

LESSON

5-8

Challenge

Constructing Polygons Using Parallel and Perpendicular Lines

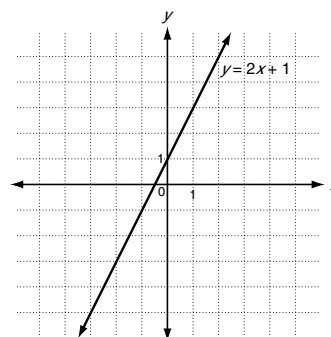
Two facts about parallel and perpendicular lines are summarized below.

If two nonvertical lines are parallel, then their slopes are equal.

If two nonvertical lines are perpendicular, then their slopes are negative reciprocals of one another.

You can use these facts if you want to construct special polygons on the coordinate plane.

In Exercises 1–4, use the grid and the graph of $y = 2x + 1$.



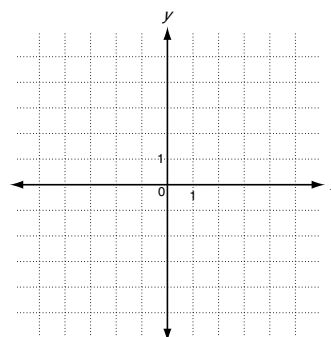
1. a. Write an equation in slope-intercept form for the line parallel to the graph of $y = 2x + 1$ and having a y -intercept of 4. _____
- b. Graph your equation on the grid at right above.
2. a. Find the y -coordinate of the point on the graph of $y = 2x + 1$ for which $x = -2$. _____
- b. Find an equation for the line containing the point found in Part a and perpendicular to the graph of $y = 2x + 1$

- c. Graph your equation from Part b on the grid at right above.

3. a. Find the y -coordinate of the point on the graph of $y = 2x + 1$ for which $x = 1$. _____
- b. Find an equation for the line containing the point found in Part a and perpendicular to the graph of $y = 2x + 1$.

- c. Graph your equation from Part b on the grid at right above.

4. Identify the polygon that you formed. Explain your response.



In Exercises 5 and 6, use the grid at right.

5. Suppose that you want to make a square using the graph of $x + y = 4$ to help determine one side of the square.

Write equations in standard form to determine a square with corners at $(4, 0)$, $(0, 4)$, $(-4, 0)$ and $(0, -4)$. _____

6. On the grid at right, graph each of the equations that you wrote in Exercise 5.