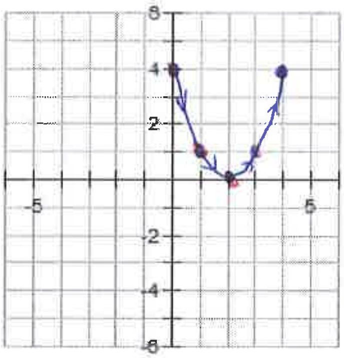
Honors Pre-Calculus/Trig 3 Name: ____________________
UNIT 7: Parametric & Polar Equations – MID REVIEW Date: ____________________

REVIEW OF PARAMETRIC EQUATIONS

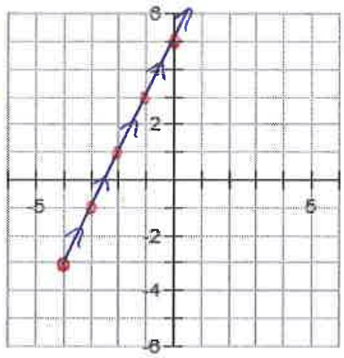
Directions: Use point plotting to graph the plane curve described by the given parametric equations. Use arrows to show the orientation of the curve corresponding to increasing values of t.

1.) $x = t + 2$ $[-2, 2]$
$y = t^2$



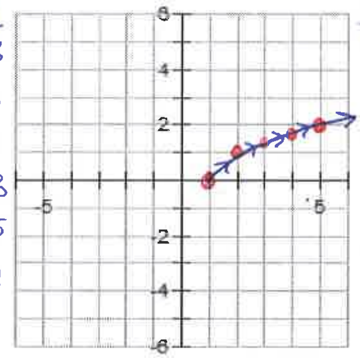
t	x	y
-2	0	4
-1	1	1
0	2	0
1	3	1
2	4	4

2.) $x = t - 2$ $[-2, 3]$
$y = 2t + 1$



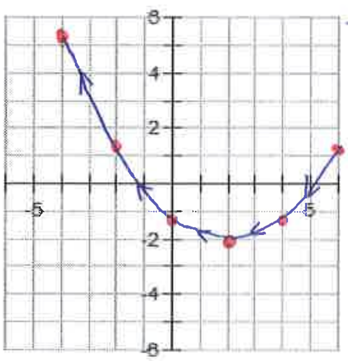
t	x	y
-2	-4	-3
-1	-3	-1
0	-2	1
1	-1	3
2	0	5
3	1	7

3.) $x = t + 1$
$y = \sqrt{t}$



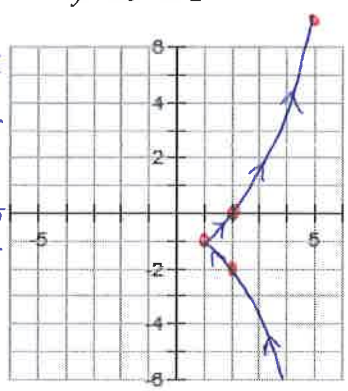
t	x	y
0	1	0
1	2	1
2	3	$\sqrt{2}$
3	4	$\sqrt{3}$
4	6	2

4.) $x = -2t + 2$ $[-2, 3]$
$y = \frac{4t^2}{5} - 2$



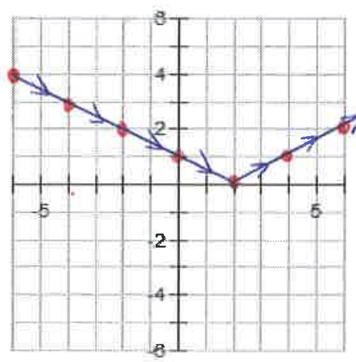
t	x	y
-2	6	$4/5$
-1	4	$-4/5$
0	2	-2
1	0	$-4/5$
2	-2	$4/5$
3	-4	$\frac{26}{5}$

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



t	x	y
-2	5	-9
-1	2	-2
0	1	-1
1	2	0
2	5	7

6.) $x = 2t$
$y = |t - 1|$



t	x	y
-3	-6	4
-2	-4	3
-1	-2	2
0	0	1
1	2	0
2	4	1
3	6	2

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

7.) $x = t$ $y = 2t$

$t = x$

$\boxed{y = 2x}$

8.) $x = 2t - 4$ $y = 4t^2$

$x + 4 = 2t$

$\frac{x+4}{2} = t$

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

$y = \cancel{4}\frac{(x+4)^2}{\cancel{4}}$

$\boxed{y = (x+4)^2}$

9.) $x = \sqrt{t}$ $y = t - 1$

$t = x^2$

$\boxed{y = x^2 - 1}$

10.) $x = -2t - 3$ $y = 2t^2 + 2t - \frac{5}{2}$

$x + 3 = -2t$

$\frac{x+3}{-2} = t$

$y = 2\left(\frac{x+3}{-2}\right)^2 + \cancel{2}\left(\frac{x+3}{\cancel{-2}}\right) - \frac{5}{2}$

$y = \cancel{2}\left(\frac{(x+3)^2}{\cancel{4}\,2}\right) - (x+3) - \frac{5}{2}$

$y = \frac{(x+3)^2}{2} - x - 3 - \frac{5}{2}$

$y = \frac{x^2+6x+9}{2} - x - 3 - \frac{5}{2}$

$\boxed{y = \frac{1}{2}x^2 + 2x - 1}$

11.) $x = 2\sin t \qquad y = 2\cos t$

$\sin t = \frac{x}{2} \qquad \cos t = \frac{y}{2}$

IDENTITY: $\sin^2\theta + \cos^2\theta = 1$

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

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

$\boxed{x^2 + y^2 = 4}$

12.) $x = 2\cos t \qquad y = 3\sin t$

$\cos t = \frac{x}{2} \qquad \sin t = \frac{y}{3}$

IDENTITY: $\sin^2\theta + \cos^2\theta = 1$

$\left(\frac{y}{3}\right)^2 + \left(\frac{x}{2}\right)^2 = 1$

$\boxed{\frac{y^2}{9} + \frac{x^2}{4} = 1}$

13.) $x = 1 + 3\cos t \qquad y = 2 + 3\sin t$

$\cos t = \frac{x-1}{3} \qquad \sin t = \frac{y-2}{3}$

IDENTITY: $\sin^2\theta + \cos^2\theta = 1$

$\left(\frac{y-2}{3}\right)^2 + \left(\frac{x-1}{3}\right)^2 = 1$

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

$\boxed{(y-2)^2 + (x-1)^2 = 9}$

14.) $x = \sec t \qquad y = \tan t$

IDENTITY: $\sec^2\theta - \tan^2\theta = 1$

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

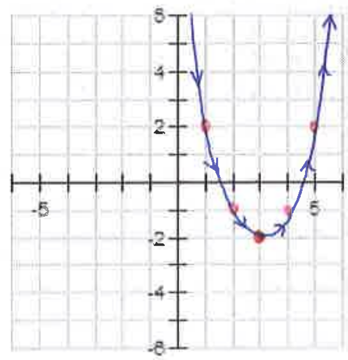
$\boxed{x^2 - y^2 = 1}$

Directions: Sketch the curve of the following parametric equations by eliminating the parameter.

15.) $x = t + 3 \qquad y = t^2 - 2$

$t = x - 3$

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



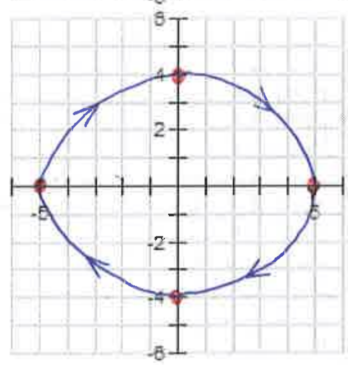
16.) $x = 5\sin t \qquad y = 4\cos t$

$\sin t = \frac{x}{5} \qquad \cos t = \frac{y}{4}$

IDENTITY: $\sin^2\theta + \cos^2\theta = 1$

$\left(\frac{x}{5}\right)^2 + \left(\frac{y}{4}\right)^2 = 1$

$\boxed{\frac{x^2}{25} + \frac{y^2}{16} = 1}$



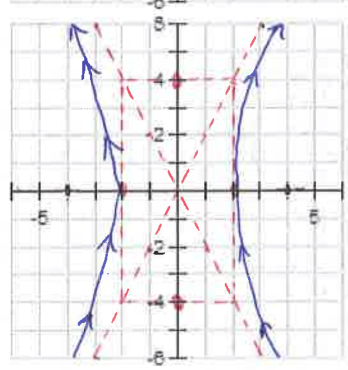
17.) $x = 2\sec t \qquad y = 4\tan t$

$\sec t = \frac{x}{2} \qquad \tan t = \frac{y}{4}$

IDENTITY: $\sec^2\theta - \tan^2\theta = 1$

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

$\boxed{\frac{x^2}{4} - \frac{y^2}{16} = 1}$



Directions: Find a set of parametric equations for the rectangular equations using **(a)** $t = x$ and **(b)** $t = 2 - x$.

18.) $y = 3x - 2$

(a) $x = t$, $y = 3t - 2$

(b) $x = 2 - t$, $y = -3t + 4$

19.) $y = x^2 + 1$

(a) $x = t$, $y = t^2 + 1$

(b) $x = 2 - t$, $y = t^2 - 4t + 5$

20.) $y = 2 - x$

(a) $x = t$, $y = 2 - t$

(b) $x = 2 - t$, $y = t$