

4.1 Parametric Functions

4.1 Practice

AP Precalculus

Find $x(t)$ and $y(t)$ for each parametric function.

1. Let $f(t) = (2t - 1, \ln 2t)$.

a. What is $x(t)$?

$$2t - 1$$

b. What is $y(t)$?

$$\ln 2t$$

2. Let $f(t) = (e^{3t}, \sin(t))$.

a. What is $x(t)$?

$$e^{3t}$$

b. What is $y(t)$?

$$\sin(t)$$

Find the coordinate point of the parametric function at the given value of the parameter.

3. At time $t = 9$, where is the parametric function

$$f(t) = \left(\frac{t-2}{t+1}, \sqrt{t-5}\right)?$$

$$\frac{9-2}{9+1} = \frac{7}{10} \quad \sqrt{9-5} = \sqrt{4}$$

$$\left(\frac{7}{10}, 2\right)$$

4. At time $t = -2$, where is the parametric function

$$f(t) = \left(t^2 + 3, \frac{1}{t}\right)?$$

$$\begin{array}{l} (-2)^2 + 3 \\ 4 + 3 \end{array} \quad \frac{1}{-2}$$

$$\left(7, -\frac{1}{2}\right)$$

5. At time $t = 3$, where is the parametric function

$$f(t) = (t + 6, 5 - t^2)?$$

$$\begin{array}{l} 3 + 6 \\ 9 \end{array} \quad \begin{array}{l} 5 - 9 \\ -4 \end{array}$$

$$(9, -4)$$

6. Given the parametric function $f(\theta) = (3 \cos \theta, 3 \sin \theta)$, complete the table of numerical values for the given values of θ . No calculator.

θ	$-\frac{\pi}{2}$	$-\frac{\pi}{4}$	0	$\frac{\pi}{4}$	$\frac{\pi}{2}$
x	0	$\frac{3\sqrt{2}}{2}$	3	$\frac{3\sqrt{2}}{2}$	0
y	-3	$-\frac{3\sqrt{2}}{2}$	0	$\frac{3\sqrt{2}}{2}$	1

7. **Calculator active.** Complete the table for the given parametric function, $f(t) = (e^t, t^2 - 1)$.

t	-1	-0.75	-0.5	-0.25	0
x	0.3679	0.4724	0.6065	0.7788	1
y	0	-0.438	-0.75	-0.938	-1

8. Which parametric function could be used to construct the given table of numerical values?

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

$m = -3, \quad b = 1$
 $m = 2, \quad b = 3$

(A) $(-3t + 1, 2t - 3)$

(B) $(1 + 3t, 2t - 3)$

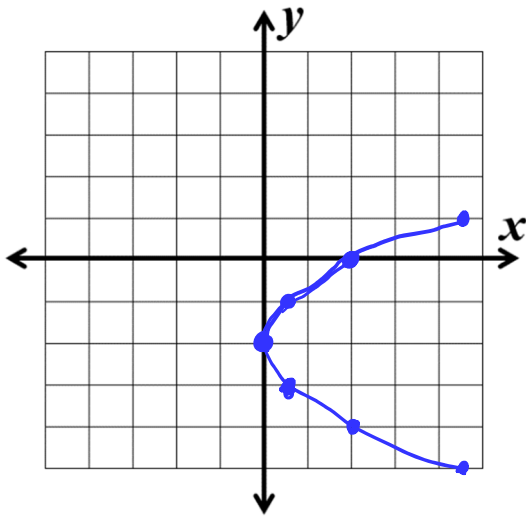
(C) $(1 - 3t, 2t + 3)$

(D) $(1 - 2t, 3t + 2)$

Sketch the curve represented by each parametric function. Check your answer with the use of technology.

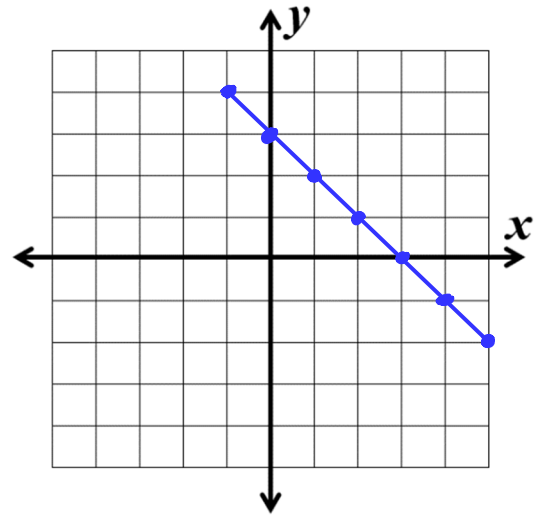
9. $f(t) = \left(\frac{t^2}{2}, t - 2\right), -3 \leq t \leq 3$

t	-3	-2	-1	0	1	2	3
x	$\frac{9}{2}$	2	$\frac{1}{2}$	0	$\frac{1}{2}$	2	$\frac{9}{2}$
y	-5	-4	-3	-2	-1	0	1



10. $f(t) = (t + 2, 1 - t), -2 \leq t \leq 3$

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



Find the domain of each parametric function.

11. $f(t) = (\sqrt{1-t}, t^3 - 1)$

$$\begin{aligned} 1-t &\geq 0 \\ -t &\geq -1 \end{aligned}$$

$$t \leq 1 \quad \text{or} \quad (-\infty, 1]$$

12. $f(t) = \left(\frac{5}{3t}, \sqrt{t+2}\right)$

$$\begin{aligned} t &\neq 0 & t+2 &\geq 0 \\ & & t &\geq -2 \end{aligned}$$

$$t \neq 0, t \geq -2 \quad \text{or} \quad [-2, 0) \cup (0, \infty)$$