Honors Pre-Calculus/Trig 3
UNIT 7: Parametric & Polar Equations – REVIEW

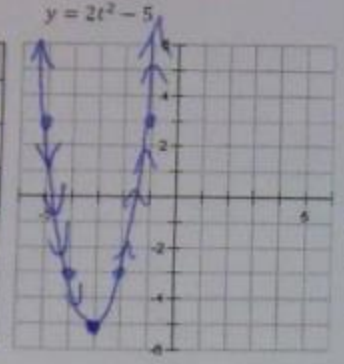
Name: KEY
Date: _____

PARAMETRIC & POLAR EQUATIONS REVIEW

Directions: Use test points to graph the plane curve described by the given parametric equations. Show the orientation of the curve as t increases using arrows.

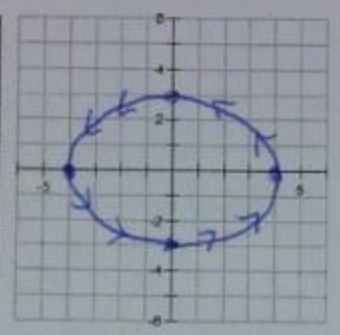
1.) $x = t - 3$ $\quad y = 2t^2 - 5$

t	x	y
-2	-5	3
-1	-4	-3
0	-3	-5
1	-2	-3
2	-1	3
3	0	13



2.) $x = 4\sin\theta$ $\quad y = -3\cos\theta$

θ	x	y
0	0	-3
$\pi/2$	4	0
π	0	3
$3\pi/2$	-4	0
2π	0	-3



Directions: Obtain the rectangular equation from the given set of parametric equations by eliminating the parameter.

3.) $x = \sqrt{t+4}$ $\quad y = \frac{1}{2}t - 2$

$(x \geq 0)$
$(t \geq -4)$

$y = \frac{1}{2}(x^2 - 4) - 2$

RECTANGULAR: $y = \frac{1}{2}x^2 - 4$

t	x	y
-4	0	-4
-3	1	$-3\frac{1}{2}$
-2	$\sqrt{2}$	-3
-1	$\sqrt{3}$	$-2\frac{1}{2}$
0	2	-2
1	$\sqrt{5}$	$-1\frac{1}{2}$

4.) $x = 3 + 3\cos\theta$ $\quad y = 1 + 5\sin\theta$

$\frac{x-3}{3} = \cos\theta$ $\quad \frac{y-1}{5} = \sin\theta$

RECTANGULAR: $\frac{(x-3)^2}{9} + \frac{(y-1)^2}{25} = 1$

θ	x	y
0	6	1
$\pi/2$	3	6
π	0	1
$3\pi/2$	3	-4
2π	6	1

Directions: Find a set of parametric equations for the rectangular equation using **(a)** $t = x$ and **(b)** $t = 3 - x$.

5.) $y = x^2 + 3x - 7$

(A) $x = t$ $\quad y = t^2 + 3t - 7$

(B) $x = 3 - t$ $\quad y = (3-t)^2 + 3(3-t) - 7$

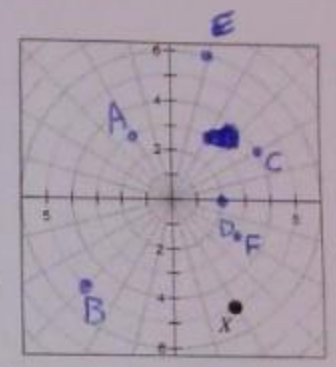
$9 - 6t + t^2 + 9 - 3t - 7$

$y = t^2 - 9t + 11$

Directions: Plot and label each polar coordinate.

6.) $A\left(3, \frac{2\pi}{3}\right)$ $\quad$ 7.) $B\left(5, -\frac{3\pi}{4}\right)$ $\quad$ 8.) $C\left(-4, \frac{7\pi}{6}\right)$

9.) $D\ (-2, -\pi)$ $\quad$ 10.) $E\left(6, \frac{5\pi}{12}\right)$ $\quad$ 11.) $F\left(-3, \frac{5\pi}{6}\right)$



Directions: Name four different pairs of polar coordinates that represent point X.

12.) $\left(5, \frac{5\pi}{3}\right)$ $\left(5, -\frac{\pi}{3}\right)$ $\left(-5, \frac{2\pi}{3}\right)$ $\left(-5, -\frac{4\pi}{3}\right)$

Directions: Find the corresponding rectangular coordinates for each polar point.

13.) $\left(3, \frac{2\pi}{3}\right)$ $\quad \left(-\frac{3}{2}, \frac{3\sqrt{3}}{2}\right)$

tall 30-60-90

14.) $\left(-4, \frac{11\pi}{6}\right)$ $\quad (-2\sqrt{3}, 2)$

wide 30-60-90

15.) $\left(2, -\frac{7\pi}{4}\right)$ $\quad (\sqrt{2}, \sqrt{2})$

16.) $\left(-5, \frac{3\pi}{2}\right)$ $\quad (0, 5)$

Directions: Find the corresponding polar coordinates for each rectangular point.

17.) $(0, 2)$ $\quad \left(2, \frac{\pi}{2}\right)$

18.) $(-\sqrt{5}, \sqrt{5})$ $\quad \left(\sqrt{10}, \frac{3\pi}{4}\right)$

19.) $(-1, -\sqrt{3})$ $\quad \left(2, \frac{4\pi}{3}\right)$

tall 30-60-90

20.) $(3\sqrt{3}, -3)$ $\quad \left(6, \frac{11\pi}{6}\right)$

Directions: Convert the rectangular equation to polar form.

21.) $y = -5$

$r\sin\theta = -5$ $\quad r = \frac{-5}{\sin\theta}$

22.) $x^2 + y^2 - 6y = 0$

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

$r - 6\sin\theta = 0$ $\quad r = 6\sin\theta$

23.) $3x - y + 2 = 0$

$3r\cos\theta - r\sin\theta + 2 = 0$

$r(3\cos\theta - \sin\theta) = -2$ $\quad r = \frac{-2}{3\cos\theta - \sin\theta}$

24.) $x = 7$

$r\cos\theta = 7$ $\quad r = \frac{7}{\cos\theta}$

Directions: Convert the polar equation to rectangular form.

25.) $r = 4\sin\theta$

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

$x^2 + y^2 = 4y$

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

$x^2 + (y-2)^2 = 4$

26.) $\theta = \frac{2\pi}{3}$

$m = \frac{\sqrt{3}}{-1}$ $\quad y = -\sqrt{3}x$

27.) $r = 4\csc\theta$

$r\sin\theta = 4$

$y = 4$

28.) $r = \frac{6}{2\cos\theta - 3\sin\theta}$

$2r\cos\theta - 3r\sin\theta = 6$

$2x - 3y = 6$

$-3y = -2x + 6$

$y = \frac{2}{3}x - 2$