LESSON MAKER PRO

Lines Tell Stories

Find the rate and starting value.

GRADE 8 · 8.AF.B.9

8.AF.B.9 "Interpret y = mx + b as defining a linear equation whose graph is a line with m as the slope and b as the y-intercept. a. Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line..."

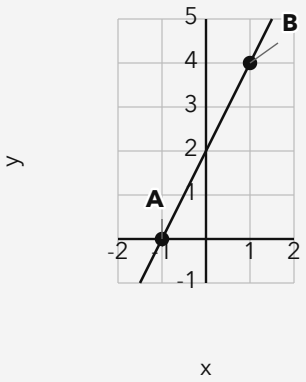
NAME _____ DATE _____

SLOPE AND START

For two points on a line, slope is change in y divided by change in x. In y = mx + b, m is the slope and b is the y-value where the line crosses the y-axis.

WORKED EXAMPLE

Find the slope, y-intercept, and equation of the line shown.



1. From A to B, y rises 4 while x increases 2.
2. Slope = 4/2 = 2.
3. The line crosses the y-axis at 2, so b = 2.

Answer: Slope: 2; y-intercept: 2; equation: y = 2x + 2.

PRACTICE 4 problems

1 Find the slope through (2, 5) and (6, 17).

ANSWER _____

2 Find the slope and y-intercept through (0, 7) and (3, 1).

ANSWER _____

3 Find the equation of the line through (2, 8) and (6, 10).

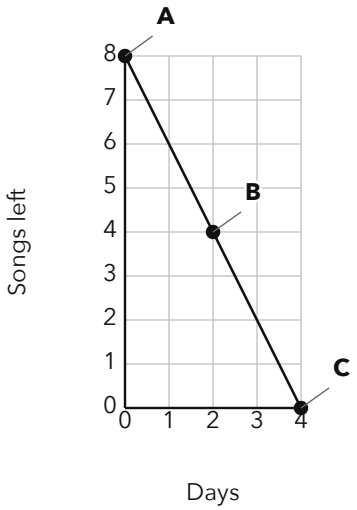
ANSWER _____

4 Find the slope through (-4, 8) and (0, -4).

ANSWER _____

APPLY IT Show your work

1 A playlist has offline songs left. On the graph, x is days and y is songs left. Find the daily change and the starting number.



ANSWER _____

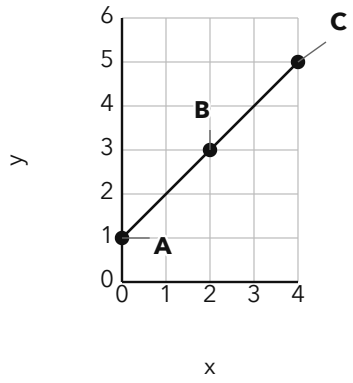
2 Two friends track money in game wallets. Ana has $11 on day 2 and $17 on day 4. Ben has $8 on day 2 and $14 on day 4. Find each daily rate and starting balance.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Compare the rise/run from A to B and from A to C. Explain why any two distinct points on this line give the same slope.



WORK SPACE AND ANSWER

ANSWER KEY

Lines Tell Stories

GRADE 8 · 8.AF.B.9

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find the slope through (2, 5) and (6, 17).	**3**
2	Find the slope and y-intercept through (0, 7) and (3, 1).	**Slope: -2; y-intercept: 7.**
3	Find the equation of the line through (2, 8) and (6, 10).	**y = 1/2x + 7**
4	Find the slope through (-4, 8) and (0, -4).	**-3**

PART 2 · APPLY IT

1. **Daily change: -2 songs per day; starting number: 8 songs.** From A to B, the change is -4 songs over 2 days, so the rate is -2 songs per day. At day 0, there are 8 songs.
2. **Ana: $3 per day, $5 to start. Ben: $3 per day, $2 to start.** Each balance rises $6 in 2 days, so each rate is $3 per day. Subtract $6 from each day 2 balance to find the day 0 balances.

CHALLENGE

A to B has rise/run 2/2 = 1; A to C has rise/run 4/4 = 1. The right triangles made by any two points on the line have the same angle with the horizontal, so they are similar. Their rise/run ratios are equal.

Accept equivalent equations, such as y = x/2 + 7 in problem 3. In the challenge, accept a clear similar-triangles explanation of equal rise/run ratios.