LESSON MAKER PRO

Trace the Path

Sketch curves and show which way they travel.

HIGH SCHOOL · P.IPE.A.1

P.IPE.A.1 "Sketch the curve defined by parametric equations."

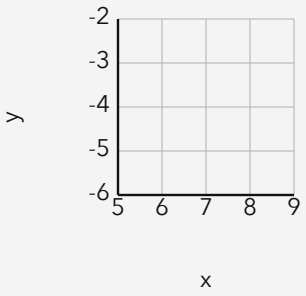
NAME _____ DATE _____

PLOT IN ORDER

Choose values of t from the given interval and calculate each (x, y) point. Plot the points in order, connect them with a smooth curve, and add an arrow to show the direction as t increases.

WORKED EXAMPLE

Sketch $x=t+7$ and $y=t^2-6$ for $-2<=t<=2$.



1. Choose t=-2, -1, 0, 1, 2.
2. Calculate (5,-2), (6,-5), (7,-6), (8,-5), (9,-2).
3. Plot and connect the points. Add an arrow from left to right.

Answer: A U-shaped arc from (5,-2) through (7,-6) to (9,-2), traveled left to right.

PRACTICE 4 problems

1 Sketch $x=t$ and $y=2t+1$ for $-1<=t<=2$. Mark the endpoints and direction.

ANSWER _____

2 Sketch $x=t$ and $y=t^2-1$ for $-2<=t<=2$. Mark the endpoints and direction.

ANSWER _____

3 Sketch $x=t^2$ and $y=t$ for $-2<=t<=2$. Mark the endpoints and direction.

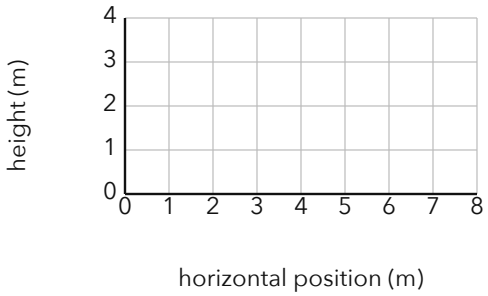
ANSWER _____

4 Sketch $x=2t+1$ and $y=3-t$ for $0<=t<=2$. Mark the endpoints and direction.

ANSWER _____

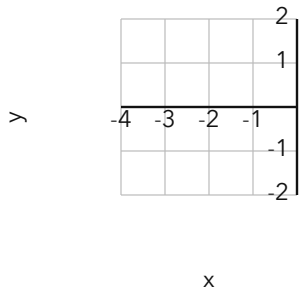
APPLY IT Show your work

1 A drone's horizontal position is $x=2t$ meters, and its height is $y=4t-t^2$ meters for $0<=t<=4$. Sketch its path and show its travel direction.



ANSWER _____

2 In a game, a character follows $x=t^2-4$ and $y=t$ for $-2<=t<=2$. Sketch the path and mark where the character starts.



ANSWER _____

CHALLENGE One step up

For $x=t^2$ and $y=t^2$, $-2<=t<=2$, why is one arrow on the path misleading? State the path and travel order.

WORK SPACE AND ANSWER

ANSWER KEY

Trace the Path

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Sketch x=t and y=2t+1 for -1<=t<=2. Mark the endpoints and direction.	**Line segment from (-1,-1) to (2,5), with an arrow toward (2,5).**
2	Sketch x=t and y=t^2-1 for -2<=t<=2. Mark the endpoints and direction.	**U-shaped arc from (-2,3) through (0,-1) to (2,3), traveled left to right.**
3	Sketch x=t^2 and y=t for -2<=t<=2. Mark the endpoints and direction.	**Right-opening arc from (4,-2) through (0,0) to (4,2), traveled from bottom to top.**
4	Sketch x=2t+1 and y=3-t for 0<=t<=2. Mark the endpoints and direction.	**Line segment from (1,3) to (5,1), with an arrow toward (5,1).**

PART 2 · APPLY IT

1. **Downward-opening arc from (0,0) through (4,4) to (8,0), traveled left to right.** At t=0, 2, and 4, the positions are (0,0), (4,4), and (8,0). Plot intermediate points such as (2,3) and (6,3) to shape the arc.
2. **Right-opening arc from (0,-2) through (-4,0) to (0,2). The character starts at (0,-2).** Substitute t=-2, 0, and 2 to find the start, leftmost point, and end. The path moves from bottom to top.

CHALLENGE

The path is the line segment from (0,0) to (4,4). It travels from (4,4) to (0,0), then back to (4,4), so its direction reverses.

Accept accurate hand sketches with the correct endpoints and direction, even if no intermediate points are labeled. In the challenge, the return trip must be shown or explained.