Unit 5, Lesson 10

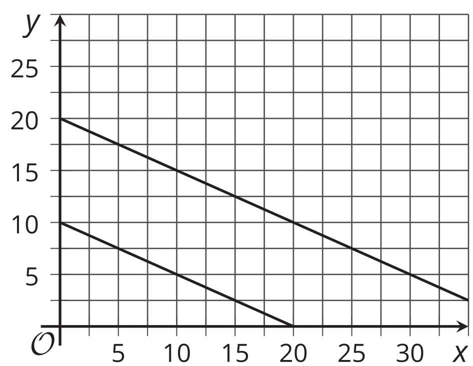
Equations of All Kinds of Lines

Let's write equations for vertical and horizontal lines.

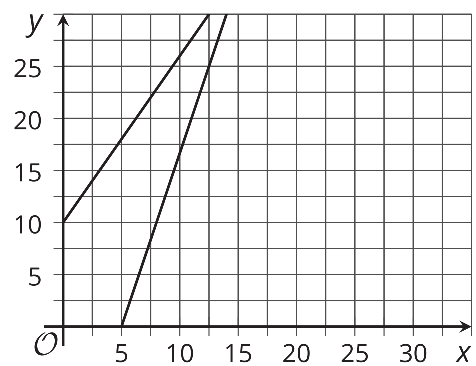
10.1 Which Three Go Together: Pairs of Lines

Which three go together? Why do they go together?

A



B



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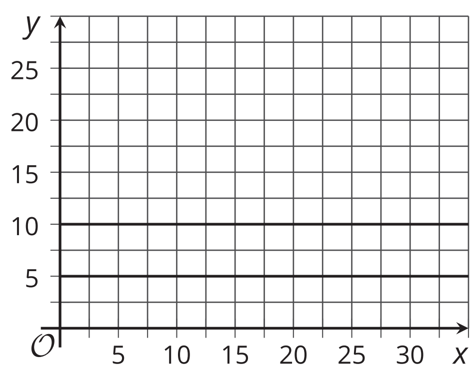
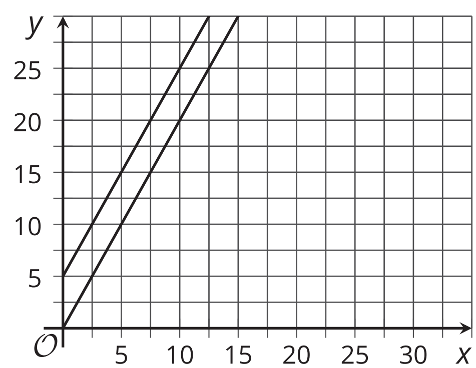
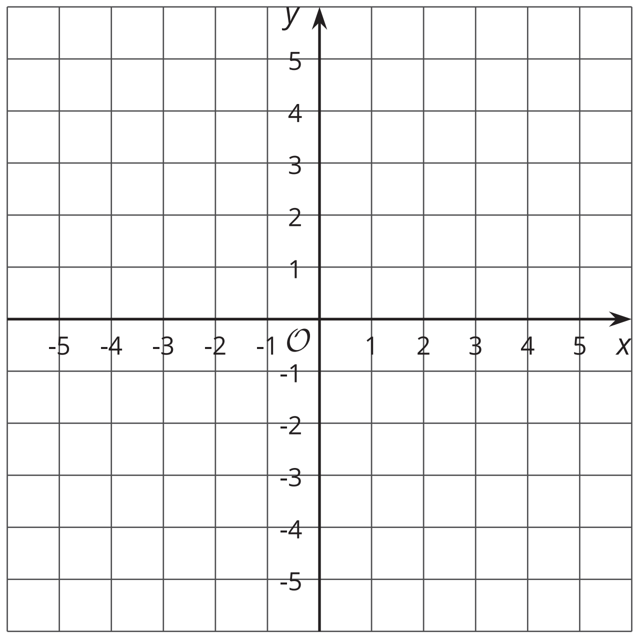


D



10.2 All the Same



1. Plot at least 10 points whose y-coordinate is -4. What do you notice about them?

2. Which equation makes the most sense to represent all of the points with y-coordinate -4? Explain how you know.
   $x = -4$ $y = -4x$ $y = -4$ $x + y = -4$

3. Plot at least 10 points whose x-coordinate is 3. What do you notice about them?

4. Which equation makes the most sense to represent all of the points with x-coordinate 3? Explain how you know.
   $x = 3$ $y = 3x$ $y = 3$ $x + y = 3$

5. Graph the equation $x = -2$.
6. Graph the equation $y = 5$.

Are you ready for more?

1. Draw the rectangle with vertices $(2, 1)$, $(5, 1)$, $(5, 3)$, and $(2, 3)$.

2. For each of the four sides of the rectangle, write an equation for a line containing the side.

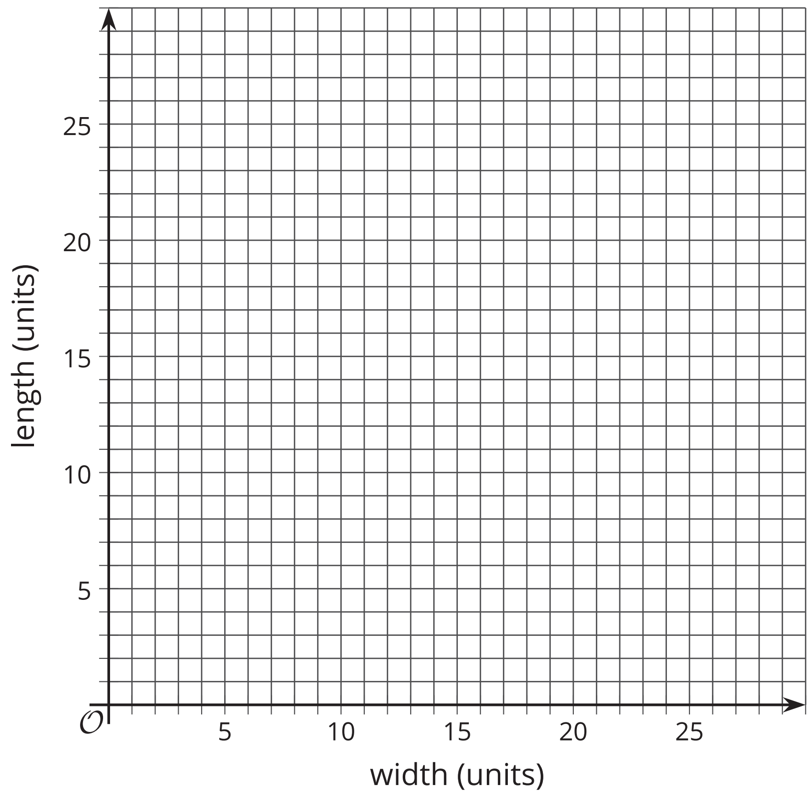
3. A rectangle has sides on the graphs of $x = -1$, $x = 3$, $y = -1$, $y = 1$. Find the coordinates of each vertex.

10.3 Same Perimeter

1. There are many possible rectangles whose perimeter is 50 units. Complete the table with lengths, ℓ, and widths, w, of at least 10 such rectangles.

w										
ℓ										

2. On the graph, plot the length and width of rectangles whose perimeter is 50 units using the values from your table. Using a straightedge, draw the line that passes through these points.



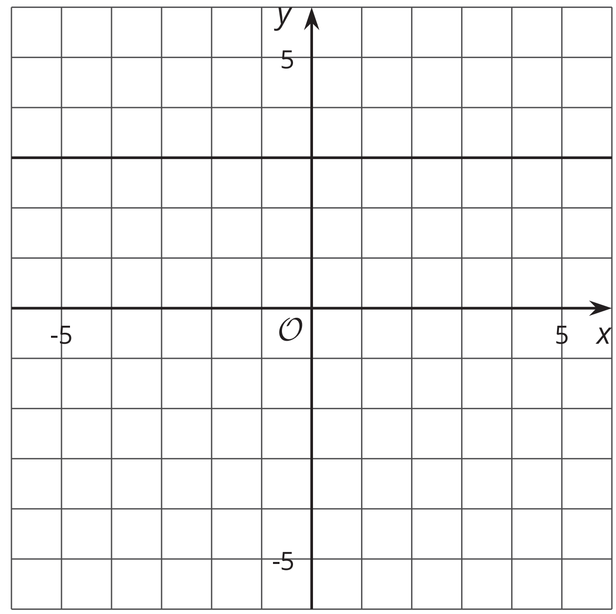
3. What is the slope of this line? What does the slope mean in this situation?

4. Write an equation for this line.

Lesson 10 Summary

Horizontal lines in the coordinate plane represent situations where the y-value doesn't change at all while the x-value changes.

The horizontal line that goes through the point $(0, 3)$ can be described by saying that "for all points on the line, the y-value is always 3." Since horizontal lines are neither increasing or decreasing, they have a slope of 0, and so an equation for this horizontal line is $y = 0x + 3$, or just $y = 3$.



Vertical lines in the coordinate plane represent situations where the x-value doesn't change at all while the y-value changes.

The vertical line that goes through the point $(-2, 0)$ can be described by saying that "for all points on the line, the x-value is always -2." An equation that says the same thing is $x = -2$.