LESSON MAKER PRO

Slope Storylines

Find rates, starts, and steady changes.

GRADE 8 · TEKS 8.4

8.4 "Proportionality. The student applies mathematical process standards to explain proportional and non-proportional relationships involving slope. The student is expected to: use similar right triangles to develop an understanding that slope..."

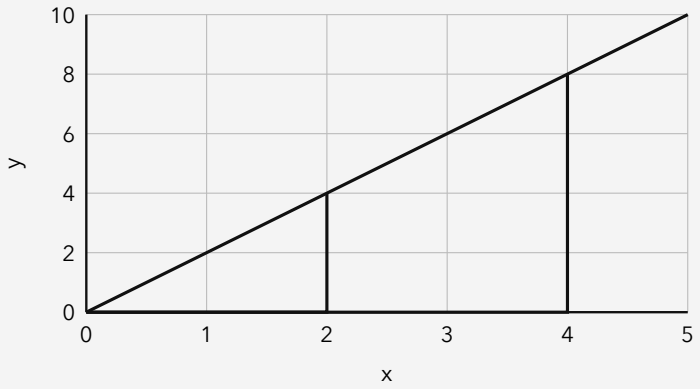
NAME _____ DATE _____

SLOPE ON A LINE

Slope measures the change in y for each change in x. On a straight line, similar right triangles have the same rise/run, so m = (y2 - y1)/(x2 - x1). A proportional relationship starts at 0, so its unit rate is its slope.

WORKED EXAMPLE

On the line y=2x, compare the two right triangles. Explain why they give the same slope.



1. Small triangle: run 2, rise 4; ratio 4/2=2.
2. Large triangle: run 4, rise 8; ratio 8/4=2.
3. The triangles are right triangles with the same acute angle along the line, so they are similar. Corresponding rises and runs scale by the same factor.

Answer: Both slopes are 2; the similarity preserves rise/run.

PRACTICE 4 problems

1 A game maker plots level points at (1, 1) and (3, 8). Find the slope. Check it by naming the rise and run.

ANSWER _____

2 A volunteer earns service points at a constant rate, starts with 0, and has 15 points after 5 hours. Is points proportional to hours? Give the unit rate and y-intercept.

ANSWER _____

3 Assume a music app has a fixed starting fee and constant monthly rate. It charges $9 for 1 month and $13 for 3 months. Find both.

ANSWER _____

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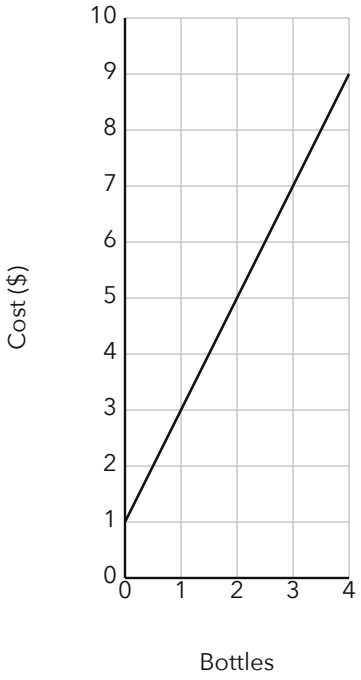
4 A hiking trail gains 9 meters in 3 kilometers, then gains 15 meters in 5 kilometers. Do the two sections have the same slope? Use both ratios to check.

ANSWER _____

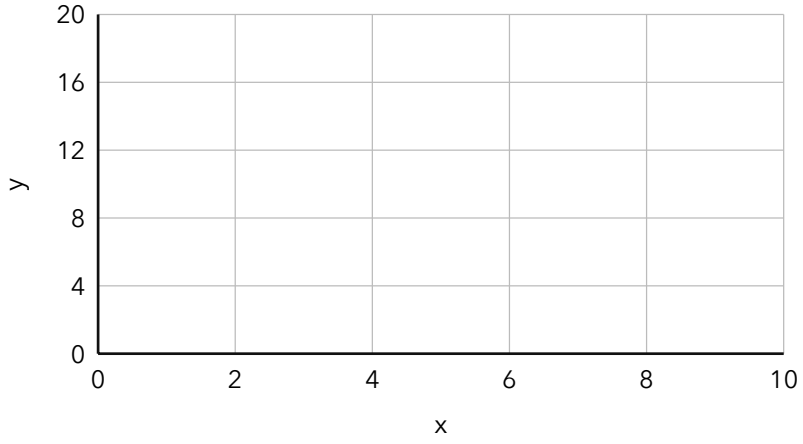
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APPLY IT Show your work

1 The graph shows the cost of reusable bottles at a school event. What is the cost per bottle, and what is the starting cost?



2 A game path rises 9 units for every 5 units right. Its proportional rule passes through the origin. On the grid, plot (0,0),(5,9),(10,18) and draw the line. Draw two slope triangles and use their ratios to explain the rise at run 10.



CHALLENGE One step up

Two gaming-club payment plans are linear. Plan A costs $7 for 1 visit and $17 for 3 visits. Plan B costs $8 for 1 visit and $24 for 3 visits. Find each plan's slope and y-intercept. At 5 visits, which plan costs less? Identify the proportional plan and explain why.

ANSWER KEY

Slope Storylines

GRADE 8 · TEKS 8.4

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A game maker plots level points at (1, 1) and (3, 8). Find the slope. Check it by naming the rise and run.	**m = 7/2; rise = 7 and run = 2.**
2	A volunteer earns service points at a constant rate, starts with 0, and has 15 points after 5 hours. Is points proportional to hours? Give the unit rate and y-intercept.	**Yes; unit rate = 3 points per hour, y-intercept = 0.**
3	Assume a music app has a fixed starting fee and constant monthly rate. It charges $9 for 1 month and $13 for 3 months. Find both.	**Rate of change = $2 per month; y-intercept = $7.**
4	A hiking trail gains 9 meters in 3 kilometers, then gains 15 meters in 5 kilometers. Do the two sections have the same slope? Use both ratios to check.	**Yes; 9/3 = 3 and 15/5 = 3, so both slopes are 3 meters per kilometer.**

PART 2 · APPLY IT

1. **$2 per bottle; starting cost $1.** Use two points on the line. The cost rises 2 dollars for each bottle, and the line crosses the y-axis at 1.
2. **Rise 18 units; 9/5=18/10. The two right triangles are similar; slope is 9/5.** Require plotted points, line and two visible right triangles; game coordinates are abstract, not an accessibility-ramp specification.

CHALLENGE

Plan A: m = 5 and y-intercept = 2. Plan B: m = 8 and y-intercept = 0. At 5 visits, Plan A costs $27 and Plan B costs $40, so Plan A costs less. Plan B is proportional because its y-intercept is 0.

Accept equivalent slope fractions when they are simplified correctly. For explanations, accept statements that compare rise/run ratios or state that a proportional graph passes through the origin.