

Slope Connection Lab

Connect tables, equations, graphs, and real situations.

GRADE 7 • 7.PFA.1

7.PFA.1 "The student will investigate and analyze proportional relationships between two quantities using verbal descriptions, tables, equations in $y = mx$ form, and graphs, including problems in context. Determine the slope, m ..."

NAME _____

DATE _____

THE BIG IDEA

In a proportional relationship, y/x stays the same for every nonzero x , and the graph goes through $(0,0)$. This constant rate is the slope, m , so the equation is $y = mx$. The slope can be positive, negative, or zero.

WORKED EXAMPLE

A proportional line passes through $(5,20)$. Find its slope and write its equation.

1. Use $m = y/x$.
2. $m = 20/5 = 4$.
3. Put 4 in $y = mx$: $y = 4x$.

Answer: $m = 4$; $y = 4x$

PRACTICE 6 problems

- 1** This table shows a proportional relationship. x : 3, 6, 9 y : 21, 42, 63 Find m and write the equation.

ANSWER _____

- 2** The equation of a proportional line is $y = -2x$. State the slope and tell whether the line rises or falls from left to right.

ANSWER _____

- 3** A proportional line goes through $(0,0)$ and $(9,-6)$. Find the slope, write the equation, and list two more points on the line.

ANSWER _____

- 4** A graph of a proportional line contains $(0,0)$ and $(-10,30)$. Find m and write the equation.

ANSWER _____

- 5** A graph is a horizontal line through the origin. What is its slope, and what equation represents it?

ANSWER _____

- 6** Graph $y = 1/3x$. List three points you can plot, including the origin.

ANSWER _____

APPLY IT Show your work

1

A video game gives you 8 gems for each quest you complete. Let x be the number of quests and y be the number of gems. What is the rate of change? Write an equation. How many gems will you have after 7 quests?

WORK SPACE

ANSWER _____

2

A student makes a playlist with songs that are each 3 minutes long. Let x be the number of songs and y be the total playing time in minutes. Write an equation and find the total time for 9 songs.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A proportional line passes through $(-12, 18)$ and $(8, -12)$. Write its equation. Without graphing, explain whether the line rises or falls from left to right. Then give two points that could be used to graph the line.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	This table shows a proportional relationship. x: 3, 6, 9 y: 21, 42, 63 Find m and write the equation.	$m = 7$; $y = 7x$
2	The equation of a proportional line is $y = -2x$. State the slope and tell whether the line rises or falls from left to right.	$m = -2$; the line falls from left to right.
3	A proportional line goes through (0,0) and (9,-6). Find the slope, write the equation, and list two more points on the line.	$m = -2/3$; $y = -2/3x$; sample additional points: (3,-2) and (-3,2).
4	A graph of a proportional line contains (0,0) and (-10,30). Find m and write the equation.	$m = -3$; $y = -3x$
5	A graph is a horizontal line through the origin. What is its slope, and what equation represents it?	$m = 0$; $y = 0x$
6	Graph $y = 1/3x$. List three points you can plot, including the origin.	Sample points: (0,0), (3,1), and (6,2).

PART 2 • APPLY IT

- Rate: 8 gems per quest; $y = 8x$; 56 gems** The number of gems increases by 8 for every quest, so $m = 8$.
Substitute $x = 7$ into $y = 8x$.
- $y = 3x$; 27 minutes** Each song adds 3 minutes, so the constant rate is 3 minutes per song. Substitute $x = 9$ into $y = 3x$.

CHALLENGE

$m = -3/2$, so $y = -3/2x$. The line falls from left to right because its slope is negative. Sample points: (0,0) and (2,-3).

Accept equivalent equations with the same slope, such as $y = (-6/9)x$ for $y = -2/3x$. For graphing items, accept any correctly plotted points on the stated line.