

Parametric Equations

Show parameter values, preserve the inherited domain, and state the direction of motion when requested.

1. Eliminate t from $x = 2 \cos(t)$, $y = -2 \sin(t)$, $0 \leq t \leq \pi$. State the inherited portion and orientation.



2. Make a value table and trace $x = t - 1$, $y = 1t^2 - 1$ on $-2 \leq t \leq 2$, with orientation.

t	-2	-1	0	1	2
(x,y)					



Math Sheet

Name _____ Score _____ Teacher _____ Date _____

Parametric Equations

Show parameter values, preserve the inherited domain, and state the direction of motion when requested.

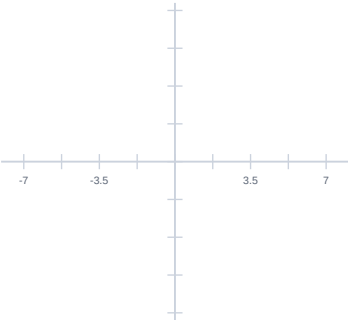
3. A projectile follows $x = 5t$ and $y = 5 + 14t - 4t^2$ for $t \geq 0$. Find its initial height, horizontal velocity, maximum height, and when and where it lands.

4. Give a parameterization of $y = 3x - 2$ on $-1 \leq x \leq 3$.

Parametric Equations

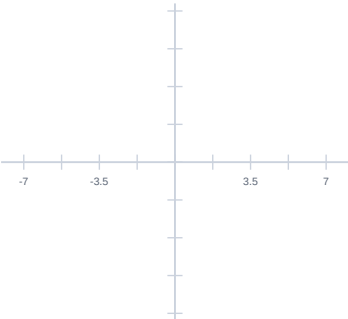
Show parameter values, preserve the inherited domain, and state the direction of motion when requested.

5. Eliminate t from $x = 6 \cos(t)$, $y = -6 \sin(t)$, $0 \leq t \leq \pi$. State the inherited portion and orientation.



6. Make a value table and trace $x = t - 1$, $y = 2t^2 - 1$ on $-2 \leq t \leq 2$, with orientation.

t	-2	-1	0	1	2
(x,y)					



Parametric Equations

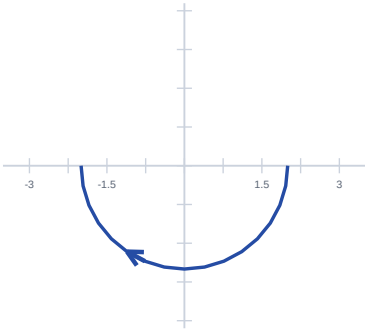
Worked Answer Key

Show parameter values, preserve the inherited domain, and state the direction of motion when requested.

1. Eliminate t from $x = 2 \cos(t)$, $y = -2 \sin(t)$, $0 \leq t \leq \pi$. State the inherited portion and orientation.

Answer: $x^2 + y^2 = 4$; inherited domain $y \leq 0$, traced clockwise from (2, 0) to (-2, 0).

- 1. Use $\cos^2(t) + \sin^2(t) = 1$.
- 2. The parameter interval determines the retained semicircle or full trace.

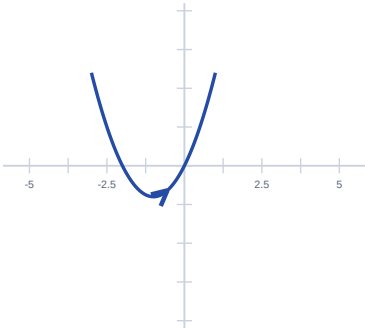


2. Make a value table and trace $x = t - 1$, $y = 1t^2 - 1$ on $-2 \leq t \leq 2$, with orientation.

t	-2	-1	0	1	2
(x,y)	(-3,3)	(-2,0)	(-1,-1)	(0,0)	(1,3)

Answer: $y = 1(x + 1)^2 - 1$; as t increases, move from smaller x to larger x.

- 1. Solve $x = t + b$ for t and substitute into y.
- 2. Keep the x-domain inherited from the bounded t interval.



Math Sheet

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Parametric Equations

Worked Answer Key

Show parameter values, preserve the inherited domain, and state the direction of motion when requested.

3. A projectile follows $x = 5t$ and $y = 5 + 14t - 4t^2$ for $t \geq 0$. Find its initial height, horizontal velocity, maximum height, and when and where it lands.

Answer: Initial height 5; horizontal velocity 5; maximum height 17.25 at $t = 1.75$; landing $t = (14 + \sqrt{276})/8$, x approximately 19.13.

1. For $y = -4t^2 + 14t + 5$, the vertex occurs at $t = -b/(2a) = 14/8$. Substitute this time to find the maximum height.
2. Set $y = 0$ and use the quadratic formula. Keep the nonnegative root, then substitute it into $x = 5t$.

4. Give a parameterization of $y = 3x - 2$ on $-1 \leq x \leq 3$.

Answer: $x = t + 1$, $y = 3t + 1$, $-2 \leq t \leq 2$.

1. Set the shifted horizontal expression equal to t .
2. Carry the rectangular domain back to the same t interval.

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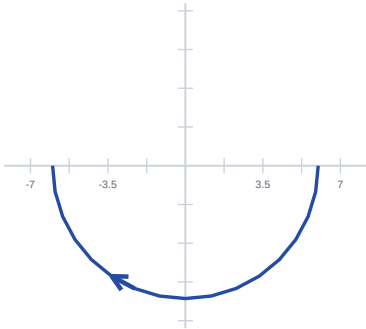
Worked Answer Key

Show parameter values, preserve the inherited domain, and state the direction of motion when requested.

5. Eliminate t from $x = 6 \cos(t)$, $y = -6 \sin(t)$, $0 \leq t \leq \pi$. State the inherited portion and orientation.

Answer: $x^2 + y^2 = 36$; inherited domain $y \leq 0$, traced clockwise from $(6, 0)$ to $(-6, 0)$.

- 1. Use $\cos^2(t) + \sin^2(t) = 1$.
- 2. The parameter interval determines the retained semicircle or full trace.



6. Make a value table and trace $x = t - 1$, $y = 2t^2 - 1$ on $-2 \leq t \leq 2$, with orientation.

t	-2	-1	0	1	2
(x,y)	(-3,7)	(-2,1)	(-1,-1)	(0,1)	(1,7)

Answer: $y = 2(x + 1)^2 - 1$; as t increases, move from smaller x to larger x .

- 1. Solve $x = t + b$ for t and substitute into y .
- 2. Keep the x -domain inherited from the bounded t interval.

