

Slope Signal

Read lines, tables, and real situations.

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 _____

RISE OVER RUN

For any nonvertical line, slope is the change in y divided by the change in x : $m = (y_2 - y_1)/(x_2 - x_1)$. Similar right triangles along the same nonvertical line have the same rise/run, so the slope stays constant. A proportional relationship has a y -intercept of 0, and its unit rate is the slope.

WORKED EXAMPLE

Find the slope of the line through (17, 23) and (29, 41).

1. $m = (41 - 23)/(29 - 17)$

2. $m = 18/12$

3. $m = 3/2$

Answer: $m = 3/2$

PRACTICE 6 problems

- 1** Find the slope of the line through (1, 5) and (5, 25).

ANSWER _____

- 2** A table shows x -values 1, 5, 9 and y -values 10, 26, 42. Find the slope and y -intercept.

ANSWER _____

- 3** The proportional relationship is $y = 6x$. Give three points on its graph, including the origin. State the unit rate.

ANSWER _____

- 4** For $y = -4x + 15$, identify the slope and y -intercept.

ANSWER _____

- 5** A line has slope 5 and passes through (4, 31). Find its y -intercept.

ANSWER _____

- 6** Two right triangles along one line have rise/run values of $16/4$ and $24/6$. Do they show the same slope? State the slope.

ANSWER _____

APPLY IT Show your work

- 1** Kai earns 6 game tokens for each quest completed. Let x be the number of quests and y be the total number of tokens. Write an equation for the relationship, state the slope or unit rate, and decide whether the relationship is proportional.

WORK SPACE

ANSWER _____

- 2** An e-scooter rental has a \$6 unlock fee plus the same hourly charge. The table shows that 1 hour costs \$11, 5 hours cost \$31, and 9 hours cost \$51. Find the hourly rate and y-intercept, write an equation $C = mx + b$, and find the cost for 8 hours.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A line contains the points $(1, 7)$, $(6, 27)$, and $(x, 43)$. Find x . Explain by comparing the slopes between consecutive points.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Find the slope of the line through (1, 5) and (5, 25).	5
2	A table shows x-values 1, 5, 9 and y-values 10, 26, 42. Find the slope and y-intercept.	m = 4, b = 6
3	The proportional relationship is $y = 6x$. Give three points on its graph, including the origin. State the unit rate.	Sample answer: (0, 0), (4, 24), (8, 48); unit rate = 6
4	For $y = -4x + 15$, identify the slope and y-intercept.	m = -4, b = 15
5	A line has slope 5 and passes through (4, 31). Find its y-intercept.	11
6	Two right triangles along one line have rise/run values of $16/4$ and $24/6$. Do they show the same slope? State the slope.	Yes. Both slopes are 4.

PART 2 • APPLY IT

- $y = 6x$; slope and unit rate = 6 tokens per quest; proportional.** Each quest adds 6 tokens, so multiply the number of quests by 6. The equation has a y-intercept of 0, so it is proportional.
- Hourly rate = \$5 per hour; y-intercept = \$6; $C = 5x + 6$; cost for 8 hours = \$46.** The cost rises \$20 over 4 hours, so the hourly rate is \$5. The unlock fee is the y-intercept, then substitute 8 for x.

CHALLENGE

$x = 10$. The slope from (1, 7) to (6, 27) is $20/5 = 4$. To keep slope 4, $16/(x - 6) = 4$, so $x - 6 = 4$ and $x = 10$.

Accept equivalent slope fractions and equivalent equation forms. For the graph-point item, accept any three correct points on $y = 6x$ that include (0, 0).