

Function Matchup

Use graphs and rules to evaluate, compare, and model.

GRADE 8 • 8.FGR.5

8.FGR.5 "Describe the properties of functions to define, evaluate, and compare relationships, and use functions and graphs of functions to model and explain real phenomena."

NAME _____

DATE _____

CONNECT THE REPRESENTATIONS

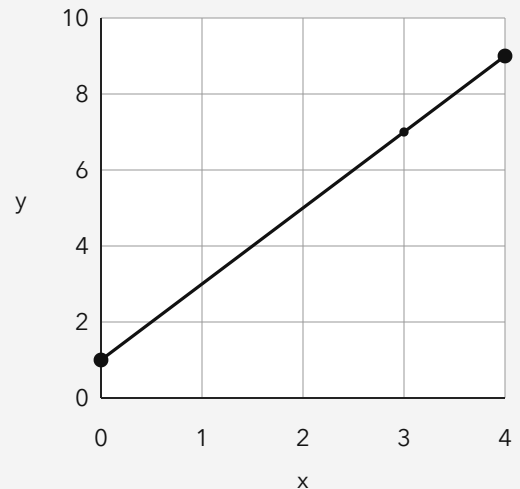
A function assigns exactly one output to each input in its domain. A vertical line cannot meet its graph at two different outputs. A linear function has a constant rate of change; its graph is straight. Compare functions at the same input.

WORKED EXAMPLE

The function f is graphed for $0 \leq x \leq 4$. Read $f(3)$, then check using $f(x) = 2x + 1$.

1. At $x = 3$, read $y = 7$.
2. Substitute: $f(3) = 2(3) + 1 = 7$.

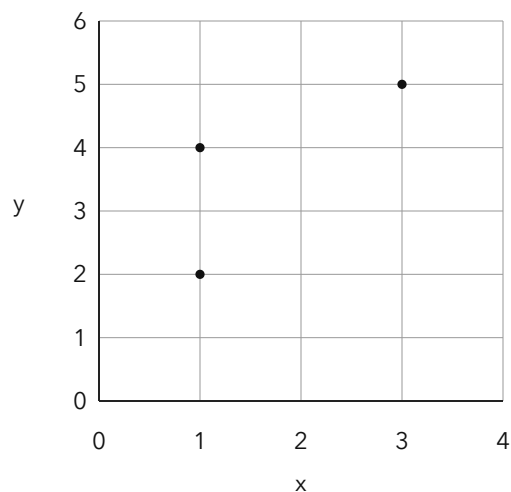
Answer: $f(3) = 7$.



PRACTICE 4 problems

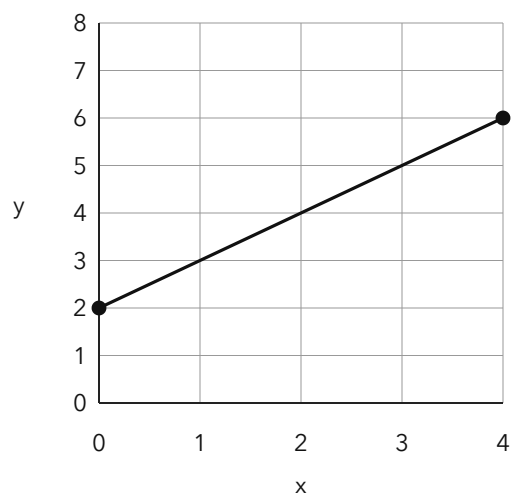
- 1** The relation consists of the three plotted points only. Is it a function? Explain using an input and its outputs.

ANSWER _____



- 2** The function g is graphed. Read $g(2)$. Find the input for output 6, and write its linear rule.

ANSWER _____

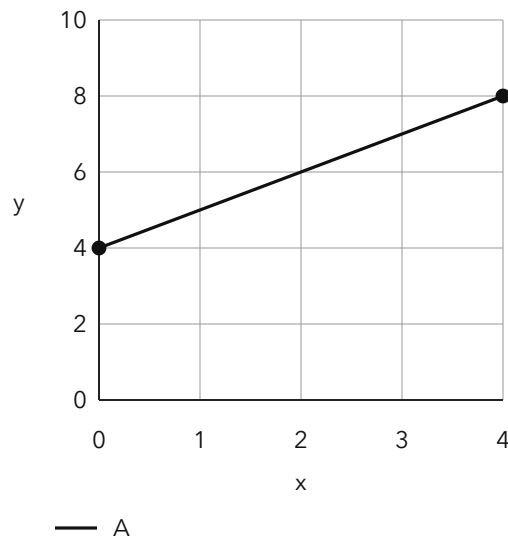


- 3** A linear function has inputs 0, 2, 4 with outputs 3, 7, 11. Write its rule and evaluate it at $x = 5$.

ANSWER _____

- 4** A is the graphed function. B follows $y = 3x + 2$. Which output is greater at $x = 4$, and by how much?

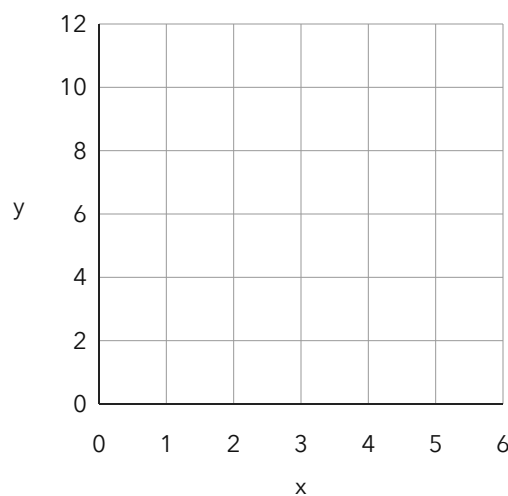
ANSWER _____



APPLY IT Show your work

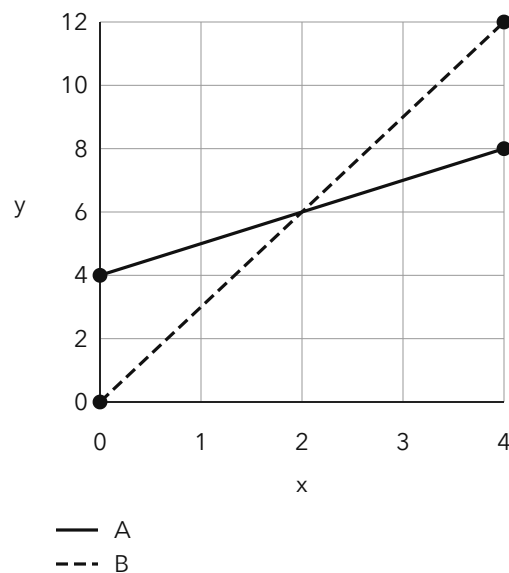
- 1** A tank contains 12 liters and drains at 2 liters per minute until empty. Here x is minutes and y is liters. Write a rule, graph it over the meaningful time interval, and find the amount after 4 minutes.

REASONING AND ANSWER

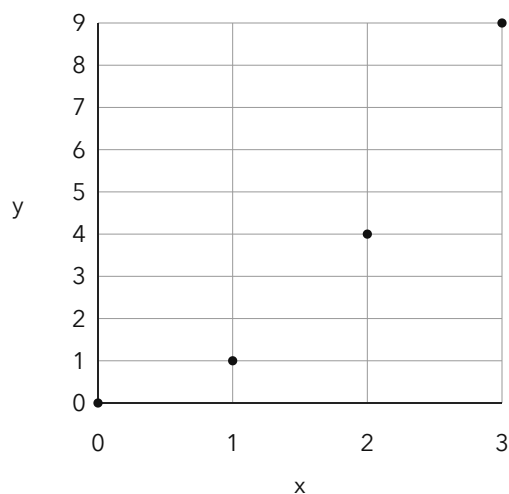


2

The graph models two tanks filling for 4 minutes. x is minutes; y is liters. A is solid and B dashed. Write each linear rule and explain where the graphs meet.

REASONING AND ANSWER**CHALLENGE** One step up

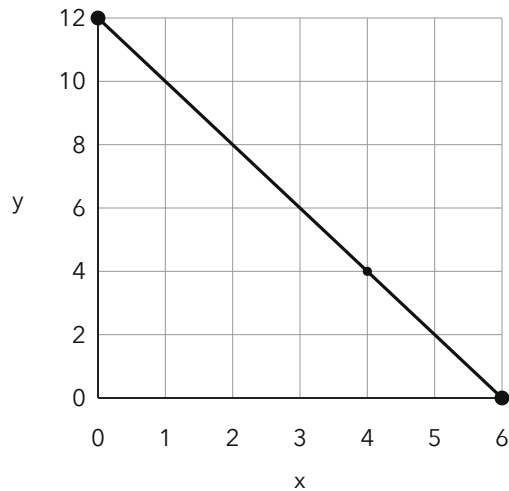
A graph consists only of the shown points. Is it a function? Is it consistent with a linear rule? Explain both conclusions.

WORK SPACE AND ANSWER

APPLY IT 1

$y = 12 - 2x$ for $0 \leq x \leq 6$. Segment from (0, 12) to (6, 0); after 4 minutes, 4 liters remain.

Start at 12 and subtract 2 per minute. Solve $12 - 2x = 0$ for the empty time, 6 minutes.

**PRACTICE 1**

No. Input $x = 1$ has outputs 2 and 4.

PRACTICE 2

$g(2) = 4$; output 6 occurs at $x = 4$; $g(x) = x + 2$.

PRACTICE 3

$f(x) = 2x + 3$; $f(5) = 13$.

PRACTICE 4

$A(4) = 8$; $B(4) = 14$. B is greater by 6.

APPLY IT 2

A: $y = x + 4$. B: $y = 3x$. They meet at (2, 6): after 2 minutes each tank holds 6 liters. A starts at 4 and gains 1 per minute; B starts at 0 and gains 3. Solve $x + 4 = 3x$.

CHALLENGE

Yes: each input has one output. No linear rule fits: as x increases by 1, y increases by 1, then 3, then 5.

A set of discrete points can be a function without being linear. The linear-table item explicitly assumes linearity. In task 5, accept a closed segment including the empty-tank endpoint.