2y)^2}\Big) & \\
\frac{1}{8}\Big(8\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 + 8\cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2 + & 2r \geq s \wedge 4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 + \\
8\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2 + 8\tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 + & 4(s+2y)r + (s+2x)\sqrt{4r^2 - \\
4\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 - 6\pi r^2 + 28sr - & 2\left(\pi r^2 + (s+2x)(s+2y)\right) \\
8yr - 30s^2 + 4sx + 4sy + 8xy + & \\
4\sqrt{4r^2-(3s-2y)^2}\,y - s\sqrt{4r^2-(s+2x)^2} - & \\
2x\sqrt{4r^2-(s+2x)^2} - 6s\sqrt{4r^2-(3s-2y)^2} - & \\
2s\sqrt{4r^2-(s+2y)^2} - 4y\sqrt{4r^2-(s+2y)^2}\Big) & \\
\cos^{-1}\left(\frac{\frac{3s}{2}-x}{r}\right)r^2 + \cos^{-1}\left(\frac{\frac{s}{2}+x}{r}\right)r^2 + \cos^{-1}\left(\frac{\frac{3s}{2}-y}{r}\right)r^2 + & \text{True} \\
\cos^{-1}\left(\frac{\frac{s}{2}+y}{r}\right)r^2 + \tan^{-1}\left(\frac{3s-2x}{\sqrt{4r^2-(3s-2x)^2}}\right)r^2 + & \\
\tan^{-1}\left(\frac{s+2x}{\sqrt{4r^2-(s+2x)^2}}\right)r^2 - \pi r^2 + 4sr - 4s^2 + & \\
\frac{1}{2}\sqrt{4r^2-(3s-2y)^2}\,y - \frac{3}{4}s\sqrt{4r^2-(3s-2y)^2} - & \\
\frac{1}{4}s\sqrt{4r^2-(s+2y)^2} - \frac{1}{2}y\sqrt{4r^2-(s+2y)^2} &
\end{cases}$$