

Slope Line Sketch

Construct proportional lines from a point and slope

GRADE 7 • 7.PFA.1.c

7.PFA.1.c "Graph a line representing a proportional relationship, between two quantities given an ordered pair on the line and the slope, m , as rate of change. Slope may include positive or negative values."

NAME _____

DATE _____

BUILD UNDERSTANDING

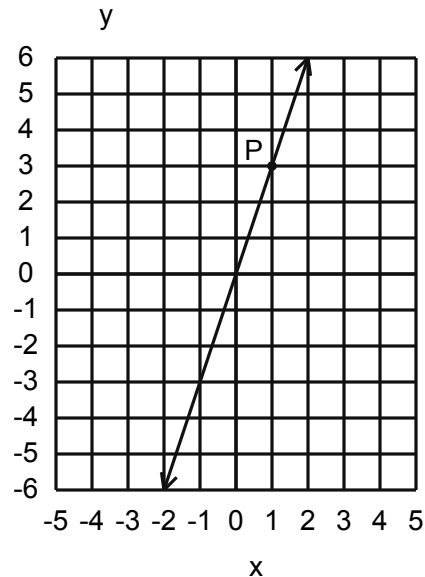
A proportional line passes through $(0, 0)$. Starting from the given point, use slope $m = \text{rise/run}$ to locate another point. Check that both points and the origin lie on your line. A negative slope goes down as you move right; reversing the run reverses the rise too. Use a ruler. Practice requires full lines with arrowheads; Apply It 1 requires only the stated segment.

WORKED EXAMPLE

A proportional line passes through $P(1, 3)$ and has slope 3. Use the point and slope to graph the line.

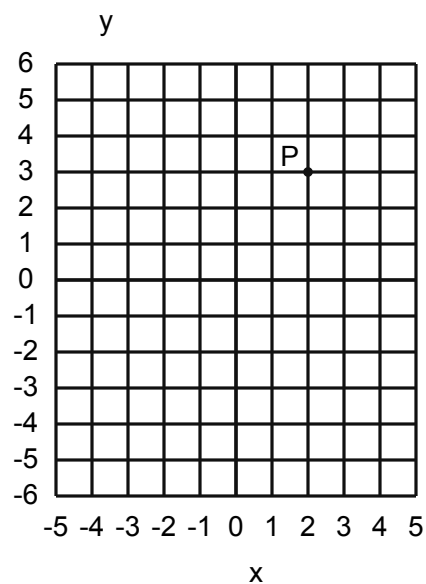
1. From P , move left 1 and down 3 to reach $(0, 0)$.
2. Move right 1 and up 3 to $(2, 6)$; join the points with a straight line.

Answer: The completed line is $y = 3x$.

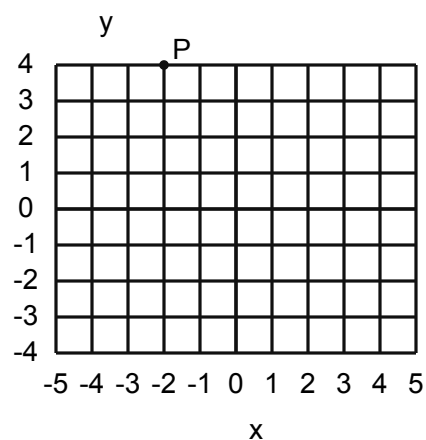


PRACTICE 4 problems

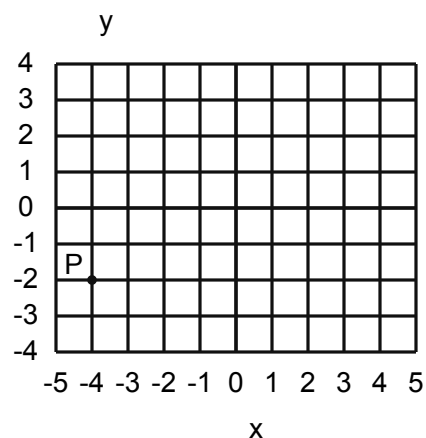
- 1** Graph the proportional line through $P(2, 3)$ with slope $3/2$. Use rise/run to find another point. Draw the line with arrowheads and write its equation.



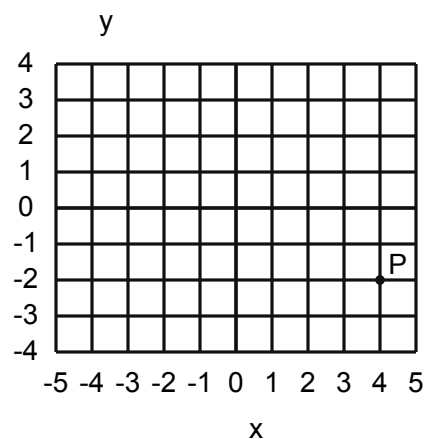
- 2** Graph the proportional line through $P(-2, 4)$ with slope -2 . Use rise/run to find another point. Draw the line with arrowheads and write its equation.



- 3** Graph the proportional line through $P(-4, -2)$ with slope $1/2$. Use rise/run to find another point. Draw the line with arrowheads and write its equation.

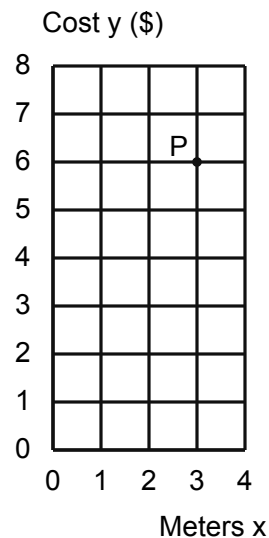


- 4** Graph the proportional line through $P(4, -2)$ with slope $-1/2$. Use rise/run to find another point. Draw the line with arrowheads and write its equation.



APPLY IT Show your work

- 1** Ribbon costs \$2 per meter with no extra fee; $P(3, 6)$ is marked. Graph the proportional cost for 0 to 4 meters, including fractional meters, and write the equation.



- 2** A proportional printing cost has slope \$3 per page. A student starts at $(1, 4)$, then uses rise 3 and run 1. Explain why the resulting line is wrong and give a correct starting point.

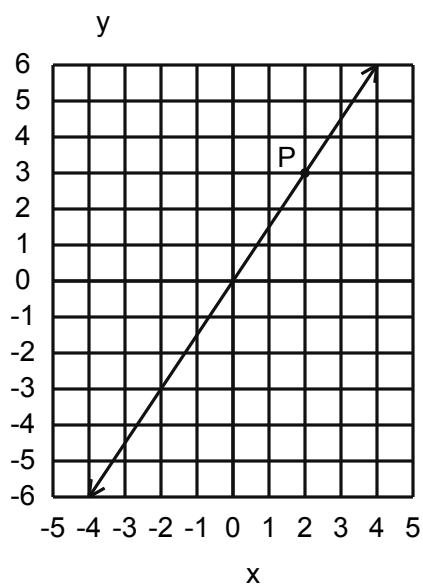
CHALLENGE One step up

A proportional line has slope -3 . A student proposes $P(2, 6)$ and $Q(2, -6)$. Which point fits? Explain, then give the point reached by moving left 1 along the correct line from Q .

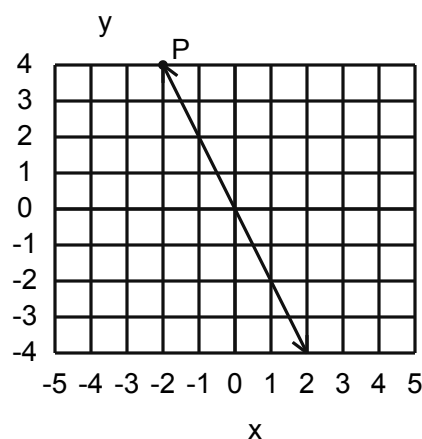
Require all five graphs. Practices 1-4 and the worked example use arrowheads to show full lines. Apply It 1 is restricted to 0-4 meters. Every grid interval is one unit. Accept equivalent equations.

PRACTICE 1

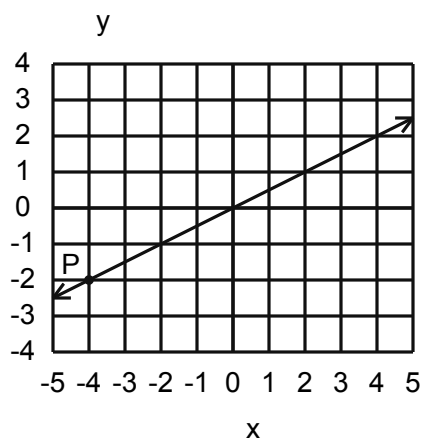
$y = (3/2)x$. Use P, (0, 0) and (4, 6); join with a straight line and arrowheads.

**PRACTICE 2**

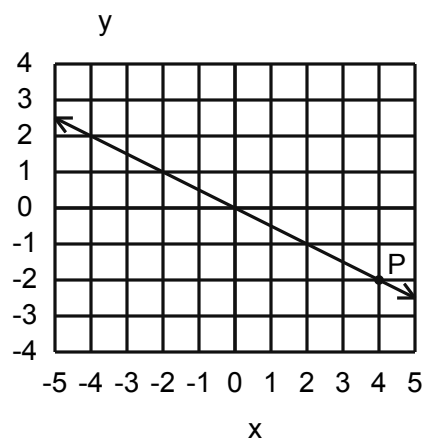
$y = (-2)x$. Use P, (0, 0) and (2, -4); join with a straight line and arrowheads.

**PRACTICE 3**

$y = (1/2)x$. Use P, (0, 0) and (4, 2); join with a straight line and arrowheads.

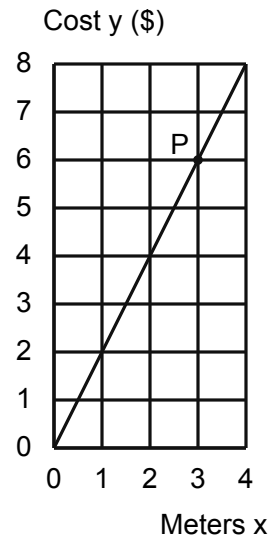
**PRACTICE 4**

$y = (-1/2)x$. Use P, (0, 0) and (-4, 2); join with a straight line and arrowheads.



APPLY IT 1

$y = 2x$. Draw the segment from $(0, 0)$ through P to $(4, 8)$.
Use rise \$2 for run 1 meter. The origin represents zero meters costing \$0.



APPLY IT 2

The point $(1, 4)$ is inconsistent with $y = 3x$; use $(1, 3)$ or $(0, 0)$.
The wrong line has the correct slope but misses the origin. Point and slope must both match the proportional relationship.

CHALLENGE

Q fits because $-3 \times 2 = -6$. Moving left 1 raises y by 3, reaching $(1, -3)$. P does not fit.