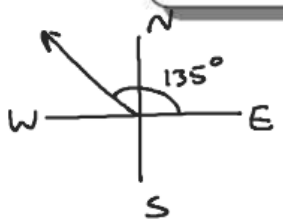
What you'll Learn About

- Parametric Equations/Parametric Curves/Eliminating the Parameter
- Lines and Line Segments/Simulating Motion with a grapher



A ship is heading northwest at 12 mph.

a. Find the component form of the ship after 1 hour.

$\langle 12\cos 135, 12\sin 135 \rangle$

b. Find the component form of the ship after 2 hours.

$\langle 24\cos 135, 24\sin 135 \rangle$

c. Find the component form of the ship after 3 hours.

$\langle 36\cos 135, 36\sin 135 \rangle$

parameter

d. Write the parametric equations for the boat at any time t.

$x = 12t\cos 135°$

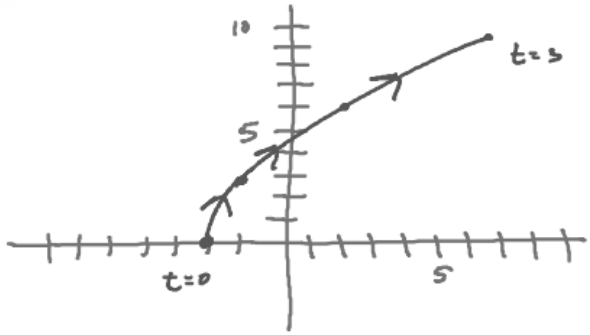
$y = 12t\sin 135°$

t	x	y
0	-2	0
1	-1	3
2	2	6
3	7	9
4	14	12
5	23	15

For the given parameter interval, graph the parametric equations

A. $x = t^2 - 2$ $y = 3t$ on the interval $0 \le t \le 3$

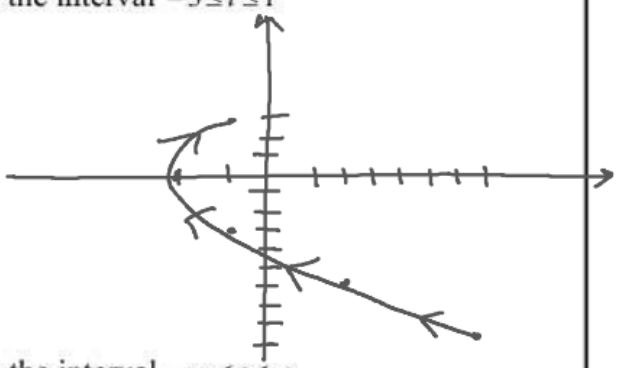
(-2,0)
(-1,3)
(2,6)
(7,9)



B. $x = t^2 - 2$ $y = 3t$ on the interval $0 \le t \le 5$

C. $x = t^2 - 2$ $y = 3t$ on the interval $-3 \le t \le 1$

t	x	y
-3	7	-9
-2	2	-6
-1	-1	-3
0	-2	0
1	-1	3



D. $x = t^2 - 2$ $y = 3t$ on the interval $-\infty \le t \le \infty$

Get Rid of t

1) Solve for t in x equation

2) Plug t = equation into Y

Eliminate the parameter and identify the graph of the parametric curve

A) $x = t^2 - 2$ $y = 3t$ on the interval $-\infty \le t \le \infty$

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

$t = \pm\sqrt{x+2}$

$y = \pm 3\sqrt{x+2}$

Square Root Function

B) $x = 1 - 2t$ $y = 2 - t$

$\frac{x-1}{-2} = \frac{-2t}{-2}$

$-\frac{1}{2}x + \frac{1}{2} = t$

$2 - \left(-\frac{1}{2}x + \frac{1}{2}\right)$

$2 + \frac{1}{2}x - \frac{1}{2}$

$y = \frac{1}{2}x + \frac{3}{2}$

Linear

C) $\frac{x}{2} = \frac{2\cos(t)}{2}$ $y = 2\sin(t)$ $0 \le t \le 2\pi$

$\frac{x}{2} = \cos t$

$t = \cos^{-1}\left(\frac{x}{2}\right)$

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

D) $x = 2\cos(t)$ $y = 2\sin(t)$ $0 \le t \le 2\pi$