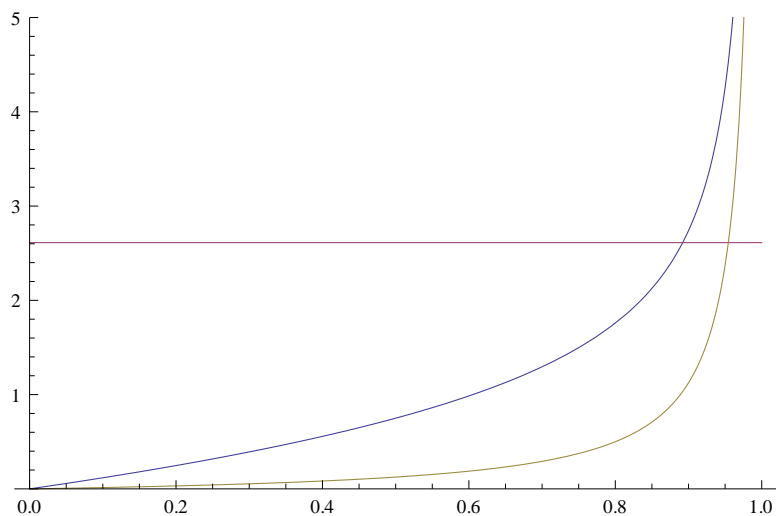```
Lambda = 0.5; V = 1;
Plot[{PolyLog[3 / 2, z] + Lambda ^ 3 * z / (1 - z) / V, 2.612, Lambda ^ 3 * z / (1 - z) / V},
 {z, 0, 1}, PlotRange → {0, 5}]
```



```
NIntegrate[1 / (Exp[x] - 1), {x, 1, Infinity}]
```

0.458675

```
Series[Exp[x] - 1, {x, 0, 10}]
```

$$x + \frac{x^2}{2} + \frac{x^3}{6} + \frac{x^4}{24} + \frac{x^5}{120} + \frac{x^6}{720} + \frac{x^7}{5040} + \frac{x^8}{40\,320} + \frac{x^9}{362\,880} + \frac{x^{10}}{3\,628\,800} + O[x]^{11}$$

```
Series[Sqrt[x], {x, 0, 10}]
```

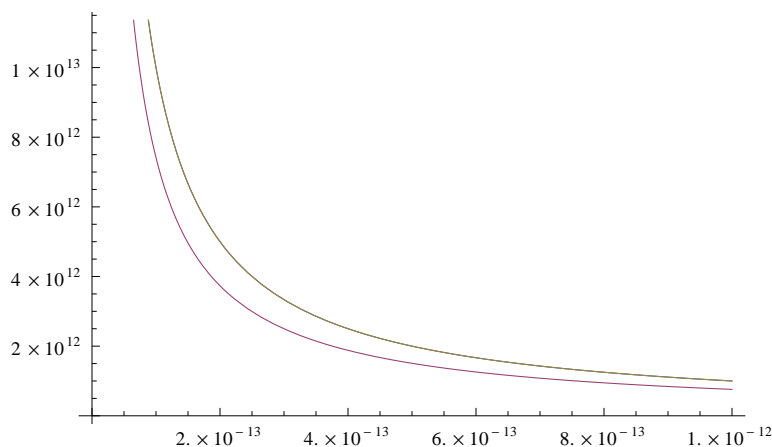$$\sqrt{x} + O[x]^{21/2}$$

```
Sqrt
```

```
Integrate[1 / x ^ (0.9999), {x, 0, 1}]
```

10 000.

```
Plot[{1 / x, x ^ -.99, 1 / (Exp[x] - 1)}, {x, 0, 0.000000000001}]
```

Power::infy : Infinite expression $\dfrac{1}{0.}$ encountered. $\gg$


```
Solve[b == x + Log[x], x]
```

InverseFunction::ifun :

 Inverse functions are being used. Values may be lost for multivalued inverses. $\gg$

Solve::ifun : Inverse functions are being used by Solve, so some

     solutions may not be found; use Reduce for complete solution information. $\gg$

$$\left\{\left\{x \rightarrow \text{ProductLog}\left[e^{b}\right]\right\}\right\}$$

```
Series[ProductLog[b], {b, 0, 10}]
```

$$b - b^2 + \frac{3\,b^3}{2} - \frac{8\,b^4}{3} + \frac{125\,b^5}{24} - \frac{54\,b^6}{5} + \frac{16\,807\,b^7}{720} - \frac{16\,384\,b^8}{315} + \frac{531\,441\,b^9}{4480} - \frac{156\,250\,b^{10}}{567} + O[b]^{11}$$

```
Plot[ProductLog[x], {x, 0, 1000}]
```
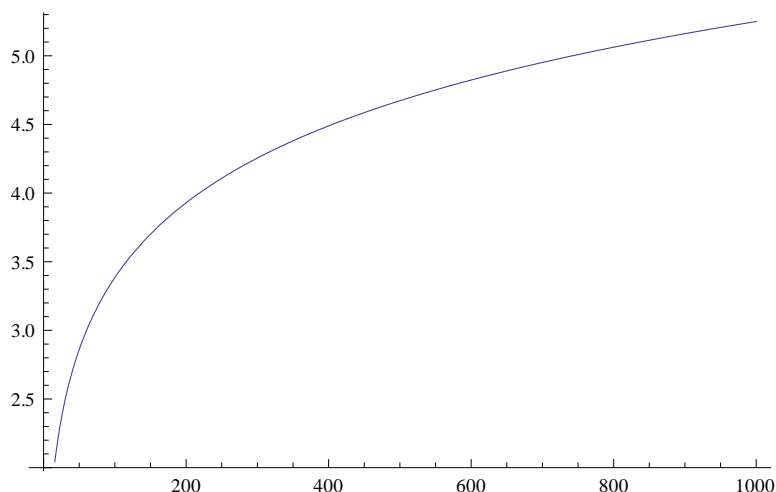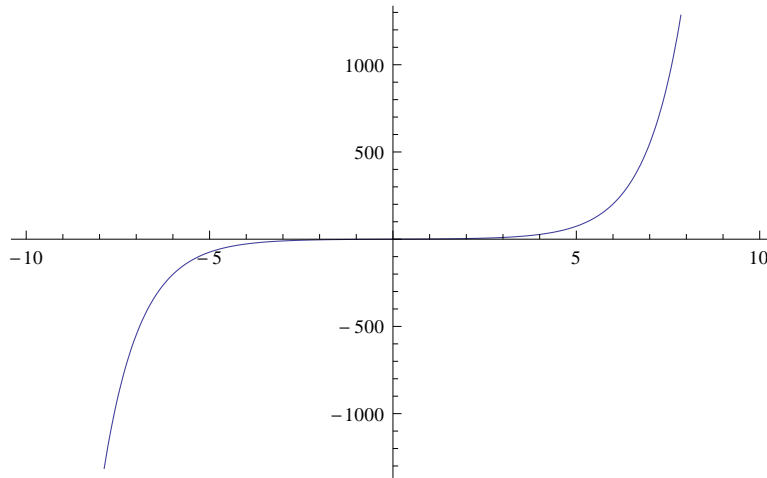


```
D[Sinh[x], x]
```

$\text{Cosh}[x]$

D[k T Log[2 Sinh[h w / k / T / 2]], T]

$$-\frac{h\,w\,\text{Coth}\left[\frac{h\,w}{2\,k\,T}\right]}{2\,T} + k\,\text{Log}\left[2\,\text{Sinh}\left[\frac{h\,w}{2\,k\,T}\right]\right]$$

D[1 / Tanh[x], x]

$-\text{Csch}[x]^2$

Plot[1 / Csch[x], {x, -10, 10}]

D[h w / 2 / Tanh[h w / k / T / 2], T]

$$\frac{h^2\,w^2\,\text{Csch}\left[\frac{h\,w}{2\,k\,T}\right]^2}{4\,k\,T^2}$$

t := c / (n + 1 / 2);

k T Log[e / k / T] - T D[k T Log[e / k / T], T]

$$k\,T\,\text{Log}\left[\frac{e}{k\,T}\right] - T\,\left(-k + k\,\text{Log}\left[\frac{e}{k\,T}\right]\right)$$

Simplify[%]

k T

`Plot[{Sinh[x], 1 / Sqrt[1 / Tanh[x] ^ 2 - 1]}, {x, -2, 2}]`
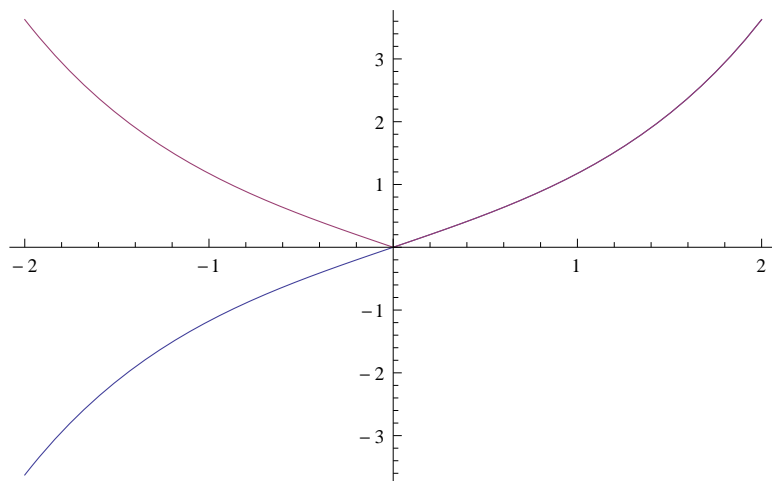
`Solve[Sqrt[x ^ 2 + 1] / x == n, x]`

$$\left\{ \left\{ x \to -\frac{1}{\sqrt{-1+n^2}} \right\}, \left\{ x \to \frac{1}{\sqrt{-1+n^2}} \right\} \right\}$$

$$D\left[\frac{1}{\sqrt{-1+n^2}}, n \right]$$

$$-\frac{n}{\left(-1+n^2\right)^{3/2}}$$

`D[Sqrt[x ^ 2 + 1] / x, x]`

$$\frac{1}{\sqrt{1+x^2}} - \frac{\sqrt{1+x^2}}{x^2}$$

`D[6 e / ( Exp[2 e / k / T] + 3), T]`

$$\frac{12\, e^2\, e^{\frac{2e}{kT}}}{\left(3 + e^{\frac{2e}{kT}}\right)^2 k\, T^2}$$
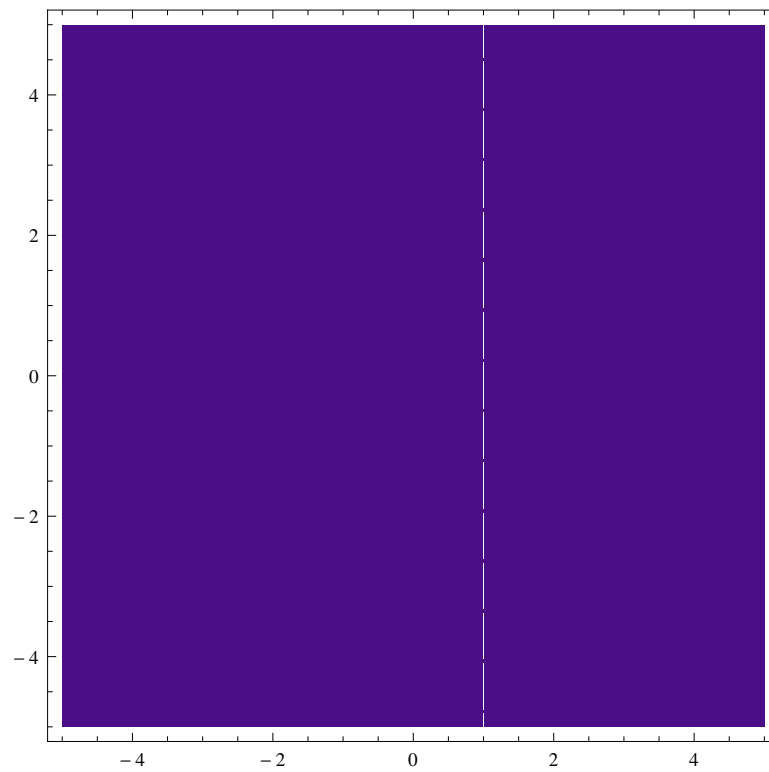
`x / (3 + x) ^ 2`

$$\frac{x}{(3+x)^2}$$

`Factor[%]`

$$\frac{x}{(3+x)^2}$$

`Sum[1 / 2 ^ n, {n, 1, Infinity}]`

1

`a = 1; b = 0; DensityPlot[f[a * x + b * y - 1, 0.01], {x, -5, 5}, {y, -5, 5}]`

`f[x_, e_] := UnitStep[x + e / 2] - UnitStep[x - e / 2];`

`Plot[f[x, 1], {x, -5, 5}]`