LESSON MAKER PRO

Slope Stays Steady

Find constant rates and write equations for lines.

GRADE 8 · 8.AT.A.2

8.AT.A.2 "Use proportional reasoning to identify slope and represent linear relationships. Use proportional reasoning to explain why the slope m is the same between any two points on a non-vertical line by showing that the ratios of vertical change..."

NAME _____ DATE _____

THE BIG IDEA

To find a line's slope, divide the change in y by the change in x. This ratio is the same between any two points on a non-vertical line. Write the equation as y = mx + b, where m is the slope and b is the y-value when x = 0. If the line passes through the origin, b = 0.

WORKED EXAMPLE

A line passes through (2, 15) and (6, 27). Find its slope and write its equation.

1. Change in y: 27 - 15 = 12. Change in x: 6 - 2 = 4.
2. Slope: m = 12/4 = 3.
3. Use (2, 15): 15 = 3(2) + b, so b = 9.

Answer: m = 3; y = 3x + 9

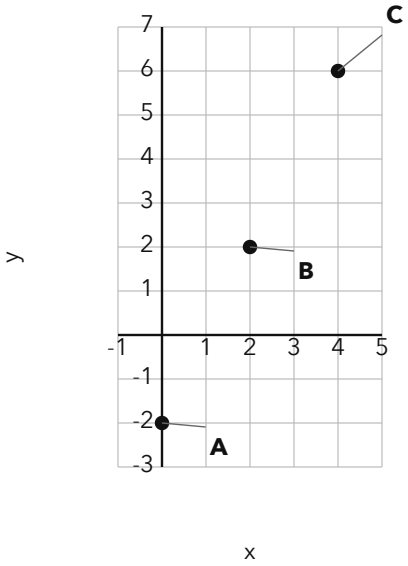
PRACTICE 6 problems

1 Use the table to write an equation for y in terms of x.

x	y
0	0
3	12
6	24

ANSWER _____

2 Find the slope and the y-intercept of the line through A, B, and C.



ANSWER _____

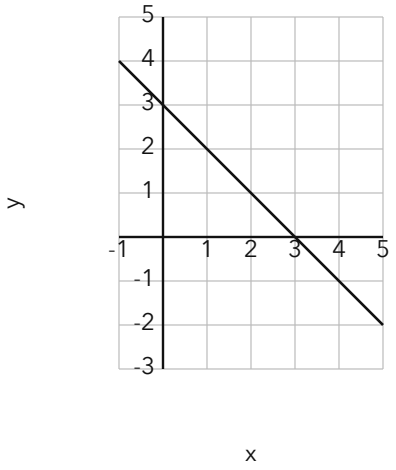
3 Write an equation for the line through (-3, 4) and (1, -4).

ANSWER _____

4 A line passes through A(1, -2), B(4, 4), and C(7, 10). Find the ratio of vertical change to horizontal change from A to B and from B to C. What do the ratios show about the slope?

ANSWER _____

5 Write an equation for the line shown.



ANSWER _____

6 Use the table to write an equation for y in terms of x.

x	y
0	-1
2	2
4	5

ANSWER _____

APPLY IT Show your work

1 A gaming lounge charges a starting fee plus the same price for each hour. A 3-hour visit costs $19, and a 5-hour visit costs $27. Let x be the number of hours and y be the total cost in dollars. Find the hourly price and write an equation for y.

WORK SPACE

ANSWER _____

2 A tablet's battery level falls at a steady rate while a game runs. After 2 hours it is at 74%, and after 5 hours it is at 50%. Let x be hours of play and y be the battery percentage. Find the change in percentage points per hour and write an equation for y.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A line passes through A(-4, -9), B(-1, -3), and C(3, 5). Show the ratio of vertical change to horizontal change for each pair of points: A and B, B and C, and A and C. Then write an equation and explain how the ratios support it.

WORK SPACE AND ANSWER

ANSWER KEY

Slope Stays Steady

GRADE 8 · 8.AT.A.2

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Use the table to write an equation for y in terms of x.	**y = 4x**
2	Find the slope and the y-intercept of the line through A, B, and C.	**Slope: 2; y-intercept: -2**
3	Write an equation for the line through (-3, 4) and (1, -4).	**y = -2x - 2**
4	A line passes through A(1, -2), B(4, 4), and C(7, 10). Find the ratio of vertical change to horizontal change from A to B and from B to C. What do the ratios show about the slope?	**From A to B: 6/3 = 2. From B to C: 6/3 = 2. The equal ratios show that the slope is 2 for both pairs.**
5	Write an equation for the line shown.	**y = -x + 3**
6	Use the table to write an equation for y in terms of x.	**y = 3/2x - 1**

PART 2 · APPLY IT

1. **$4 per hour; y = 4x + 7** The hourly price is (27 - 19)/(5 - 3) = 4 dollars. The starting fee is 19 - 4(3) = 7 dollars.
2. **-8 percentage points per hour; y = -8x + 90** The rate is (50 - 74)/(5 - 2) = -8 percentage points per hour. The starting battery percentage is 74 - (-8)(2) = 90.

CHALLENGE

The ratios are 6/3 = 2, 8/4 = 2, and 14/7 = 2. Every pair has slope 2. Using B gives -3 = 2(-1) + b, so b = -1 and the equation is y = 2x - 1. The equal ratios show that the three points have the same slope.

Accept equivalent forms of the equations and slope ratios. For the battery problem, the rate is negative because the percentage decreases.