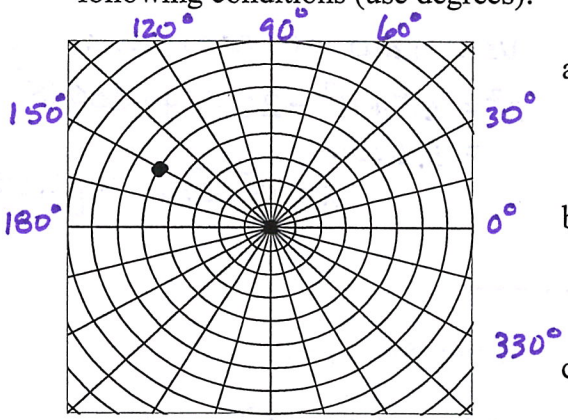
Honors Precalculus
Quiz §§ 6.4

Name KEY
Period _____

(Calculators OK)
*****SHOW WORK*****

1. Find a polar representation for the point shown below which satisfies the following conditions (use degrees):



a) r is positive and θ is positive.
$(5, 150°)$ for example

b) r is positive and θ is negative.
$(5, -210°)$ for example

c) r is negative and θ is positive.
$(-5, 330°)$ for example

2. Find rectangular coordinates for the point with polar coordinates $\left(4, \frac{7\pi}{5}\right)$. Round coordinates to two decimal places. $(r\cos\theta, r\sin\theta)$

$$\left(4\cos\frac{7\pi}{5}, 4\sin\frac{7\pi}{5}\right) \approx (-1.24, -3.80)$$

3. Find a polar representation for the point with rectangular coordinates $(-1,3)$. Use degrees to express the angle, and round coordinates to two decimal places.

since the first value is negative, we have to add 180° to the $\tan^{-1}$

$$r = \sqrt{x^2+y^2} = \sqrt{(-1)^2+3^2} = \sqrt{10} \approx 3.16$$

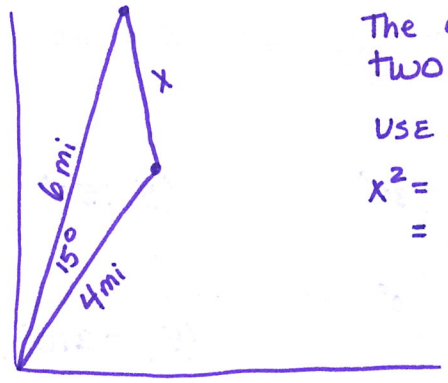
$$\theta = \tan^{-1}\left(\frac{3}{-1}\right) + 180°$$

$$= -71.565° + 180$$

$$= 108.435°$$

$$\boxed{(3.16, 108.44°)}$$

4. From the air traffic control tower, the location – in polar coordinates – of two incoming planes are $(4mi, 70^\circ)$ and $(6mi, 85^\circ)$. How far are the two planes from one another at this time? (you can assume the planes are flying at the same altitude)



The angle between the two directions is 15°

USE LAW OF COSINES:

$x^2 = 6^2 + 4^2 - 2(6)(4)\cos 15^\circ$

$= 5.6356$

$x = \sqrt{5.6356} \approx \boxed{2.374 \text{ mi}}$

5. Convert the rectangular equation to polar form: $5x - 2y = 4$

$x = r\cos\theta$
$y = r\sin\theta$

$5(r\cos\theta) - 2(r\sin\theta) = 4$

$r(5\cos\theta - 2\sin\theta) = 4$

$$\boxed{r = \frac{4}{5\cos\theta - 2\sin\theta}}$$

6. Convert the polar equation to rectangular form; put the equation into a standard form in order to identify the graph: $r = 6\cos\theta$

$x = r\cos\theta$
$y = r\sin\theta$
$r^2 = x^2 + y^2$

$r = 6\cos\theta$

$r^2 = 6r\cos\theta$

$x^2 + y^2 = 6x$

$(x^2 - 6x \quad) + y^2 = 0$

$(-3)^2$

"Complete the Square"

$(x^2 - 6x + 9) + y^2 = 0 + 9$

$$\boxed{(x-3)^2 + (y-0)^2 = 3^2}$$

STANDARD FORM

This is the graph of a circle, with radius = 3, centered at (3, 0).

IDENTIFICATION