LESSON MAKER PRO

Slope Stays Steady

Use rise and run to find the same rate anywhere on a line.

GRADE 8 · TEKS 8.4.A

8.4.A "use similar right triangles to develop an understanding that slope, m, given as the rate comparing the change in y-values to the change in x-values, (y2 - y1)/ (x2 - x1), is the same for any two points (x1, y1) and (x2..."

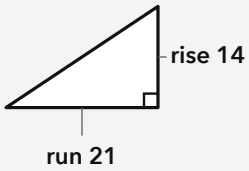
NAME _____ **DATE** _____

ONE LINE, ONE SLOPE

For a nonvertical line, slope compares vertical change to horizontal change: $m = (y_2 - y_1)/(x_2 - x_1)$. Right triangles drawn along the same line are similar, so the rise/run ratio is the same no matter which two points you use.

WORKED EXAMPLE

Use the ascending line in the right triangle to find its slope: a run of 21 to the right gives a rise of 14.

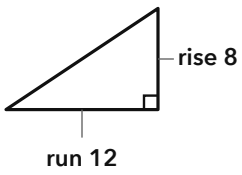


1. Slope = rise/run.
2. m = 14/21.
3. Simplify 14/21 by dividing by 7.

Answer: m = 2/3

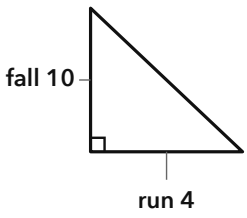
PRACTICE 6 problems

1 Use the ascending line in the right triangle to find its slope: a run of 12 to the right gives a rise of 8.



ANSWER _____

2 The right triangle shows a line moving 4 to the right and falling 10. Find the slope.



ANSWER _____

3 Find the slope of the line through (-4, 3) and (2, 7).

ANSWER _____

4 Find the slope of the line through (5, -1) and (1, 9).

ANSWER _____

5 Points P(0, -2), Q(3, 4), and R(6, 10) lie on one line. Find the slope from P to Q and the slope from Q to R.

ANSWER _____

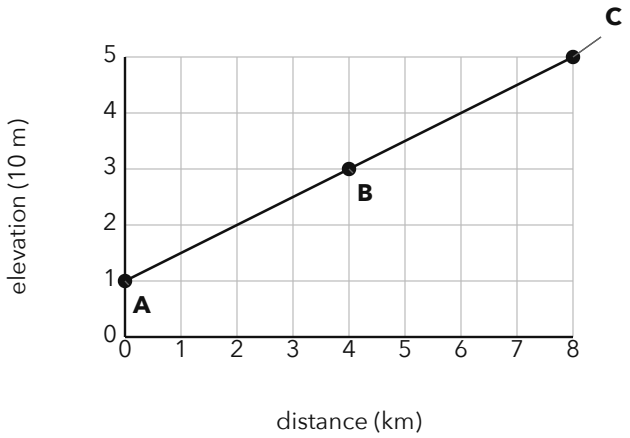
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6 A line passes through (-2, 5) and has slope -3/4. Another point on the line has x-coordinate 6. Find its y-coordinate.

ANSWER _____

APPLY IT Show your work

1 The graph shows a bike trail's elevation. The y-axis measures elevation in tens of meters, and the x-axis measures horizontal distance in kilometers. Use points A and C to find m in graph units. Then state how many meters the trail rises per kilometer.



ANSWER _____

2 A gaming club tracks one player's points after each set of matches. Use any two rows in the table to find the player's constant rate of points per match. Verify the rate with a different pair of rows.

GAMING CLUB POINTS

Matches played	Points earned
1	16
4	28
7	40
10	52

ANSWER _____

CHALLENGE One step up

Points A(-4, 1), B(2, 5), and R(x, 9) lie on the same nonvertical line. Find x. Explain how the slopes show that your value works.

WORK SPACE AND ANSWER

ANSWER KEY

Slope Stays Steady

GRADE 8 · TEKS 8.4.A

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Use the ascending line in the right triangle to find its slope: a run of 12 to the right gives a rise of 8.	**2/3**
2	The right triangle shows a line moving 4 to the right and falling 10. Find the slope.	**-5/2**
3	Find the slope of the line through (-4, 3) and (2, 7).	**2/3**
4	Find the slope of the line through (5, -1) and (1, 9).	**-5/2**
5	Points P(0, -2), Q(3, 4), and R(6, 10) lie on one line. Find the slope from P to Q and the slope from Q to R.	**2; 2**
6	A line passes through (-2, 5) and has slope -3/4. Another point on the line has x-coordinate 6. Find its y-coordinate.	**-1**

PART 2 · APPLY IT

1. **m = 1/2; 5 meters per kilometer** From A to C, the elevation changes by 4 graph units and the distance changes by 8 kilometers. The slope is 4/8 = 1/2 ten-meter unit per kilometer, which is 5 meters per kilometer.
2. **4 points per match** For example, from 1 to 4 matches, points increase by 12 while matches increase by 3. The rate is 12/3 = 4 points per match, and the other consecutive rows give the same ratio.

CHALLENGE

x = 8; the slope from A to B is 4/6 = 2/3, and the slope from B to R is 4/6 = 2/3.

Accept equivalent simplified slope forms when they have the correct sign. For the challenge, accept a correct equation such as 4/(x - 2) = 2/3 and a statement that both slopes are equal.