

Plot the Proof

Every point on a graph must make the equation true.

GRADE 8 • 8.PAR.4.2

8.PAR.4.2 "Show and explain that the graph of an equation representing an applicable situation in two variables is the set of all its solutions plotted in the coordinate plane."

NAME _____

DATE _____

THE BIG IDEA

A solution to an equation in x and y is an ordered pair that makes the equation true. Plot every solution pair you find. The graph is the full set of points that make the equation true, not just one point.

WORKED EXAMPLE

Find two solution points for $y = 19x + 23$.

1. Choose $x = 7$.
2. Substitute: $y = 19(7) + 23 = 156$.
3. Choose $x = -6$.
4. Substitute: $y = 19(-6) + 23 = -91$.

Answer: The solution points are (7, 156) and (-6, -91).

PRACTICE 6 problems

- 1** For $y = x + 5$, find y when $x = -4, 0$, and 3 . Write the solution points.

ANSWER _____

- 2** Which candidate points are solutions to $y = 3x - 11$: $(-1, -14)$, $(5, 4)$, and $(6, 8)$?

ANSWER _____

- 3** For $y = -4x + 13$, find the points on the graph when $x = -5, 0$, and 6 .

ANSWER _____

- 4** Which candidate points should be plotted for $x + y = 10$: $(8, 2)$, $(-1, 11)$, and $(5, 4)$?

ANSWER _____

- 5** For $y = 9x + 8$, list the points you would plot when $x = -4, 0$, and 5 .

ANSWER _____

- 6** Would $(9, 20)$ be plotted on the graph of $y = 4x - 16$? Show a substitution.

ANSWER _____

APPLY IT Show your work

- 1** A music app playlist starts with 15 saved songs. You add 4 songs each week. Let x be weeks and y be saved songs. Write the equation, then list the points for $x = 0, 3$, and 5 . Explain why these points belong on the graph.

WORK SPACE

ANSWER _____

- 2** A gaming club orders custom controller grips. The order has an \$18 design fee plus \$5 for each grip. Let x be the number of grips and y be the total cost. Write the equation, list the solution points for $x = 0, 2$, and 4 , and decide whether $(3, 33)$ belongs on the graph.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Kai plots only $(15, 0)$ and $(0, 5)$ as dots for $x + 3y = 15$. He says the graph is complete. Explain what is missing, and name one more solution point.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	For $y = x + 5$, find y when $x = -4, 0$, and 3 . Write the solution points.	$(-4, 1), (0, 5), (3, 8)$
2	Which candidate points are solutions to $y = 3x - 11$: $(-1, -14)$, $(5, 4)$, and $(6, 8)$?	$(-1, -14)$ and $(5, 4)$
3	For $y = -4x + 13$, find the points on the graph when $x = -5, 0$, and 6 .	$(-5, 33), (0, 13), (6, -11)$
4	Which candidate points should be plotted for $x + y = 10$: $(8, 2)$, $(-1, 11)$, and $(5, 4)$?	$(8, 2)$ and $(-1, 11)$
5	For $y = 9x + 8$, list the points you would plot when $x = -4, 0$, and 5 .	$(-4, -28), (0, 8), (5, 53)$
6	Would $(9, 20)$ be plotted on the graph of $y = 4x - 16$? Show a substitution.	Yes. $4(9) - 16 = 20$, so $(9, 20)$ is a solution.

PART 2 • APPLY IT

- $y = 4x + 15$; $(0, 15), (3, 27), (5, 35)$. Each point makes $y = 4x + 15$ true, so it belongs on the graph.** Use 15 as the starting amount and add 4 for each week. Substitute each given x -value to find y .
- $y = 5x + 18$; $(0, 18), (2, 28), (4, 38)$. Yes, $(3, 33)$ belongs on the graph because $5(3) + 18 = 33$.** The fixed fee is 18 and each grip adds 5. Check the candidate point by substituting $x = 3$ into the equation.

CHALLENGE

The graph must include every point that makes $x + 3y = 15$ true, not only two dots. For example, $(3, 4)$ is also a solution because $3 + 3(4) = 15$.

Accept correctly ordered coordinate pairs and equivalent equation forms. For graphing items, accept the listed points or a correctly plotted set of those points.