For each graph below, name the shape and the axis it is symmetric (positive x-axis, negative y-axis, etc).

$r = 5 + 2\sin\theta$ dimple limacon — positive y-axis

$r = 2 + 3\cos\theta$ limacon w/inner loop — positive x-axis

$r = 2 - 2\cos\theta$ cardiod — negative x-axis

For each rose curve, tell the number of petals and length of each petal.

$r = 3\sin 4\theta$ — 8 petals — 3 units long

$r = 4\sin 5\theta$ — 5 petals — 4 units long

Polar Graphs: Cardioid, Limacon with an Inner Loop, Dimpled Limacon, Rose, Circle, Ellipse

1. $r = 2\cos(5\theta)$

This graph is a Rose curve

It has 5 petals that are 2 units long

2. $r = 3 - 2\cos\theta$

This graph is a dimple Limacon

symmetric about the neg. x-axis

3. $r = 4 + 4\sin\theta$

This graph is a cardiod

symmetric about the pos. y-axis

4. $r = 2 - 3\sin\theta$

This graph is a limacon w/inner loop

symmetric about the neg y-axis

5. $r = 3\cos(2\theta)$

This graph is a Rose

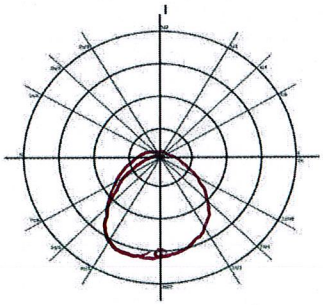
It has 4 petals that are 3 units long

6. $r = 3$

This graph is a Circle
Centered at origin

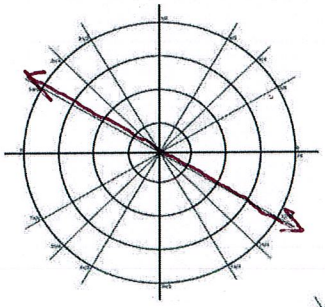
7. $r = -3\sin\theta$

This graph is a circle



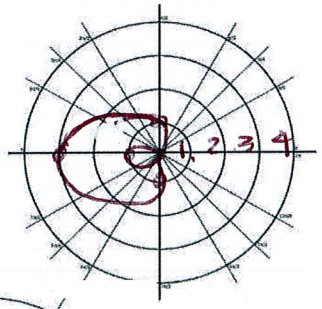
8. $\theta = \frac{11\pi}{6}$

This graph is a line



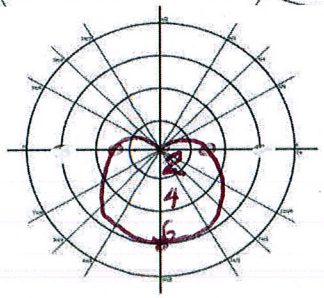
9. $r = 1 - 2\cos\theta$

This graph is a limacon w/inner loop



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

This graph is a cardiod



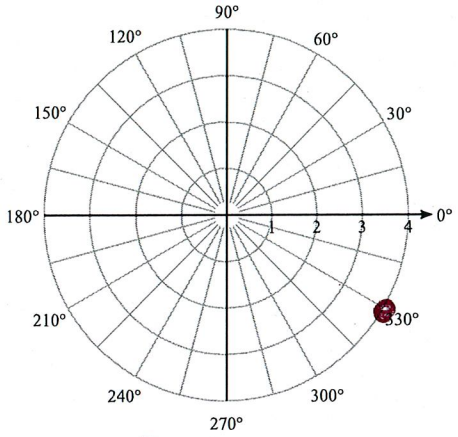
Polar Unit Name_____ ID: 1

Extra Practice

Date_____ Period____

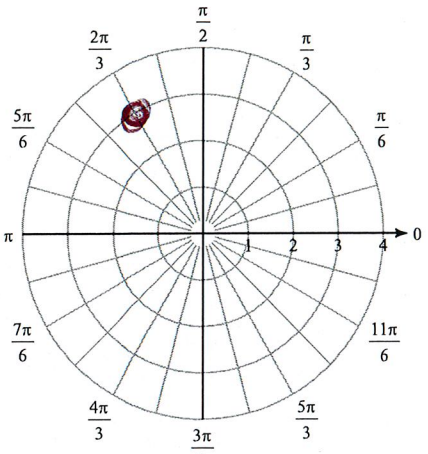
Plot the point with the given polar coordinates. State the three other pairs of polar coordinates for each point.

1) (4, 330°)



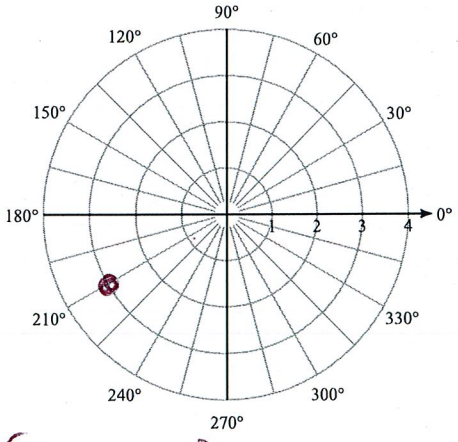
(4, -30°)
(-4, 150°)
(-4, -210°)

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



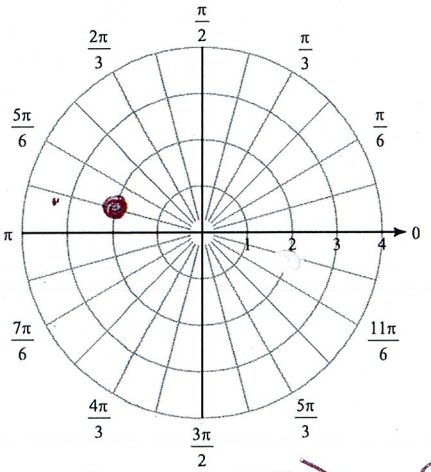
$(3, \frac{2\pi}{3})$
$(-3, \frac{5\pi}{3})$
$(-3, -\frac{\pi}{3})$

3) (–3, 30°)



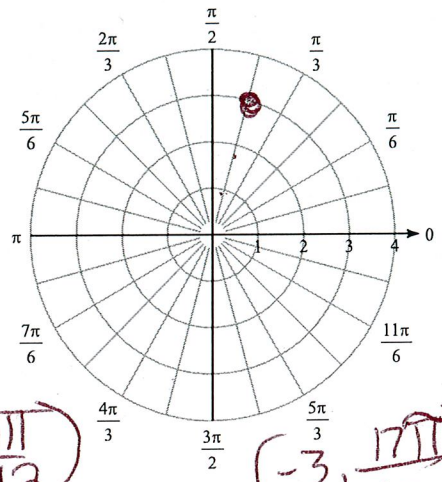
(3, 210°)
(3, -150°)
(-3, -330°)

4) $\left(2, \frac{11\pi}{12}\right)$



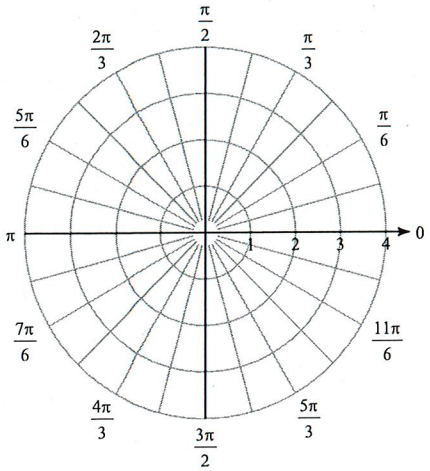
$(-2, -\frac{\pi}{12})$ $(2, -\frac{13\pi}{12})$
$(-2, \frac{23\pi}{12})$

5) $\left(3, -\frac{19\pi}{12}\right)$



$\left(3, \frac{5\pi}{12}\right)$ $\left(-3, \frac{17\pi}{12}\right)$ $\left(-3, \frac{-7\pi}{12}\right)$

6) $\left(-1, \frac{11\pi}{12}\right)$



Convert each pair of polar coordinates to rectangular coordinates.

7) $\left(-2, \frac{11\pi}{6}\right) = (-\sqrt{3}, 1)$

8) $\left(1, \frac{3\pi}{4}\right) = \left(-\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$

9) $\left(-1, \frac{3\pi}{2}\right) = (0, 1)$

10) $\left(-2, \frac{3\pi}{4}\right) = (\sqrt{2}, -\sqrt{2})$

Radians

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

11) $\left(-\frac{1}{2}, \frac{\sqrt{3}}{2}\right) = \left(1, \frac{2\pi}{3}\right)$

12) $(-\sqrt{2}, -\sqrt{2}) = \left(2, \frac{5\pi}{4}\right)$

13) $\left(-\frac{3\sqrt{3}}{2}, -\frac{3}{2}\right) = \left(3, \frac{7\pi}{6}\right)$

14) $(0, -1) = \left(1, \frac{3\pi}{2}\right)$

Convert each equation from rectangular to polar form.

15) $(x-2)^2 + (y-1)^2 = 5$

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

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

$r = 2\sin\theta$

17) $(x+2)^2 + (y-1)^2 = 5$

$r = -4\cos\theta + 2\sin\theta$

18) $(x+3)^2 + y^2 = 9$

$r = -6\cos\theta$