## 4.2 Graph Linear Equations

**Goal** • Graph linear equations in a coordinate plane.

*Your Notes*

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**VOCABULARY**

Solution of an equation in two variables

_____

Graph of an equation in two variables

_____

Linear equation

_____

Standard form of a linear equation

_____

Linear function

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**Example 1**  *Graph an equation*

**Graph the equation** $x + y = 4$**.**

**Solution**

**Step 1 Solve** the equation for $y$.
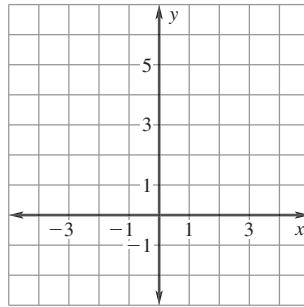
$x + y = 4$

$\quad y = $ _____

**Step 2 Make** a table.

Choose a few values for $x$ and find the values for $y$.

> Use convenient values for $x$ when making a table. These should include a combination of negative values, zero, and positive values.

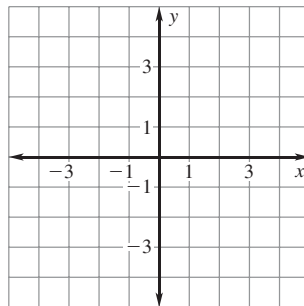| $x$ | $-2$ | $-1$ | 0 | 1 | 2 |
|-----|------|------|---|---|---|
| $y$ |      |      |   |   |   |

**Step 3 Plot** the points.



**Step 4 Connect** the points by drawing a line through them. Use arrows to indicate that the graph goes on without end.
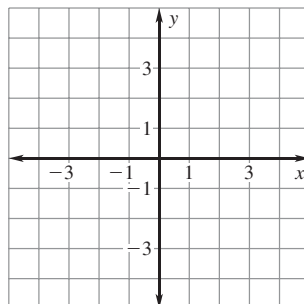
**Example 2** *Graph y = b and x = a*

**Graph (a) $y = -3$ and (b) $x = 2$.**

**Solution**

The equations $y = -3$ and $0x + 1y = -3$ are equivalent. For any value of $x$, the ordered pair $(x, -3)$ is a solution of $y = -3$.

**a.** Regardless of the value of $x$, the value of $y$ is always _____ . The graph of $y = -3$ is a _____ line 3 units _____ the $x$-axis.



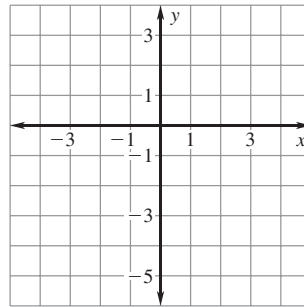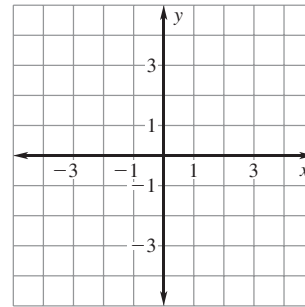**b.** Regardless of the value of $y$, the value of $x$ is always _____ . The graph of $x = 2$ is a _____ line 2 units to the _____ of the $y$-axis.

✔ *Checkpoint* **Graph the equation.**
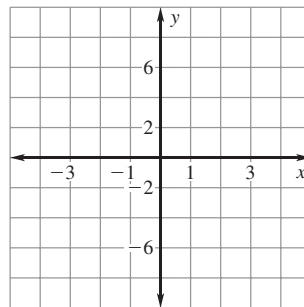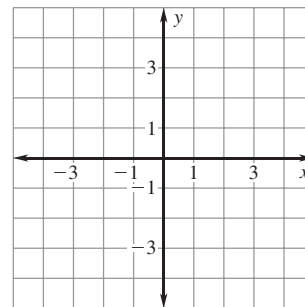
**1.** $y = 2x - 1$

**2.** $x = 0.5$

**3.** $y = -4x + 1$

**4.** $y = -1.5$

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**EQUATIONS OF HORIZONTAL AND VERTICAL LINES**

1. The graph of $y = b$ is a _____ line.

2. The line of graph $y = b$ passes through the point _____.

3. The graph of $x = a$ is a _____ line.

4. The line of graph $x = a$ passes through the point _____.
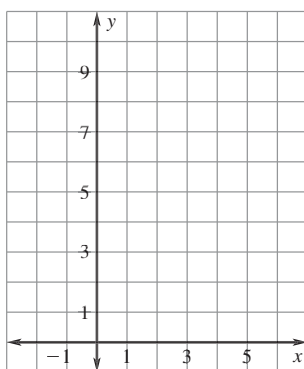
**Example 3**     *Graph a linear function*

**Graph the function $y = 2x + 2$ with domain $x \geq 0$. Then identify the range of the function.**

**Solution**

**Step 1 Make** a _____.

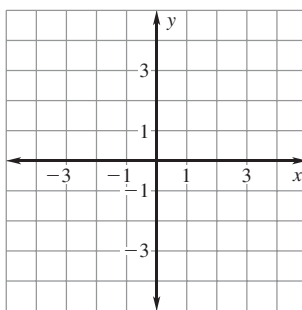| x | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| y |   |   |   |   |   |

**Step 2 Plot** the _____.



**Step 3 Connect** the points with a _____ because the domain is _____.

**Step 4 Identify** the range. From the graph, you can see that all points have a *y*-coordinate of _____, so the range of the function is _____.

✔ *Checkpoint* **Complete the following exercise.**

**5.** Graph the function $y = -x + 4$ with domain $x \geq 0$. Then identify the range of the function.



*Homework*