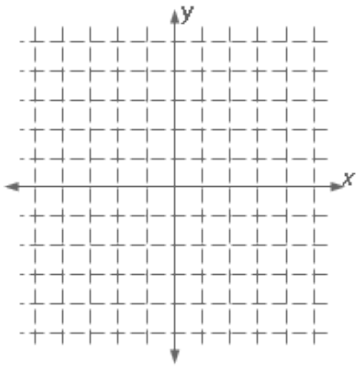
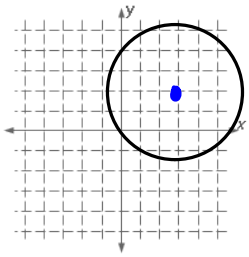
Converting Equations from Rectangular to Polar Form

EX #6: Convert $(x-3)^2+(y-2)^2=13$ to polar form.



Converting Equations from Rectangular to Polar Form

EX #6: Convert $(x-3)^2+(y-2)^2=13$ to polar form.



C: (3, 2)

$r=\sqrt{13}$

$x^2-6x+9+y^2-4y+4=13$

$x^2+y^2-6x-4y=0$

$r^2-6r\cos\theta-4r\sin\theta=0$

$r^2=6r\cos\theta+4r\sin\theta$

$r=6\cos\theta+4\sin\theta$

Convert $r = -3 \sin\theta$ to rectangular form. Identify the graph.

Convert $r = -3 \sin\theta$ to rectangular form. Identify the graph.

$$r = -3\sin\theta$$

$$r^2 = -3r\sin\theta$$

$$x^2 + y^2 = -3y$$

$$x^2 + y^2 + 3y = 0$$

Complete the square

$$x^2 + y^2 + 3y + \frac{9}{4} = \frac{9}{4}$$

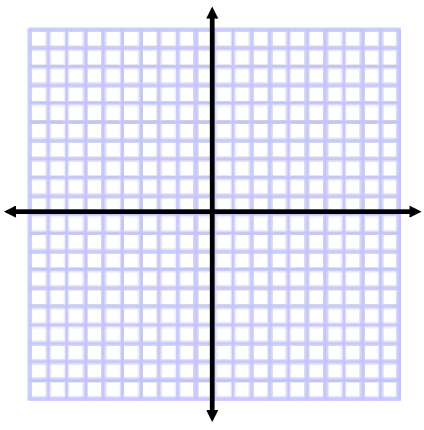
$$x^2 + \left(y + \frac{3}{2}\right)^2 = \frac{9}{4}$$

Assignment:

p.576 #50-70 even

Equation Conversion from Polar Form to Rectangular Form

$$\theta = \frac{2\pi}{3}$$



p.576 #50-70 even

Today is a practice/review day!

50) $\left(3\sqrt{2}, \frac{3\pi}{4}\right)$

52) $\left(4, -\frac{2\pi}{3}\right)$

54) $(2.25, 4.349)$

56) $(2.31, -3.229)$

58) $r = \cos\theta$

60) $r^2 \sin^2\theta - 2r\cos\theta = 0$

62) $r^3 \sin\theta \cos^2\theta = \frac{1}{4}$

64) $r\sin\theta + 3 = 0$

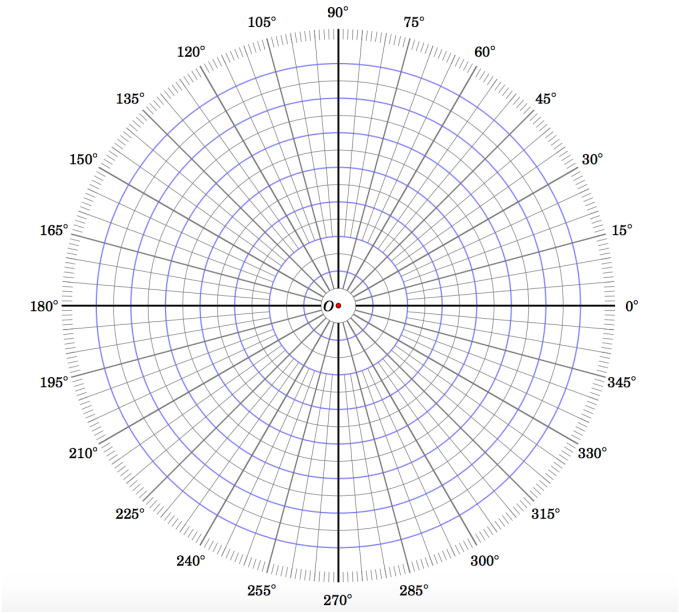
66) $x^2 + y^2 = y + \sqrt{x^2 + y^2}$

68) $\left(x + \frac{1}{2}\right)^2 + \left(y - \frac{1}{2}\right)^2 = \frac{1}{2}$

70) $x^2 + y^2 = 16$

Plot the given polar coordinate.

$(4, 165°)$



Today's Plan:

Learning Target (standard): I will describe coordinates in rectangular and polar form.

Students will: Complete practice problems over previous concepts at the boards, put up homework problems on the board and make necessary corrections to their own work, take notes over new material and complete practice problems over new concepts.

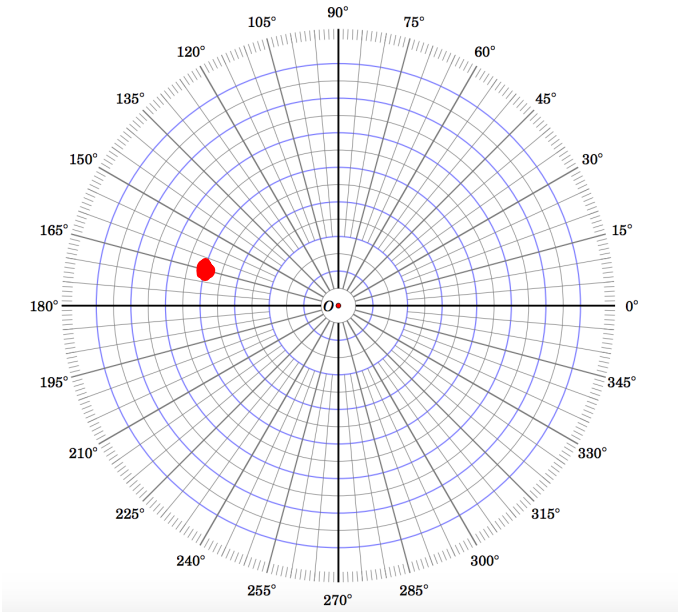
Teacher will: Provide practice problems over previous concepts, check homework problems for accuracy and provide students feedback, describe and provide examples of new concepts and assign students assessment problems over new concepts.

Assessment: Board work, homework check and homework assignment

Differentiation: Students will work at the board, go over and correct homework at their seats, actively engage in lecture over new concepts, practice new concepts with the aid of other students and the teacher and complete homework assignment.

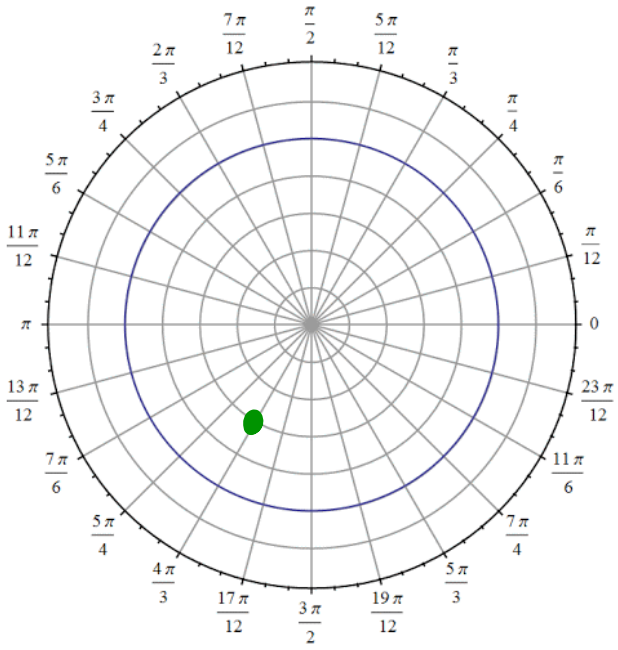
Plot the given polar coordinate.

$(4, 165°)$



Plot the given polar coordinate.

$$\left(3, \frac{4\pi}{3}\right)$$



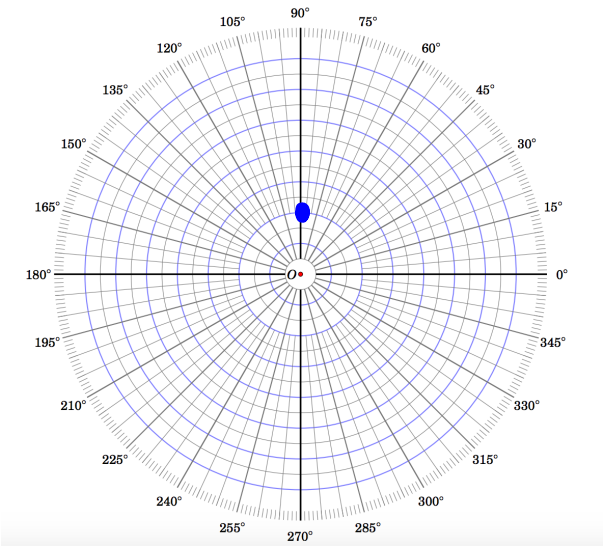
Find 3 pairs of polar coordinates that describe the same point as the provided polar coordinates.

$$(2, 90°)$$

$(2, -270°)$

$(-2, 270°)$

$(-2, -90°)$



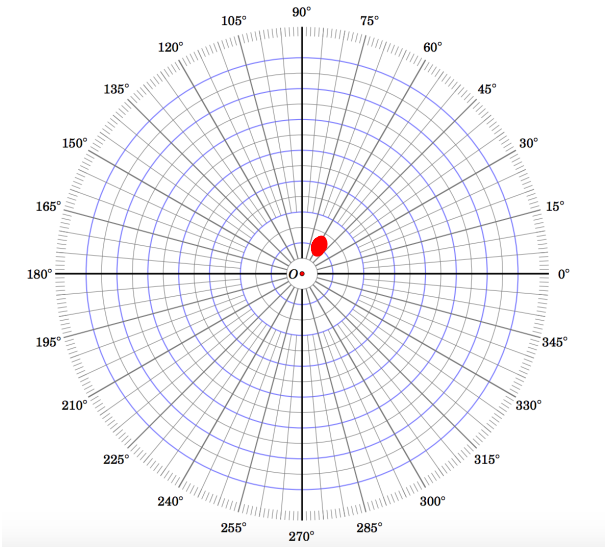
Find 3 pairs of polar coordinates that describe the same point as the provided polar coordinates.

$(1, 60°)$

$(1, -300°)$

$(-1, 240°)$

$(1, 420°)$

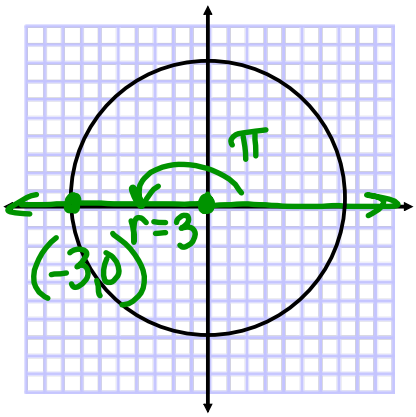


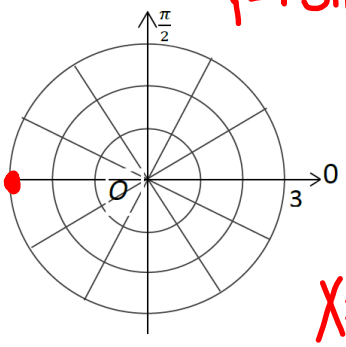
Convert the pair of polar coordinates to rectangular coordinates.

$(3, \pi)$

$x = r\cos\theta$

$y = r\sin\theta$





$x = 3\cos\pi$ $y = 3\sin\theta$

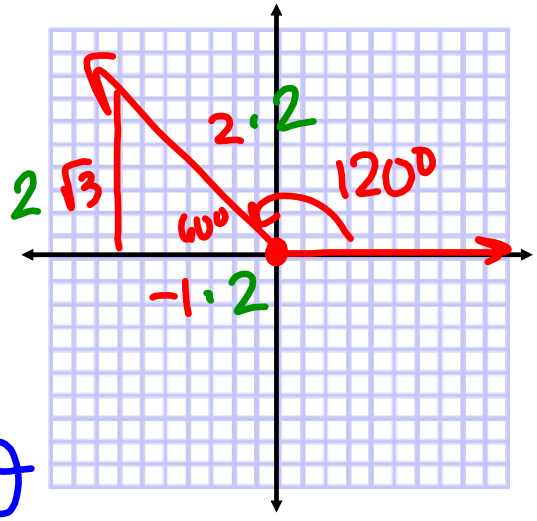
$x = 3(-1)$ $y = 3(0)$

$x = -3$ $y = 0$

$(-3, 0)$

Convert the pair of polar coordinates to rectangular coordinates.

$(4, 120°)$



$X = r\cos\theta$

$X = 4\left(-\frac{1}{2}\right)$

$X = -2$

$Y = r\sin\theta$

$Y = 4\left(\frac{\sqrt{3}}{2}\right)$

$Y = 2\sqrt{3}$

$(-2, 2\sqrt{3})$

Convert the equation from rectangular to polar form.

$$y = \frac{x^2}{4}$$

$4y = x^2$

$4(r\sin\theta) = (r\cos\theta)^2$

$4r\sin\theta = r^2\cos^2\theta$

$4r\sin\theta - r^2\cos^2\theta = 0$

Convert the equation from rectangular to polar form.

$$y = \frac{x^2}{4}$$

$4y = x^2$

$4r\sin\theta = r^2\cos^2\theta$

$\frac{4r\sin\theta}{\cos^2\theta} = r^2$

$4\sin\theta \cdot \frac{1}{\cos^2\theta} = r$

$\frac{4\sin\theta}{\cos\theta} \cdot \frac{1}{\cos\theta} = r$

$4\tan\theta\sec\theta = r$

Convert the equation from polar to rectangular form.

$$r = 2\cos\theta$$

$r^2 = 2r\cos\theta$

$x^2 + y^2 = 2x$

$x^2 - 2x + 1 + y^2 = +1$

$(x-1)^2 + y^2 = 1$

*Circle

C: (1, 0)

r = 1

Convert the equation from rectangular to polar form.

$$y = \frac{x^2}{2}$$

$2y = x^2$

$2r\sin\theta = r^2\cos^2\theta$

$2\sin\theta = r\cos^2\theta$

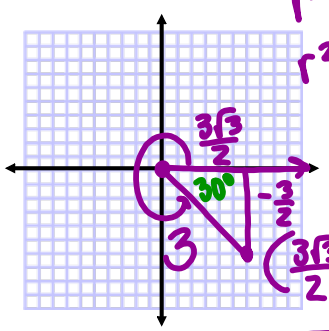
$\frac{2\sin\theta}{\cos^2\theta} = r$

$2 \cdot \frac{\sin\theta}{\cos\theta} \cdot \frac{1}{\cos\theta} = r$

$r = 2\tan\theta\sec\theta$

Convert the pair of rectangular coordinates to polar coordinates where $r > 0$ and $0 \le \theta < 2\pi$.

$$\left(\frac{3\sqrt{3}}{2}, -\frac{3}{2}\right)$$



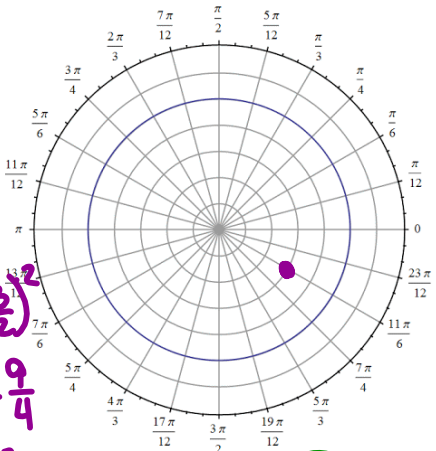
$r^2 = x^2 + y^2$

$r^2 = \left(\frac{3\sqrt{3}}{2}\right)^2 + \left(-\frac{3}{2}\right)^2$

$r^2 = \frac{27}{4} + \frac{9}{4}$

$r^2 = 9$

$r = 3$

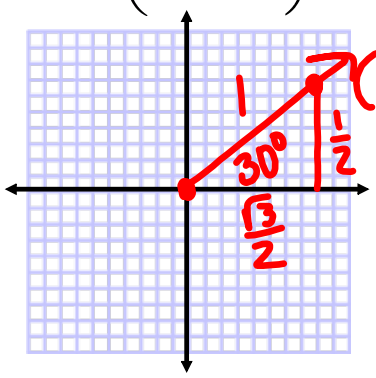


$\theta = -\frac{\pi}{6} = \frac{11\pi}{6}$

$\left(3, \frac{11\pi}{6}\right)$

Convert the pair of rectangular coordinates to polar coordinates where $r > 0$ and $0 \le \theta < 2\pi$.

$$\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$$



$r^2 = x^2 + y^2$

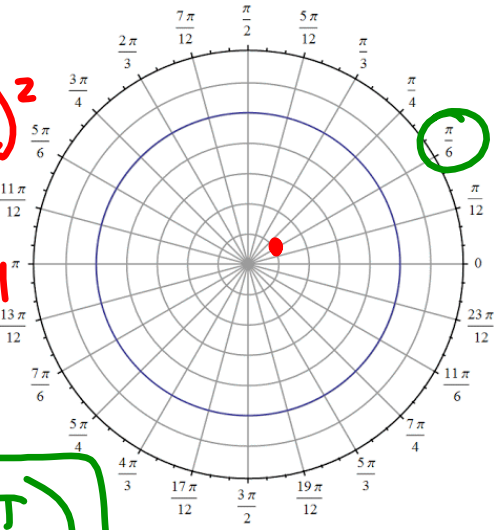
$r^2 = \left(\frac{\sqrt{3}}{2}\right)^2 + \left(\frac{1}{2}\right)^2$

$r^2 = \frac{3}{4} + \frac{1}{4}$

$r^2 = 1$

$r = 1$

$\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$



$\left(1, \frac{\pi}{6}\right)$

Write the equation in polar form.

$$2x^2 + 2y^2 = 3$$

$2(x^2 + y^2) = 3$

$2r^2 = 3$

$r^2 = \frac{3}{2}$

Convert the equation from polar to rectangular form.

$$r = \cot\theta \csc\theta$$

$r = \left(\frac{\cos\theta}{\sin\theta}\right)\left(\frac{1}{\sin\theta}\right)$

$r = \frac{\cos\theta}{\sin^2\theta}$

$r\sin^2\theta = \cos\theta$

$r^2\sin^2\theta = r\cos\theta$

$y^2 = x$

$x = y^2$

Write the equation in rectangular form.

$$r = \frac{4}{1 - \cos\theta}$$

$r - r\cos\theta = 4$

$\sqrt{x^2+y^2} - x = 4$

$\left(\sqrt{x^2+y^2}\right)^2 = (x+4)^2$

$x^2 + y^2 = x^2 + 8x + 16$

$y^2 = 8x + 16$

Assignment:

Polar Coordinates Practice

#1-12