

question2

June 19, 2021

```
[1]: from sage.plot.plot3d.transform import rotate_arbitrary
from sage.repl.ipython_kernel.interact import sage_interactive
import matplotlib.pyplot as plt
```

```
[2]: step=14
PI = math.pi
```

0.1 Plot Function

Changing the coordinates of the centre of the circle by rotating it by $\frac{2\pi}{step}$.

```
[3]: def plotfun(r, p):
    g = Graphics()
    ct=0
    for n in xrange(0, 2*PI+2*PI/step, 2*PI/step):
        (x,y) = (p*math.cos(n), p*math.sin(n))
        g += circle((x,y), r, rgbcolor=hue(ct/(2*step)))
        ct+=1
    label = "Rotating a circle centered at (0,{0:.2f}) with radius {1:.2f}".
    ↪format(p, r)
    g.show(title=label)
    return g
```

```
[4]: sage_interactive(plotfun, r=(0,3,0.5), p=(0,3,0.5))
```

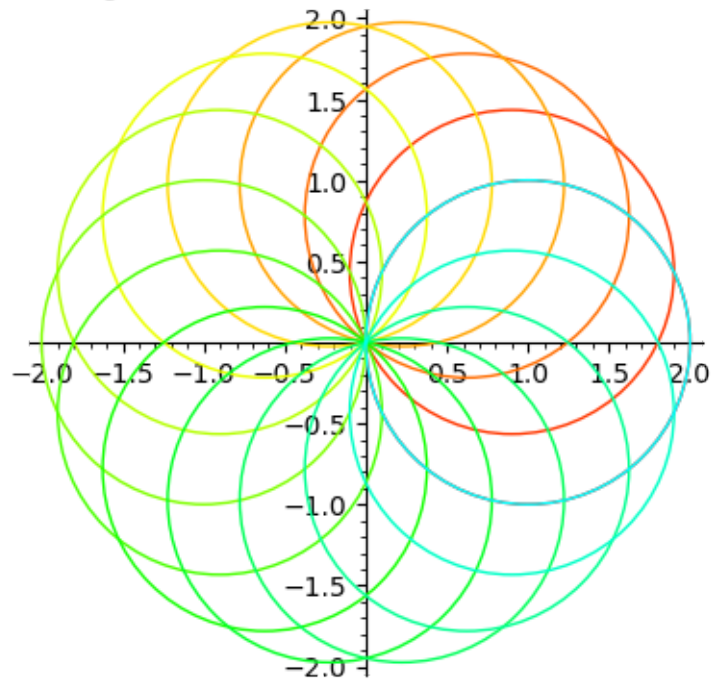
Interactive function <function plotfun at 0x7f9d68bd90d0> with 2 widgets
r: FloatSlider(value=1.0, descripti...

0.2 Plotting for different values of r and p

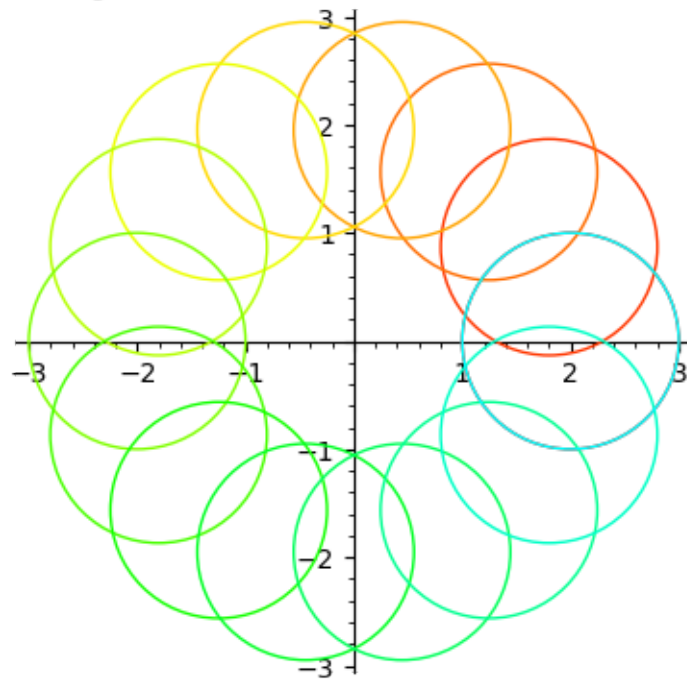
```
[5]: count = 1
for r in range(1,4,1):
    for p in range(1,4,1):
        g = plotfun(r, p)
        label = "Rotating a circle centered at (0,{0:.2f}) with radius {1:.2f}".
        ↪format(p, r)
```

```
g.save("r={0}andp={1}".format(r,p)+".png", title=label)  
count+=1
```

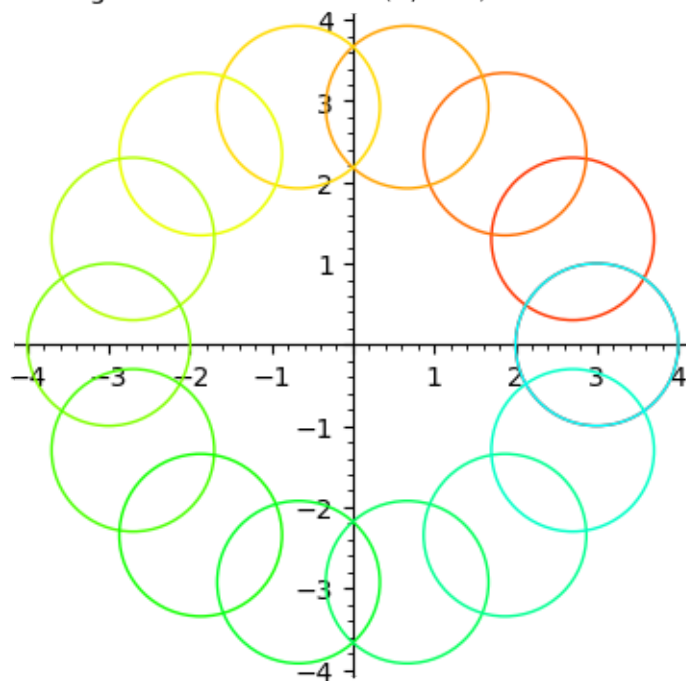
Rotating a circle centered at (0,1.00) with radius 1.00



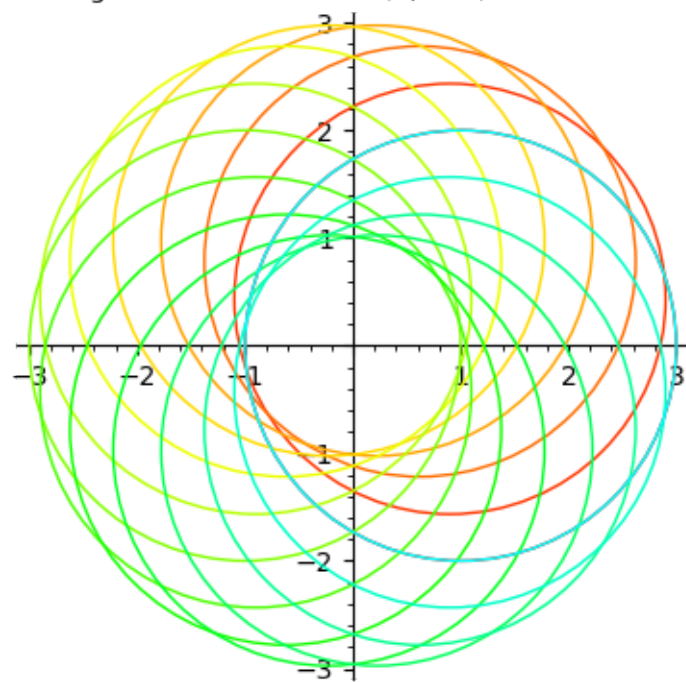
Rotating a circle centered at (0,2.00) with radius 1.00



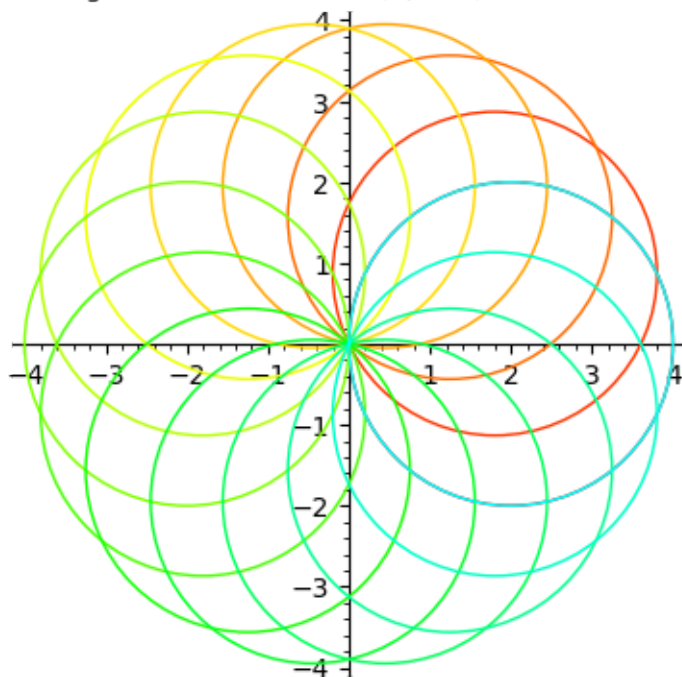
Rotating a circle centered at $(0, 3.00)$ with radius 1.00



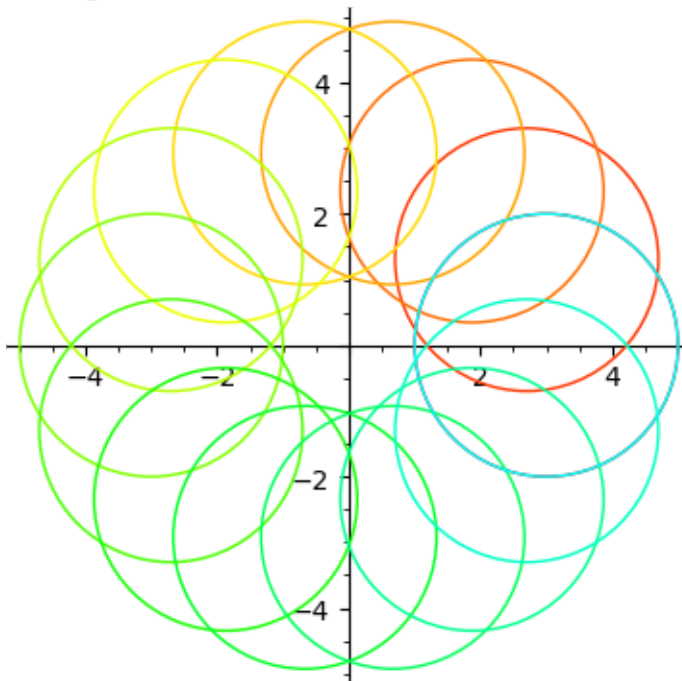
Rotating a circle centered at $(0, 1.00)$ with radius 2.00



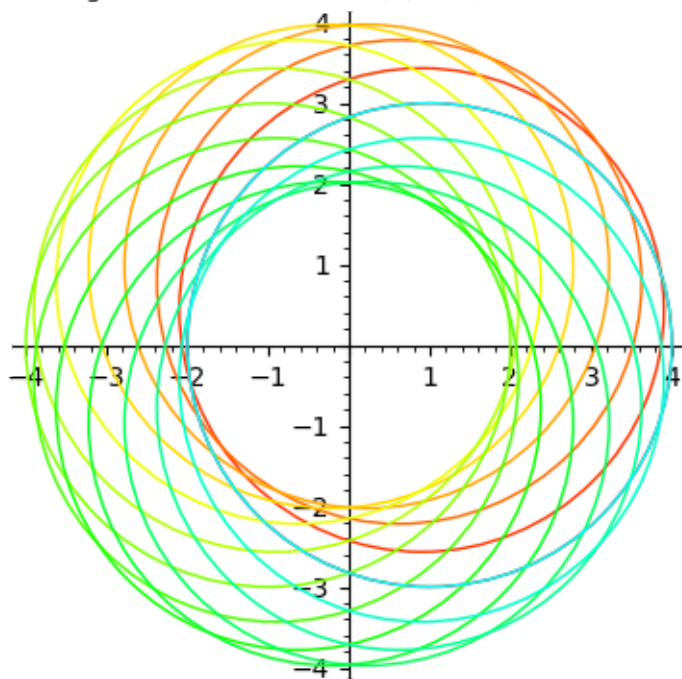
Rotating a circle centered at $(0, 2.00)$ with radius 2.00



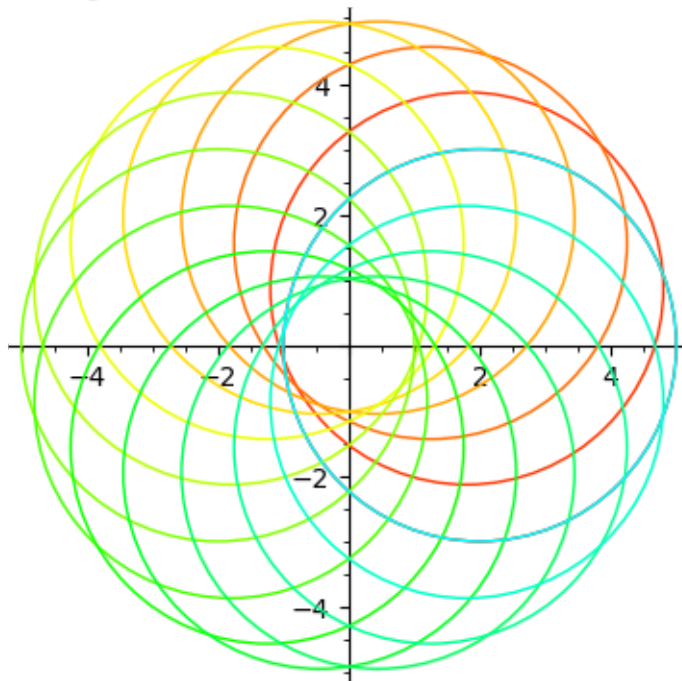
Rotating a circle centered at $(0, 3.00)$ with radius 2.00



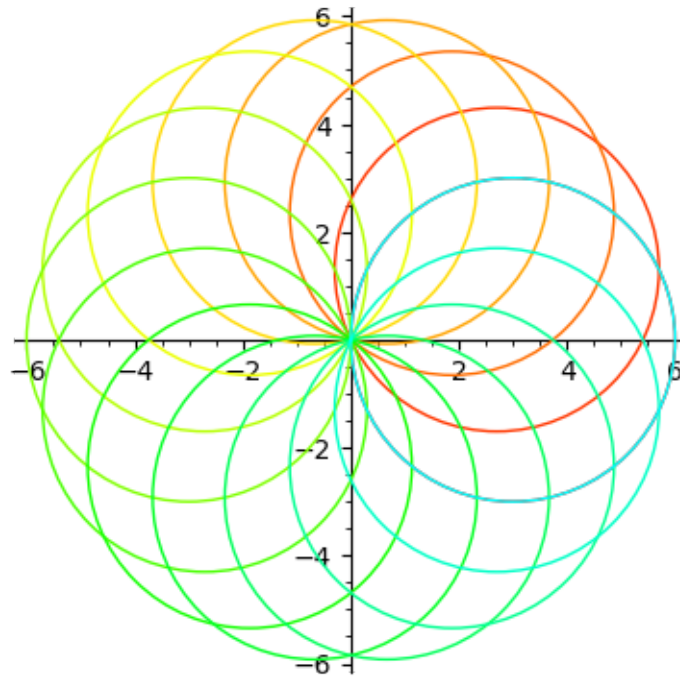
Rotating a circle centered at $(0,1.00)$ with radius 3.00



Rotating a circle centered at $(0,2.00)$ with radius 3.00



Rotating a circle centered at (0,3.00) with radius 3.00



Creating a Matrix of images

```
[6]: !montage -density 300 -tile 3x3 -geometry +5+50 *.png question2.png
```

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[ ]:
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