

① Plot $x=2-t^2$, $y=2t^2$ for $0 \leq t \leq 3$,

(Chart of t, x, y values)

t	x	y
0	2	0
1	1	2
2	-2	8
3	-7	18



(By EQ of x & y)

$$x = 2 - t^2$$

$$y = 2t^2$$

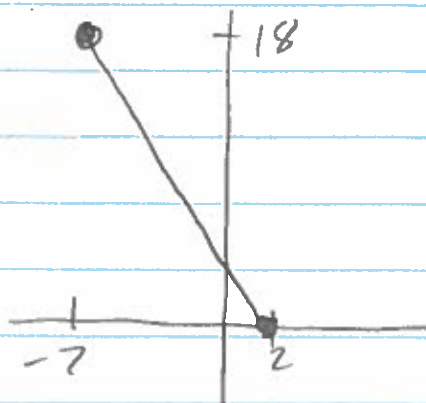
$$t^2 = 2 - x$$

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

$$y = 4 - 2x$$

from $t=0 \rightarrow (x, y) = (2, 0)$

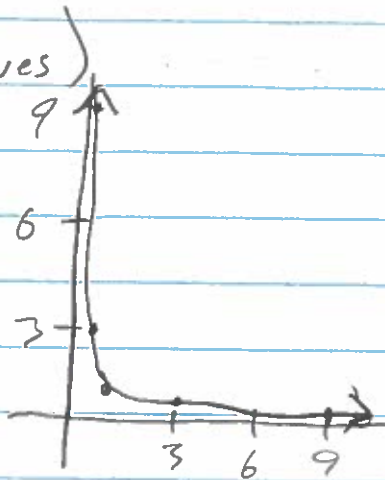
to $t=3 \rightarrow (x, y) = (-7, 18)$



② Plot $x=3^t, y=3^{-t}$.

(Chart of t, x, y values)

t	x	y
-2	$\frac{1}{9}$	9
-1	$\frac{1}{3}$	3
0	1	1
1	3	$\frac{1}{3}$
2	9	$\frac{1}{9}$



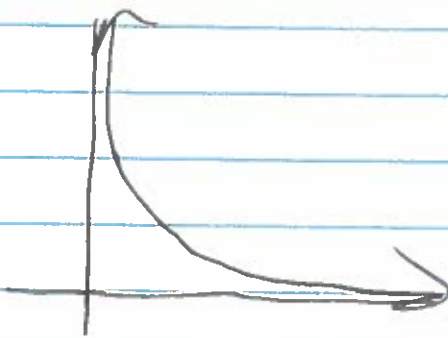
(EQ of x & y)

$$x=3^t$$

$$y=3^{-t}$$
$$y=\frac{1}{3^t}$$

$(y \geq 0)$

$y = \frac{1}{x}$



(3) Show that $x_0 = t+2$, $y_0 = e^2 e^t$ and $x_1 = \ln t$, $y_1 = t$ share the same para. curve. Then plot it.

$$x_0 = t+2$$

$$y_0 = e^2 e^t$$

$$x_0 - 2 = t$$

$$y_0 = e^{2+t}$$

$$y_0 = e^{x_0 - 2}$$
$$y_0 = e^{x_0}$$

$$x_1 = \ln t$$

$$e^{x_1} = t$$

$$e^{x_1} = y_1$$



④ Give a system of para EQs for $y = \cosh x$ from $(-\ln 2, 5/4)$ to $(\ln 2, 5/4)$.

$$\begin{aligned} x &= t \\ y &= \cosh t \end{aligned} \quad -\ln 2 \leq t \leq \ln 2$$

⑤ Give a system of para EQs for the line segment joining $(0, -4)$ and $(3, 5)$.

$$\begin{aligned} x &= x_0 + (x_1 - x_0)t \\ &= 0 + (3 - 0)t \\ \boxed{x &= 3t} \end{aligned}$$

$$\begin{aligned} y &= y_0 + (y_1 - y_0)t \\ &= -4 + (5 - (-4))t \\ \boxed{y &= -4 + 9t} \end{aligned}$$

(Always for this formula)

$$\boxed{0 \leq t \leq 1}$$

⑥ Give a system of para EQs for the line segment joining $(1, 2)$ and $(-3, 3)$.

$$\begin{aligned} x &= x_0 + (x_1 - x_0)t \\ &= 1 + (-3 - 1)t \\ \boxed{x &= 1 - 4t} \end{aligned}$$

$$\begin{aligned} y &= y_0 + (y_1 - y_0)t \\ &= 2 + (3 - 2)t \\ \boxed{y &= 2 + t} \end{aligned}$$

$$\boxed{0 \leq t \leq 1}$$

② Give two different systems of param Eqs for the line segment $y=4-3x$ between $x=-2$ and $x=3$.

$$\begin{cases} x=t \\ y=4-3t \end{cases} \quad -2 \leq t \leq 3$$

AND

$$\begin{aligned} (x_0, y_0) &= (-2, 4-3(-2)) \\ &= (-2, 10) \end{aligned}$$

$$\begin{aligned} (x_1, y_1) &= (3, 4-3(3)) \\ &= (3, -5) \end{aligned}$$

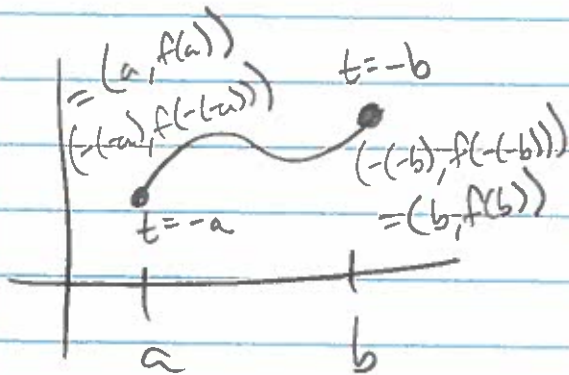
$$\begin{aligned} x &= x_0 + (x_1 - x_0)t \\ &= -2 + (3 - (-2))t \end{aligned}$$

$$x = -2 + 5t$$

$$\begin{aligned} y &= y_0 + (y_1 - y_0)t \\ &= 10 + (-5 - 10)t \end{aligned}$$

$$y = 10 - 15t$$

⑧ Let $a < b$. Find a system of para EQs for the planar curve $y=f(x)$ right-to-left from $(b, f(b))$ to $(a, f(a))$.



(Since $a < b$,
 $-b < -a$.)

Let $x = -t$
for $y = f(-t)$
 $-b \leq t \leq a$