

Model and Graph

Write equations that connect two quantities, then graph them.

HIGH SCHOOL • HSA-CED.A.2

CCSS.Math.Content.HSA-CED.A.2 "Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales."

NAME _____

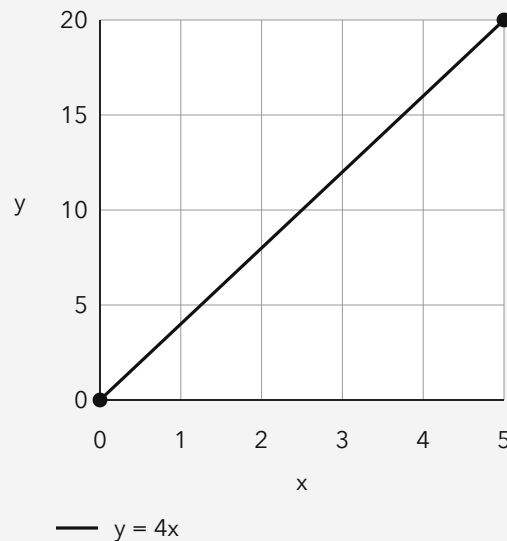
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LINK INPUTS AND OUTPUTS

Define x and y with units. Create an equation from the relationship. Graph only the contextual domain: use separate points for counts and continuous graphs for measurements.

WORKED EXAMPLE

Ribbon costs \$4 per meter; any length from 0 to 5 meters is sold. Let x be meters and y dollars. Model and graph the cost.



1. Multiply length by 4: $y = 4x$.
2. Domain: real x in $[0,5]$. Partial meters are allowed.
3. Graph the segment $(0,0)$ to $(5,20)$; x is meters and y is dollars.

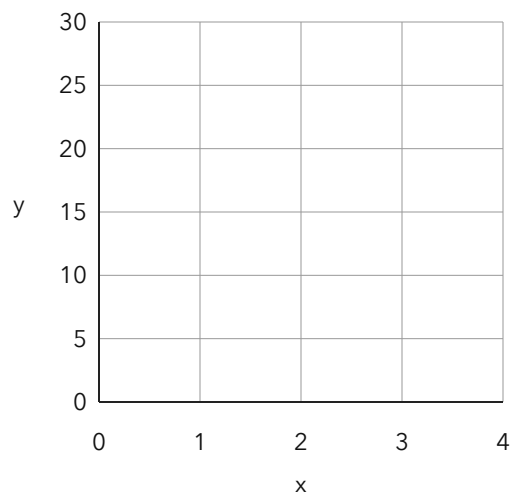
Answer: $y = 4x$ on $[0,5]$, a continuous segment.

PRACTICE 4 problems

Write each equation and domain, then graph on the provided axes. Add the units. Horizontal ticks count by 1; vertical ticks count by 5.

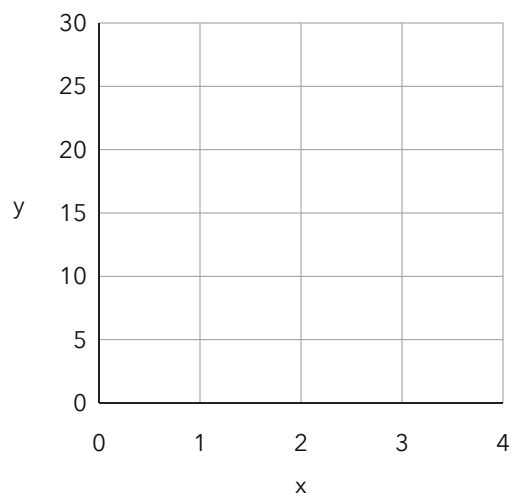
- 1** Bike rental: \$6 plus \$5 per hour, including partial hours, from 0 to 4 hours. Let x be hours and y dollars. Create the equation and graph for this context.

ANSWER _____



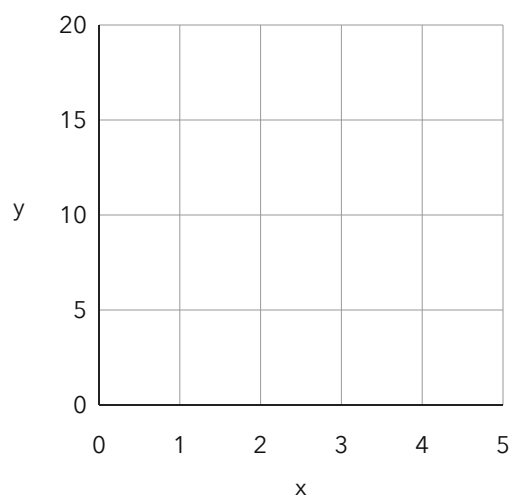
- 2** Four-match tournament: 7 points per win plus 1 participation point. Let x be wins and y total points. Create the equation and graph for this context.

ANSWER _____



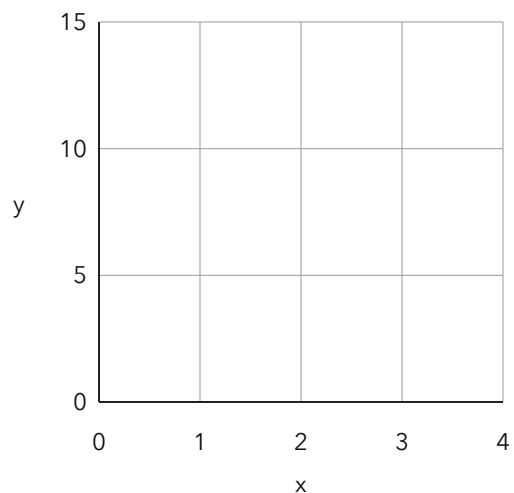
- 3** Tank: initially 9 liters, filling at 2 liters per minute during the first 5 minutes. Let x be minutes and y liters. Create the equation and graph for this context.

ANSWER _____



- 4** A \$15 card buys lunches at \$5 each. Let x be lunches bought and y dollars left. Create the equation and graph for this context.

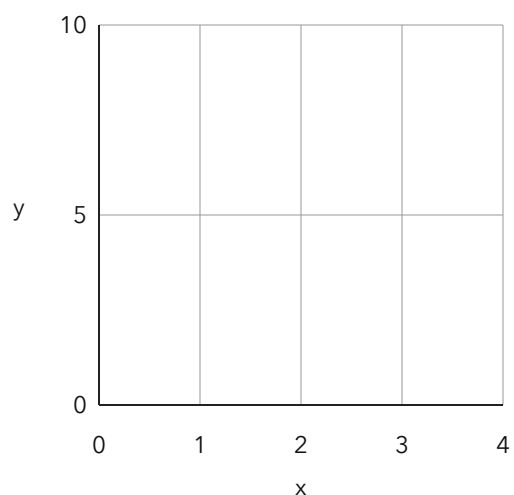
ANSWER _____



APPLY IT Show your work

- 1** A club has \$1 and earns \$2 per button. Let x be buttons and y dollars. Create the equation and graph it for 0 through 4 buttons; label units.

REASONING AND ANSWER



- 2** A \$5 wristband plus games at \$3 each gives $y = 3x + 5$, where x is games and y is dollars. A student connects (0,5) to (4,17). What extra values does the segment include that are not possible purchases? State the correct domain for up to 4 games.

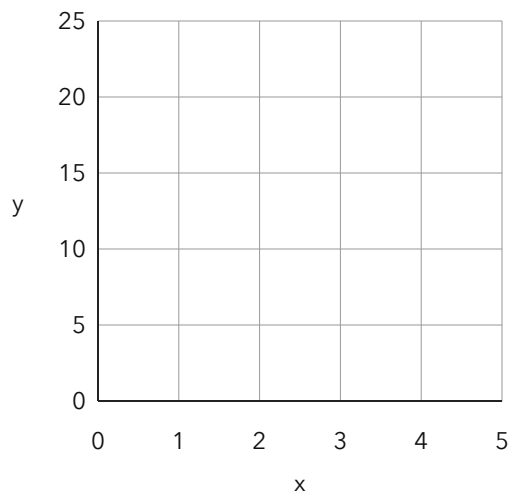
WORK SPACE

REASONING AND ANSWER

CHALLENGE One step up

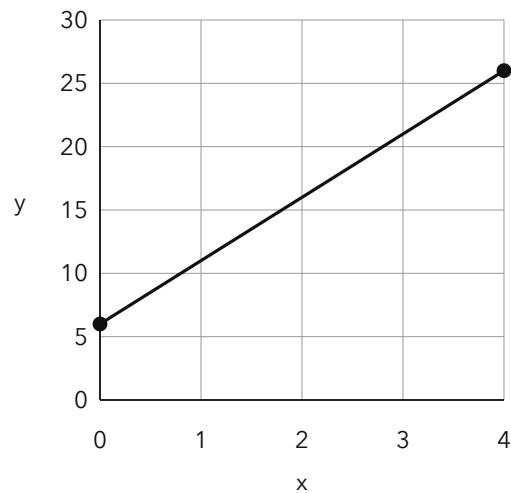
A square has side x centimeters and area y square centimeters. Create the equation and graph on $[0,5]$. Label units. Treat $x = 0$ as a zero-size limiting case. Why exclude $x < 0$?

WORK SPACE AND ANSWER

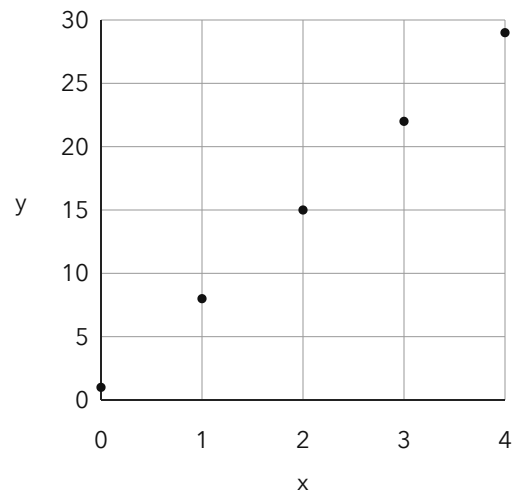


PRACTICE 1

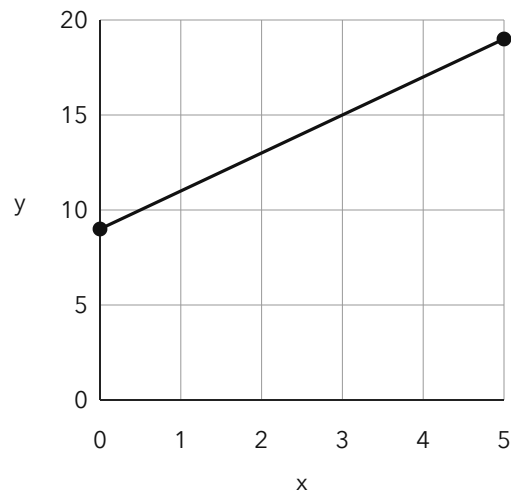
$y = 5x + 6$; real x in $[0,4]$. Axes: hours, dollars.

**PRACTICE 2**

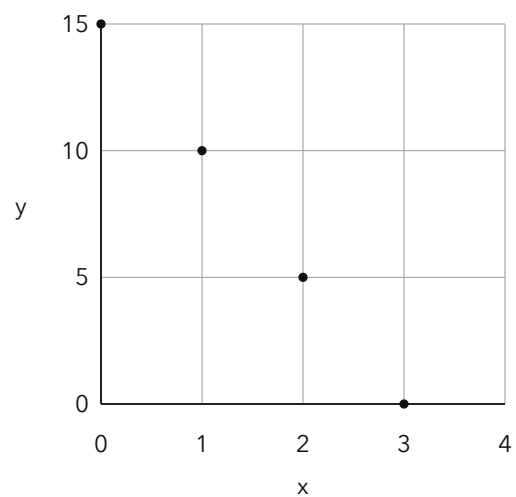
$y = 7x + 1$; x in $\{0,1,2,3,4\}$. Axes: wins, points.

**PRACTICE 3**

$y = 2x + 9$; real x in $[0,5]$. Axes: minutes, liters.

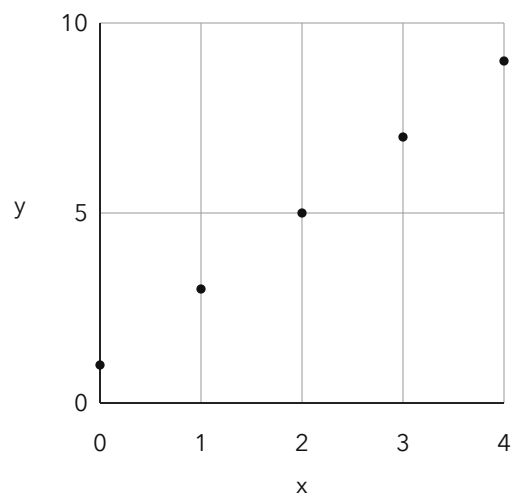
**PRACTICE 4**

$y = 15 - 5x$; x in $\{0,1,2,3\}$. Axes: lunches, dollars.



APPLY IT 1

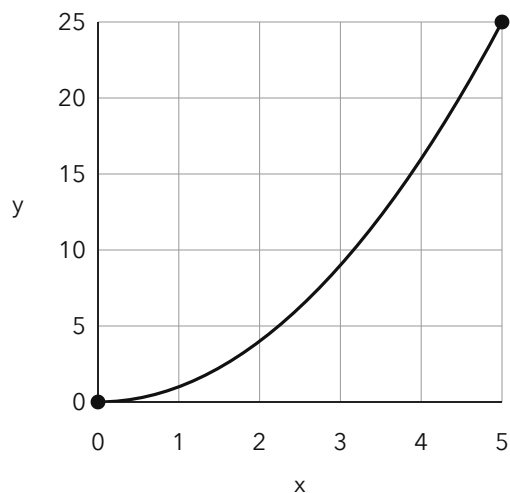
$y = 2x + 1$; x in $\{0,1,2,3,4\}$. Axes: buttons, dollars. Separate points: \$1 initially and \$2 per button.



CHALLENGE

$y = x^2$ on $[0,5]$. Axes: cm, square cm. Negative lengths are impossible; 0 is the stated limiting case.

Accept equivalent equations. Check units and domains: separate points for counts, continuous segments or curves for measurements.



APPLY IT 2

The segment includes fractional game counts such as $x = 0.5$. The domain is $\{0,1,2,3,4\}$; use separate points for those counts. A linear equation can have a discrete contextual domain; the context determines which points to include.