

7) $x = 4 \cos t$, $y = 2 \sin t$, $0 \leq t \leq 2\pi$

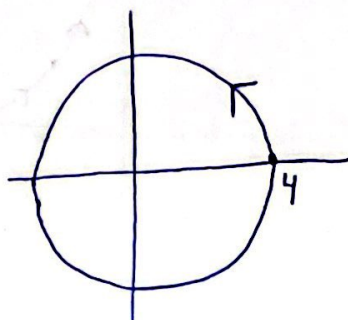
$$\cos t = \frac{x}{4} \quad \sin t = \frac{y}{2}$$

$$\cos^2 t = \frac{x^2}{16} \quad \sin^2 t = \frac{y^2}{4}$$

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

$$t_0 = 0 \rightarrow (x, y) = (4, 0) \text{ TP = IP}$$

$$t_1 = 2\pi \rightarrow (x, y) = (4, 0)$$



13) $x = t$, $y = \sqrt{1-t^2}$, $-1 \leq t \leq 0$

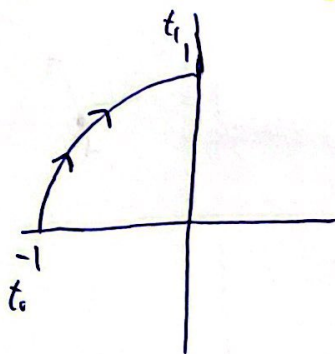
$$x^2 = t^2 \quad y = \sqrt{1-x^2}$$

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

$$x^2 + y^2 = 1$$

$$t_0 = -1 \rightarrow (x, y) = (-1, 0)$$

$$t_1 = 0 \rightarrow (x, y) = (0, 1)$$



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16) $x = -\sec t$, $y = \tan t$

$$1 + \tan^2 t = \sec^2 t$$

$$x^2 = \sec^2 t$$

$$y^2 = \tan^2 t$$

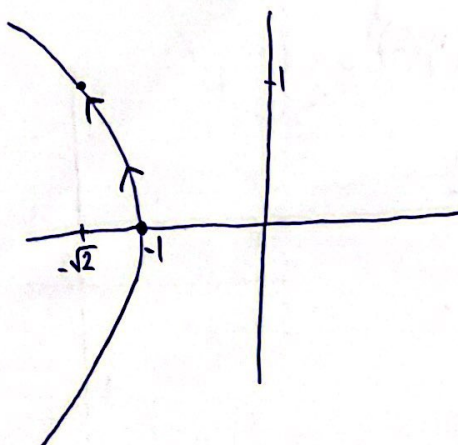
$$1 + y^2 = x^2 \rightarrow x^2 - y^2 = 1$$

$$y = \pm \sqrt{x^2 - 1}$$

$$t_0 = 0 \rightarrow (x, y) = (-1, 0)$$

$$t_1 = \frac{\pi}{4} \rightarrow (x, y) = (-\sqrt{2}, 1)$$

$$-\frac{\pi}{2} < t < \frac{\pi}{2}$$



$$\begin{array}{c} \cos^+ \\ \cos^+ \\ \sec^+ \\ x < 0 \end{array}$$

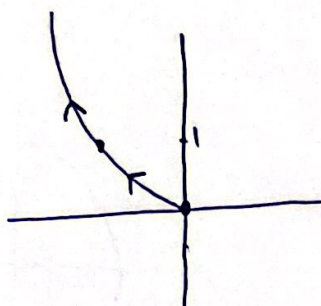
$$x = -\sqrt{t}, \quad y = t, \quad t \geq 0$$

$$2) \quad x^2 = t$$

$$x^2 = y$$

$$t_0 = 0 \rightarrow (0, 0)$$

$$t_1 = 1 \rightarrow (-1, 1)$$



$$x < 0$$

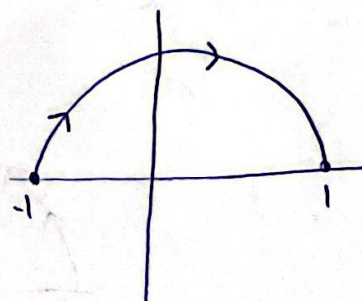
$$y > 0$$

$$6) \quad x = \cos(\pi - t), \quad y = \sin(\pi - t), \quad 0 \leq t \leq \pi$$

$$\sin^2(\pi - t) + \cos^2(\pi - t) = 1$$

$$x^2 + y^2 = 1$$

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



$$t_0 = 0 \rightarrow (-1, 0)$$

$$t_1 = \pi \rightarrow (1, 0)$$

$$10) \quad x = 1 + \sin t, \quad y = \cos t - 2, \quad 0 \leq t \leq \pi$$

$$\sin t = x - 1$$

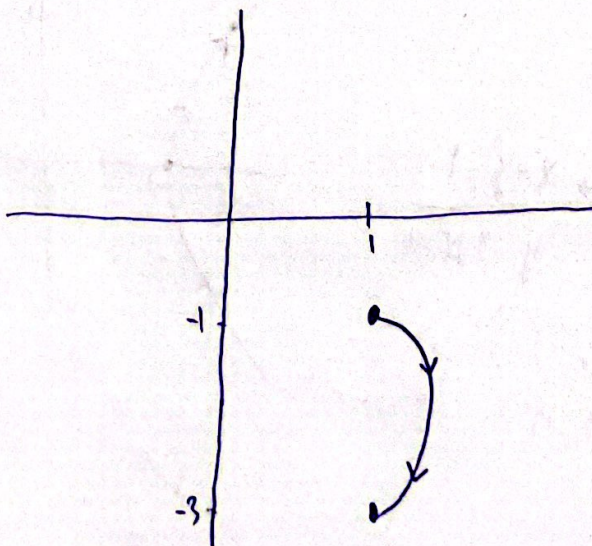
$$\cos t = y + 2$$

$$\sin^2 t = x^2 - 2x + 1$$

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

$$\cos^2 t = (y + 2)^2$$

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



$$t_0 = 0 \rightarrow (1, -1)$$

$$t_1 = \pi \rightarrow (1, -3)$$

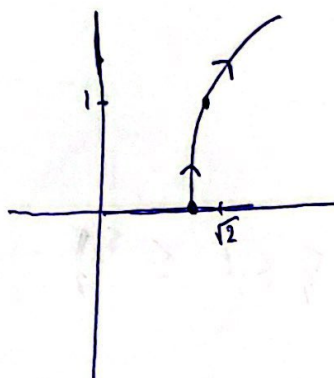
14) $x = \sqrt{t+1}$, $y = \sqrt{t}$, $t \geq 0$

$$y^2 = t$$

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

$$t_0 = 0 \rightarrow (1, 0)$$

$$t_1 = 1 \rightarrow (\sqrt{2}, 1)$$



15) $x = \sec^2 t - 1$, $y = \tan t$, $-\frac{\pi}{2} < t < \frac{\pi}{2}$

$$1 + \tan^2 t = \sec^2 t$$

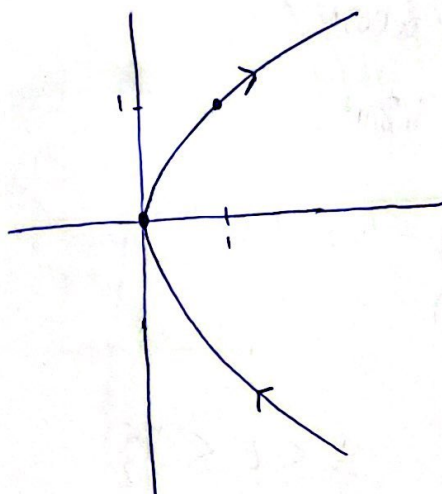
$$\sec^2 t - 1 = \tan^2 t$$

$$y^2 = \tan^2 t$$

$$x = y^2$$

$$t_0 = 0 \rightarrow (0, 0)$$

$$t_1 = \frac{\pi}{4} \rightarrow (1, 1)$$



18) $x = 2 \sinh t$, $y = 2 \cosh t$, $-\infty < t < \infty$

$$\sinh t = \frac{x}{2} \quad \cosh t = \frac{y}{2}$$

$$\cosh^2 t - \sinh^2 t = 1$$

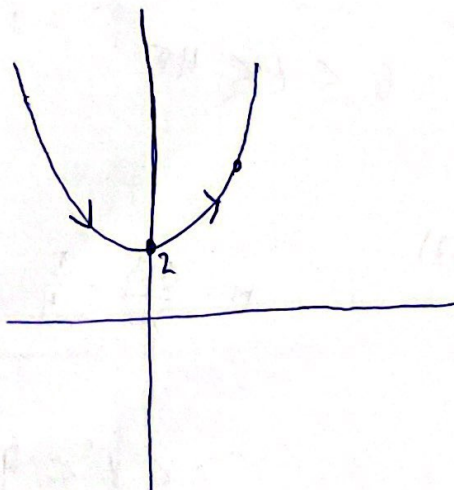
$$\frac{y^2}{4} - \frac{x^2}{4} = 1$$

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

$$y = \pm \sqrt{4 + x^2}$$

$$t_0 = 0 \rightarrow (0, 2)$$

$$t_1 = \ln 2 \rightarrow \left(\frac{3}{2}, \frac{5}{2}\right)$$



$$\sinh t = \frac{e^t - e^{-t}}{2}$$

$$2 \sinh(\ln 2) = \frac{2 - \frac{1}{2}}{2} = \frac{3}{4} \times 2 = \frac{3}{2}$$

$$\cosh t = \frac{e^t + e^{-t}}{2}$$

$$2 \cosh(\ln 2) = \frac{2 + \frac{1}{2}}{2} = \frac{5}{2} \cdot \frac{1}{2} \cdot 2 = \frac{5}{2}$$

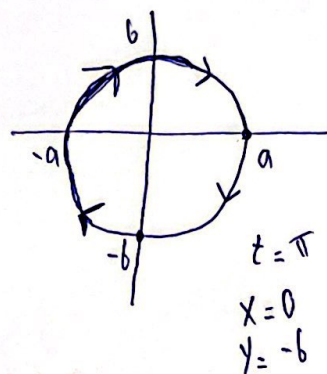
20) $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, $(a, 0)$

a) $\frac{x}{a} = \sin t \rightarrow x = a \sin t$
 $\frac{y}{b} = \cos t \rightarrow y = b \cos t$

$t = \frac{\pi}{2} \rightarrow (a, 0)$

$t = \frac{3\pi}{2} \rightarrow (a, 0)$

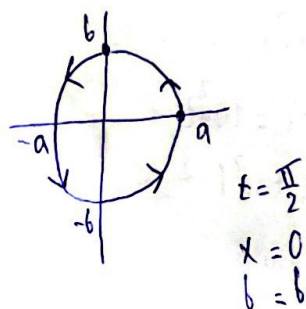
$\frac{\pi}{2} \leq t \leq \frac{3\pi}{2}$



b) $\frac{x}{a} = \cos t \rightarrow x = a \cos t$
 $\frac{y}{b} = \sin t \rightarrow y = b \sin t$

$t=0 \rightarrow (a, 0)$ $0 \leq t \leq 2\pi$

$t=2\pi \rightarrow (a, 0)$



c) $x = a \sin t$
 $y = b \cos t$

$\frac{\pi}{2} \leq t \leq \frac{3\pi}{2}$

d) $x = a \cos t$
 $y = b \sin t$

$0 \leq t \leq 4\pi$

22) $(-1, 3)$ $(3, -2)$

$m = \frac{-2-3}{3+1} = \frac{-5}{4}$

$y - y_0 = m(x - x_0)$

$y - 3 = \frac{-5}{4}(x + 1)$

$0 \leq t \leq 4$

$x = t + a \rightarrow x = t - 1$

$y = b + mt \rightarrow y = 3 - \frac{5}{4}t$

23) $(-1, 2)$

$x = t + a \rightarrow x = t - 1$

$y = b + mt \rightarrow y = 2 - 2t$

$t \geq 0$

