

Relationship Detectives

Use rates and starting values to connect tables, points, and equations.

GRADE 8 • TEKS 8.1.F

8.1.F "analyze mathematical relationships to connect and communicate mathematical ideas; and"

NAME _____

DATE _____

SPOT THE PATTERN

A linear relationship changes by the same rate each time. Find the rate of change by dividing the change in y by the change in x . Then use $y=mx+b$, where m is the rate and b is the starting value.

WORKED EXAMPLE

For $y=4x+11$, find y when $x=6$.

1. Replace x with 6: $y=4(6)+11$.
2. Multiply: $y=24+11$.
3. Add: $y=35$.

Answer: $y=35$

PRACTICE 6 problems

- 1** For $y=3x+2$, find y when $x=5$.

ANSWER _____

- 2** A table has x -values 1, 3, 5 and y -values 2, 8, 14. Write the equation for the relationship.

ANSWER _____

- 3** Find the rate of change between the points (2, 7) and (5, 16).

ANSWER _____

- 4** For $y=-2x+9$, find y when $x=7$.

ANSWER _____

- 5** A table has x -values 1, 3, 5 and y -values 10, 16, 22. Is the relationship linear? State its rate of change.

ANSWER _____

- 6** In $y=5x-8$, what value of x makes $y=17$?

ANSWER _____

APPLY IT Show your work

- 1** Jordan has \$14 saved for a game and saves \$8 each week. The game costs \$54. Write an equation for total savings y after x weeks, then find how many weeks Jordan needs to save exactly \$54.

WORK SPACE

ANSWER _____

- 2** A school's media club has 16 video clips ready. It edits 9 more clips each day. Write an equation for the number of clips y after x days, then find the number of clips after 7 days.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Plan A for renting games costs \$12 to start and \$5 per month. Plan B costs \$2 to start and \$7 per month. After how many months will the plans cost the same? Explain using an equation.

WORK SPACE AND ANSWER

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	For $y=3x+2$, find y when $x=5$.	$y=17$
2	A table has x -values 1, 3, 5 and y -values 2, 8, 14. Write the equation for the relationship.	$y=3x-1$
3	Find the rate of change between the points (2, 7) and (5, 16).	3
4	For $y=-2x+9$, find y when $x=7$.	$y=-5$
5	A table has x -values 1, 3, 5 and y -values 10, 16, 22. Is the relationship linear? State its rate of change.	Yes; the rate of change is 3.
6	In $y=5x-8$, what value of x makes $y=17$?	$x=5$

PART 2 • APPLY IT

- $y=8x+14$; $x=5$ weeks** Use 14 as the starting value and 8 as the weekly rate. Solve $8x+14=54$ to get $x=5$.
- $y=9x+16$; 79 clips** The starting number is 16 and the daily rate is 9. Substitute $x=7$ into $y=9x+16$.

CHALLENGE

5 months. Set the costs equal: $5x+12=7x+2$, so $10=2x$ and $x=5$. Both plans cost \$37.

Accept equivalent equation forms, such as $y=-1+3x$ for $y=3x-1$. For the challenge, accept a correct equation and explanation that shows both plans have the same cost after 5 months.