

PART I GET STARTED**Today's Mathematics**

We will organize solution points in a table and graph a linear equation.

Essential Question

How does a graph represent the solutions of a linear equation?

DO NOW

1. Evaluate $3x - 4$ when $x = -2$.

2. Is $(3, -1)$ a solution of $y = 2x - 7$? Show how you know.

3. On graph paper, plot $A(-4, 2)$, $B(0, -3)$, and $C(3, 1)$.

SEE IT

For $y = 2x + 1$, choose an x -value and calculate y . Write an ordered pair. Explain what it means.

QUICK WRITE | 2 MINUTES

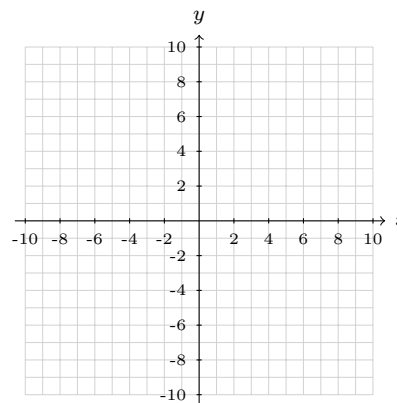
Predict what will happen when many solution points of the same linear equation are plotted.

PART II INVESTIGATE

A. BUILD A SET OF SOLUTIONS

For $y = -x + 2$, complete the table. Write each row as an ordered pair, then plot all five points.

x	$y = -x + 2$	(x, y)
-2		
-1		
0		
1		
2		



1. Draw a straight line through the plotted points.
2. Choose a new x -value. Find its solution point and verify that it lies on the line.
3. Choose a point on the line that is not in your table. Substitute it into the equation.

MAKE A CLAIM

What appears to be true about points on the line and solutions of the equation?

PART II INVESTIGATE**B. COMPARE THREE GRAPHS**

On graph paper, graph each equation. Use a table when helpful. Label at least two points on each line.

1. $y = 2x - 3$

2. $y = -2$

3. $x = 3$

4. Which graph rises or falls as x changes?
5. Which graph is horizontal? Explain why y never changes.
6. Which graph is vertical? Explain why x never changes.
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TEST A NONSOLUTION

For $y = 2x - 3$, test $(2, 2)$. Does it satisfy the equation? Should it appear on the graph? Justify.

PARTNER REASONING

Why are two distinct solution points enough to determine a line, even though a linear equation has infinitely many solutions?

PART III MAKE SENSE AND PRACTICE

WHAT WE CAN CONCLUDE

A linear equation in two variables has a line as its graph. Every point on the line is a solution. Choose x -values, calculate y , plot the pairs, and draw the line. A graph of $y = b$ is horizontal; a graph of $x = a$ is vertical.

WORKED MODEL

For $y = -2x + 1$, choose $x = -1, 0, 2$. This gives $(-1, 3)$, $(0, 1)$, and $(2, -3)$. Substitute to check, then plot and connect the points.

FOCUSED PRACTICE

1. On graph paper, complete a table and graph $y = x - 4$.
2. Graph $y = 3$ and $x = -2$ on the same coordinate plane.
3. Decide whether $(-3, 5)$ is a solution of $2x + y = -1$. Explain.

MATH WRITE | 5 MINUTES

Explain how a graph represents all solutions. Include the role of a table and what a point not on the line represents.

PART IV PUZZLE PRACTICE

Homework

Name _____ Date _____

WHAT ARCTIC BIRD CAN BE FOUND IN A BAKERY?

Write the letter of each correct answer above its exercise number in the decoder.

Find the y-values for the given x-values.

1. $y = 4x + 3$ for $x = -1, 0, 1$
2. $y = -(3/2)x + 5$ for $x = 0, 2, 4$
3. $y = -9$ for $x = 0, 1, 2$
4. $y = -7x + 8$ for $x = -1, 0, 1$
5. $y = (5/3)x - 6$ for $x = -3, 0, 3$
6. $y = 1.4x - 9$ for $x = 0, 1, 2$

Solve for y first. Then find the requested y-values.

7. $y + 8x = -2$ for $x = 0, 1, 2$
8. $12x + 3y = 15$ for $x = -1, 0, 1$
9. $\frac{1}{4}y - 3x = 9$ for $x = -2, 0, 2$
10. $0.4y + 2x = 1.2$ for $x = -3, 0, 3$
11. $22 = 2y + x$. Find y when $x = 2, 3, 4$.
12. $0.60 = 0.05x + 0.10y$. Find y when $x = 0, 2, 4$.

ANSWER BANK

- | | | |
|--------------|---------------|------------------|
| A -1, 3, 7 | C 9, 5, 1 | E -9, -7.6, -6.2 |
| F 12, 36, 60 | F 6, 5, 4 | I -2, -10, -18 |
| M 10, 9.5, 9 | N 5, 2, -1 | P 18, 3, -12 |
| R -9, -9, -9 | U -11, -6, -1 | A 15, 8, 1 |

CRACK THE CODE

1 8 3 6 4 11 10 5 9 12 7 2