

Slope Stays Steady

Use rise and run to compare points 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, $(y_2 - y_1)/(x_2 - x_1)$, is the same for any two points (x_1, y_1) and (x_2, y_2) ..."

NAME _____

DATE _____

ONE LINE, ONE SLOPE

For two points on a nonvertical line, slope $m = (y_2 - y_1)/(x_2 - x_1)$. Similar right triangles along the same line have proportional rise and run, so every pair of points on that line has the same slope. A vertical line has an undefined slope because its change in x is 0.

WORKED EXAMPLE

Find the slope of the line through $(-9, 4)$ and $(-3, 14)$.

1. $m = (14 - 4)/(-3 - (-9))$

2. $m = 10/6$

3. $m = 5/3$

Answer: $5/3$

PRACTICE 6 problems

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

ANSWER _____

- 2** Find the slope of the line through $(7, -1)$ and $(1, -10)$.

ANSWER _____

- 3** Find the slope of the line through $(-6, 9)$ and $(-2, -3)$.

ANSWER _____

- 4** Points $(2, -5)$, $(6, 1)$, and $(10, 7)$ are on one line. Find the slope from the first point to the second point and from the second point to the third point.

ANSWER _____

- 5** Do the points $(3, 2)$, $(7, 10)$, and $(11, 18)$ lie on the same line? Show by comparing slopes.

ANSWER _____

- 6** The slope between $(-4, 6)$ and $(x, -2)$ is -1 . Find x .

ANSWER _____

APPLY IT Show your work

- 1** A skateboard ramp rises 9 feet over a horizontal distance of 24 feet. Let x represent horizontal distance and y represent height. What is the slope of the ramp?

WORK SPACE

ANSWER _____

- 2** At 1 hour after ticket sales open for the school dance, 18 tickets have been sold. At 5 hours after sales open, 30 tickets have been sold. What is the slope in tickets per hour?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Points $A(-8, 14)$, $B(0, 2)$, and $C(6, -7)$ are claimed to be on the same line. Decide whether the claim is true. Find the slope from A to B and from B to C , then explain your reasoning.

WORK SPACE AND ANSWER

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Find the slope of the line through (-4, 5) and (4, 9).	1/2
2	Find the slope of the line through (7, -1) and (1, -10).	3/2
3	Find the slope of the line through (-6, 9) and (-2, -3).	-3
4	Points (2, -5), (6, 1), and (10, 7) are on one line. Find the slope from the first point to the second point and from the second point to the third point.	3/2 for both intervals
5	Do the points (3, 2), (7, 10), and (11, 18) lie on the same line? Show by comparing slopes.	Yes. The slope from (3, 2) to (7, 10) is 2, and the slope from (7, 10) to (11, 18) is 2.
6	The slope between (-4, 6) and (x, -2) is -1. Find x.	4

PART 2 • APPLY IT

- 3/8** Use slope = rise/run = $9/24$. Simplify $9/24$ to $3/8$.
- 3 tickets per hour** Use the points (1, 18) and (5, 30). The slope is $(30 - 18)/(5 - 1) = 12/4 = 3$ tickets per hour.

CHALLENGE

The claim is true. The slope from A to B is $(2 - 14)/(0 - (-8)) = -12/8 = -3/2$. The slope from B to C is $(-7 - 2)/(6 - 0) = -9/6 = -3/2$, so the slopes are equal.

Accept equivalent simplified fractions and correct use of a consistent point order. For explanations, accept statements that equal slopes show the points are on the same nonvertical line.