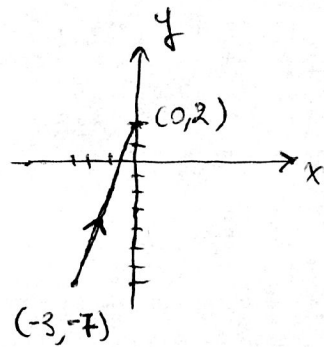


Section 1.8

4) $x = t - 3$ $y = 3t - 7$ ($0 \leq t \leq 3$)
 $t = x + 3 \Rightarrow y = 3x + 2$

for: $t = 0$ $x = -3$; $y = -7$
 $t = 3$ $x = 0$; $y = 2$.



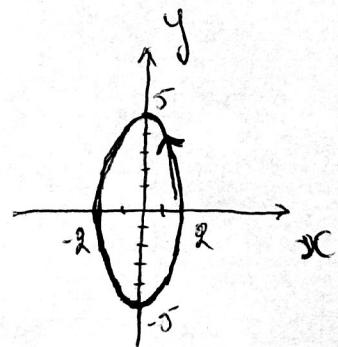
5) $x = 2 \cos t$ $y = 5 \sin t$ ($0 \leq t \leq 2\pi$).

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

$t = 0$ $x = 2$; $y = 0$
 $t = \frac{\pi}{2}$ $x = 0$; $y = 5$

$t = \pi$ $x = -2$; $y = 0$
 $t = \frac{3\pi}{2}$ $x = 0$; $y = -5$

Ellipse.



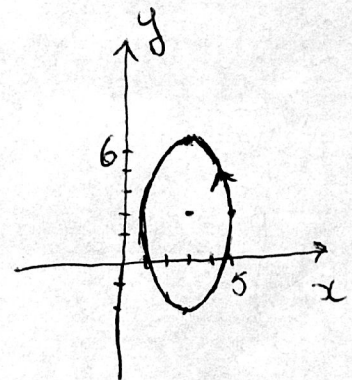
7) $x = 3 + 2 \cos t$ $y = 2 + 4 \sin t$ ($0 \leq t \leq 2\pi$)
 $\frac{x-3}{2} = \cos t$ $\frac{y-2}{4} = \sin t$

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

$t = 0$ $x = 5$; $y = 2$
 $t = \frac{\pi}{2}$ $x = 3$; $y = 6$

$t = \pi$ $x = 1$; $y = 2$
 $t = \frac{3\pi}{2}$ $x = 3$; $y = -2$

Ellipse of center (3, 2)

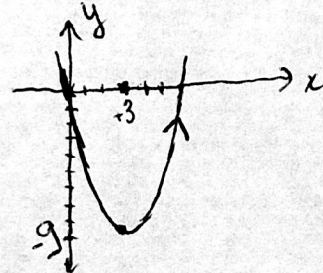


10) $x = 4t + 3$ $y = 16t^2 - 9$
 $t = \frac{x-3}{4}$ $y = (4t-3)(4t+3)$

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

$\Rightarrow y = (x-6)x = x^2 - 6x$

$y = x^2 - 6x + 9 - 9 = (x-3)^2 - 9$



$t = 0$ $x = 3$; $y = -9$
 $t = 1$ $x = 7$; $y = 7$

~~to be removed~~

Section 1.8

(3)

12) $x = \sec^2 t$ $y = \tan^2 t$

$$x = \frac{1}{\cos^2 t} ; y = \frac{\sin^2 t}{\cos^2 t}$$

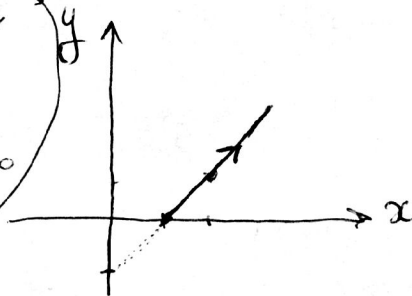
$$\Rightarrow \cos^2 t = \frac{1}{x} ; y = \frac{1 - \cos^2 t}{\cos^2 t}$$

$$\Rightarrow y = \frac{1 - \frac{1}{x}}{\frac{1}{x}} = \frac{x-1}{x} \cdot x = x-1$$

$$\Rightarrow y = x-1 \quad y \geq 0$$

$$\Rightarrow x \geq 1$$

$\sec^2 t = \tan^2 t + 1$
 $x = y + 1$
 $\Rightarrow y = x - 1$
 $x \geq 1, y \geq 0$



for $t=0$; $x=1$ $y=0$

for $t=\frac{\pi}{4}$; $x = \frac{1}{(\frac{1}{\sqrt{2}})^2} = 2$; $y=1$

25) $x = x_0 + (x_1 - x_0)t$ $y = y_0 + (y_1 - y_0)t$

a) $\frac{x-x_0}{x_1-x_0} = t \Rightarrow y = y_0 + \frac{(y_1-y_0)}{(x_1-x_0)}(x-x_0)$ which is

the equation of a straight line passing through (x_0, y_0) and (x_1, y_1)

b) for $t=0 \Rightarrow x=x_0$ and $y=y_0$.

for $t=1 \Rightarrow x = x_0 + x_1 - x_0 = x_1$ and $y = y_0 + y_1 - y_0 = y_1$

$\Rightarrow$ it is a segment joining (x_0, y_0) and (x_1, y_1) since it is already a straight line

c) parametric equations for segment joining $(1, -2)$ and $(2, 4)$ oriented in direction from $(1, -2)$ to $(2, 4) \Rightarrow x_0=1$ $y_0=-2$

$x_1=2$ $y_1=4 \Rightarrow x = 1 + (2-1)t \Rightarrow x = 1+t$ $0 \leq t \leq 1$
 $y = -2 + (4+2)t \Rightarrow y = -2+6t$

d) from direction $(2, 4) \rightarrow (1, -2) \Rightarrow x_0=2$ $y_0=4$ $x_1=1$ $y_1=-2$

$\Rightarrow x = 2 + (1-2)t \Rightarrow x = 2-t$ $0 \leq t \leq 1$

$y = 4 + (-2-4)t \Rightarrow y = 4-6t$