Math 12H Answer Key – Section 10.7 Parametric Equations

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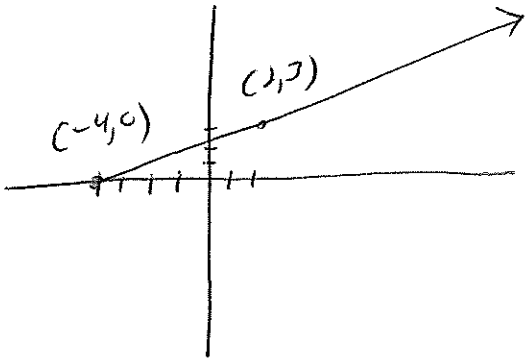
#2) $x = 6t - 4 \quad y = 3t \quad t \geq 0$



t	x	y	
0	-4	0	(-4, 0)
1	2	3	(2, 3)
2	8	6	(8, 6)
3	14	9	(14, 9)
4	20	12	(20, 12)
5	26	15	(26, 15)

2b) $x = 6t - 4 \quad y = 3t \rightarrow t = \frac{y}{3}$

$x = 6\left(\frac{y}{3}\right) - 4$

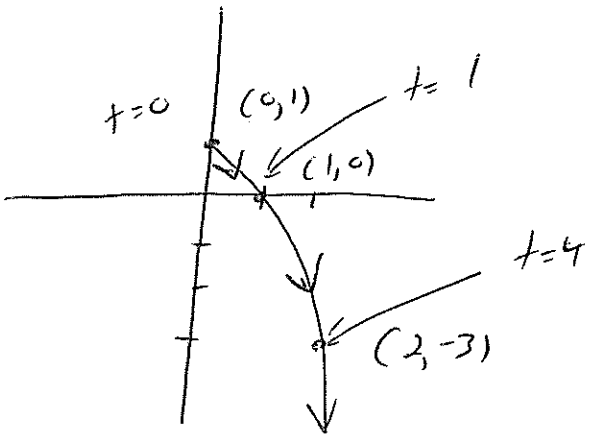
$= 2y - 4$

$x = 2y - 4 \rightarrow 2y = x + 4$

$y \geq 0$

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

#5) $x = \sqrt{t} \quad y = 1 - t \quad t \text{ must be } \geq 0$



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

b) $x = \sqrt{t} \quad y = 1 - t$

$\rightarrow x^2 = t$

$x \geq 0$

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

$x = \sqrt{t} \quad y = 1 - t \rightarrow t = 1 - y$

$$\boxed{x = \sqrt{1 - y}}$$

#6) $x = t^2$ $\quad y = t^4 + 1$

$\sqrt{x} = \sqrt{t^2}$

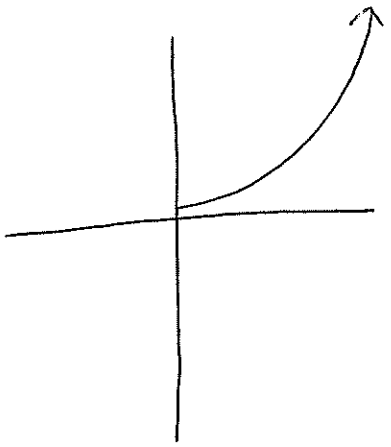
$\sqrt{x} = \sqrt{t^2}$

$t = \sqrt{x}$ $\quad y = t^4 + 1$

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

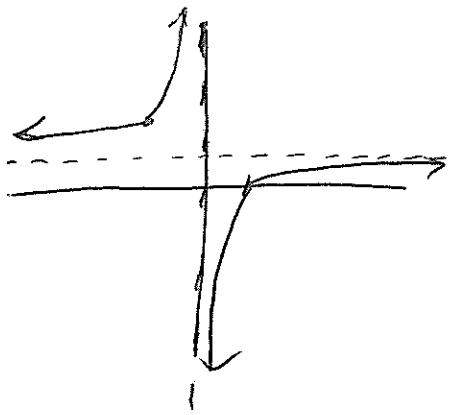
$\boxed{y = x^2 + 1}$

where $x \geq 0$



#8) $x = t + 1 \rightarrow t = x - 1$

$y = \frac{t}{t+1} \rightarrow y = \frac{x-1}{x-1+1} \rightarrow \boxed{y = \frac{x-1}{x}}$

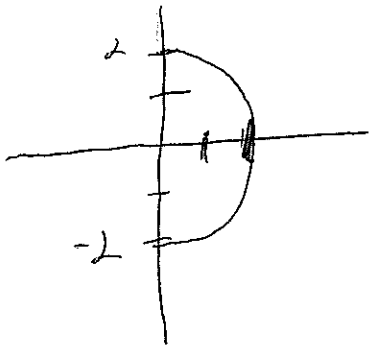


#11) $x = 2\sin t$ $\quad y = 2\cos t$ $\quad 0 \leq t \leq \pi = x \geq 0$

$x^2 = 4\sin^2 t$ $\quad y^2 = 4\cos^2 t$

$4(\underbrace{\sin^2 t + \cos^2 t}_{=1 \text{ by identity}}) = x^2 + y^2$

$4 = x^2 + y^2$



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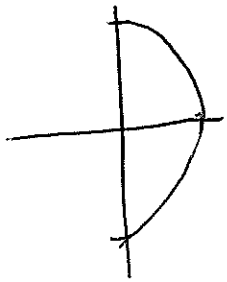
#14) $x = \sin^2 t \qquad y = \cos t$

$y^2 = \cos^2 t$



$x + y^2 = \sin^2 t + \cos^2 t = 1$

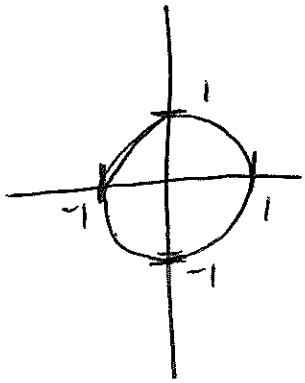
$x + y^2 = 1$

$y^2 = 1 - x \qquad y = \pm\sqrt{1-x} \quad \leftarrow 0 \le x \le 1$

#16) $x = \cos 2t \qquad y = \sin 2t$

$x^2 = \cos^2 2t \qquad y^2 = \sin^2 2t$

$x^2 + y^2 = \cos^2 2t + \sin^2 2t = 1$



$x^2 + y^2 = 1$

#24) Slope $= -2$, point passes through $(-10, -20)$ $\qquad m = \frac{-2}{1}$

$\boxed{x = -10 + t \qquad y = -20 - 2t}$ done

To find rectangular equation $\quad t = x + 10$

$\Rightarrow y = -20 - 2(x + 10)$

$y = -20 - 2x - 20$

$\boxed{y = -2x - 40}$