

Pre-Calculus 1
 Parametrics Review #2

Name _____

1. For each of the following, determine the type of equation it is, parametric or rectangular.

- a. $x = 5t - 3$
 $y = 3t^2 - 5$
 parametric
- b. $y = 3x^2 + 6x - 5$
 rectangular
- c. $x = y - 9$
 rectangular
- d. $t = 5x^2 - 1$
 $y = 3t + 15$
 parametric
- e. $y = 3t + 2$
 rectangular

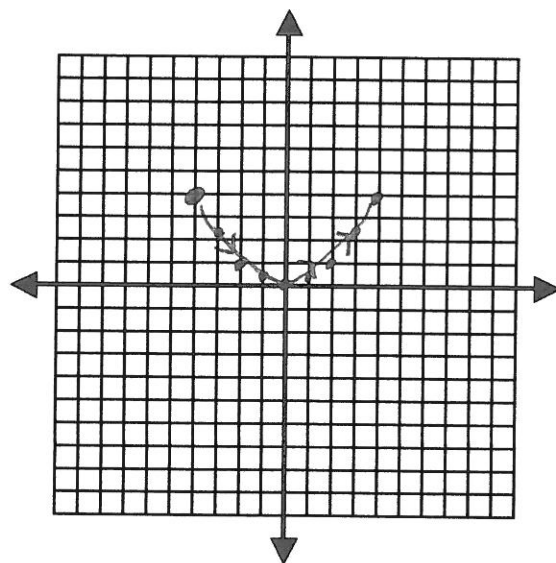
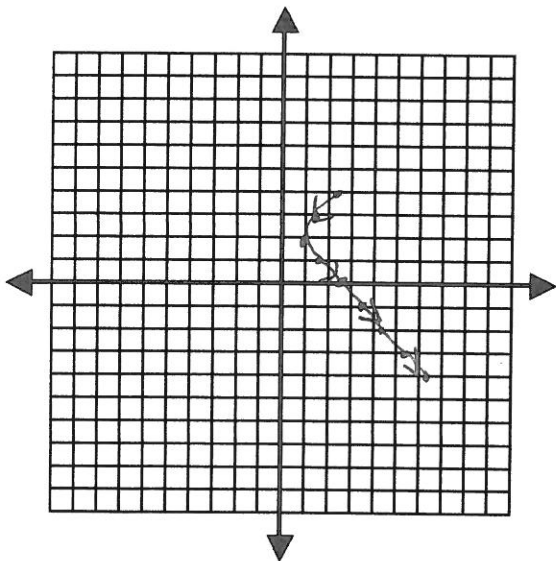
2. Graph the following by hand, then check with your calculator. Make a table values for set of specified t-values.

a. $\begin{cases} x = \sqrt{t^2 + 1} \\ y = 2 - t \end{cases} \quad -2 \leq t \leq 6$

t	x	y
-2	2.2	4
-1	1.4	3
0	1	2
1	1.4	1
2	2.2	0
3	3.2	-1
4	4.1	-2
5	5.1	-3
6	6.1	-5

b. $\begin{cases} x = t \\ y = \frac{t^2}{4} \end{cases} \quad -4 \leq t \leq 4$

t	x	y
-4	-4	4
-3	-3	2.25
-2	-2	1
-1	-1	.25
0	0	0
1	1	.25
2	2	1
3	3	2.25
4	4	4



3. Eliminate the parameter to write the parametric equations as a rectangular equation.

a.
$$\begin{cases} x = \frac{1}{t+5} \\ y = 3t - 2 \end{cases}$$

$$X = \frac{3}{Y+17}$$

or

$$Y = \frac{3}{X} - 17$$

b.
$$\begin{cases} x = 3\sec(t) - 2 \\ y = 4 + 5\tan(t) \end{cases}$$

$$\frac{(X+2)^2}{9} - \frac{(Y-4)^2}{25} = 1$$

c.
$$\begin{cases} x = 6\cos(t) - 7 \\ y = 6\sin(t) + 1 \end{cases}$$

$$(X+7)^2 + (Y-1)^2 = 36$$

d.
$$\begin{cases} x = -4 + 3\cos(t) \\ y = 7 - 2\sin(t) \end{cases}$$

$$\frac{(X+4)^2}{9} + \frac{(Y-7)^2}{4} = 1$$

4. Write **two** new sets of parametric equations for the following rectangular equations.

a. $y = \frac{1}{4}x^2 + x + 1$

$$\begin{cases} X = t \\ Y = \frac{1}{4}t^2 + t + 1 \end{cases}$$

or

$$\begin{cases} X = t + 1 \\ Y = \frac{1}{4}t^2 + \frac{3}{2}t + \frac{9}{4} \end{cases}$$

b. $x = \sqrt{y^2 - 5}$

$$\begin{cases} X = \sqrt{Y^2 - 5} \\ Y = t \end{cases}$$

or

$$\begin{cases} X = \sqrt{t^2 + 2t - 4} \\ Y = t + 1 \end{cases}$$

5. For each of the following write a pair of parametric equations for the curve.

a. $(x+7)^2 + y^2 = 16$

$X = 4 \sin t - 7$ $X = 4 \cos t$
 $Y = 4 \cos t$ or $Y = 4 \sin t - 7$

b. $(x+4)^2 + \frac{(y-3)^2}{16} = 1$

$X = \sin(t) - 4$ $X = 4 \cos(t) + 3$
 $Y = 4 \cos(t) + 3$ or $Y = \sin(t) - 4$

c. $\frac{(x-9)^2}{11} - \frac{(y+1)^2}{25} = 1$

$X = \sqrt{11} \sec(t) + 9$
 $Y = 5 \tan(t) - 1$
 or

$X = \sqrt{11} \csc(t) + 9$
 $Y = \sqrt{11} \cot(t) - 1$

d. $\frac{(y-3)^2}{49} - \frac{(x+6)^2}{64} = 1$

$X = 8 \tan(t) - 6$
 $Y = 7 \sec(t) + 3$
 or

$X = 8 \cot(t) - 6$
 $Y = 7 \csc(t) + 3$

6. Write a pair of parametric equations for a circle with center at $(-2, 5)$ and containing the point $(3, 1)$.

$(x+2)^2 + (y-5)^2 = 41$

$X = \sqrt{41} \sin(t) - 2$

$X = \sqrt{41} \cos(t) + 5$

$Y = \sqrt{41} \cos(t) + 5$ or

$Y = \sqrt{41} \sin(t) - 2$

7. The Robots are at it again. Robot A is moving from $(2, 5)$ to $(8, 2)$ in 3 seconds, Robot B is moving from $(3, 0)$ to $(7, 6)$ in 4 seconds.

a. Write a pair of parametric equations for both robots.

A: $X = 2 + 2t$
 $Y = 5 - t$

B: $X = 3 + t$
 $Y = \frac{3}{2}t$

b. Do the robots cross paths? If so, where?

Yes, $(5.25, 3.375)$

c. Do the robots collide?

No, Robot A reaches intersection in 1.625 seconds
 Robot B reaches intersection in 2.25 seconds