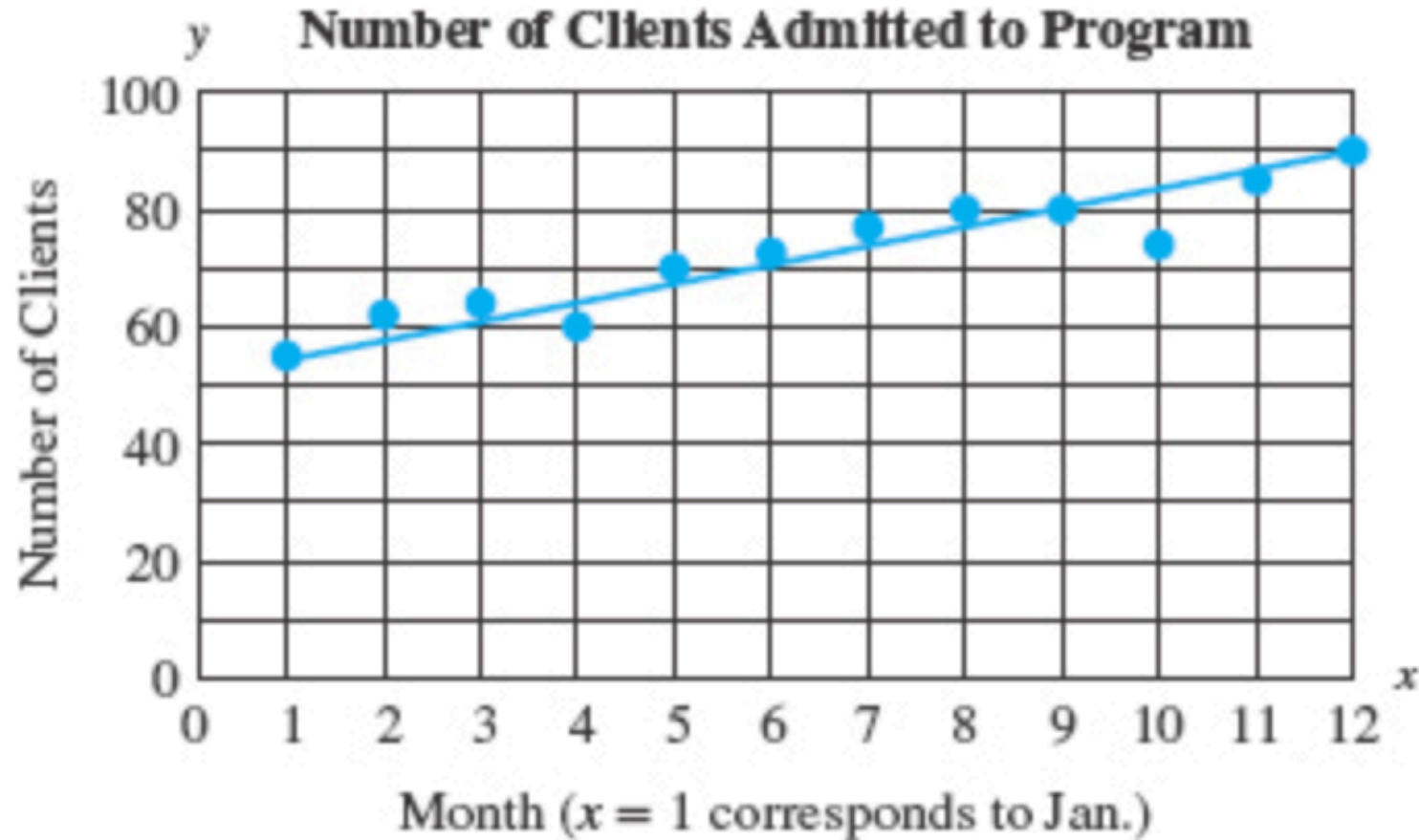


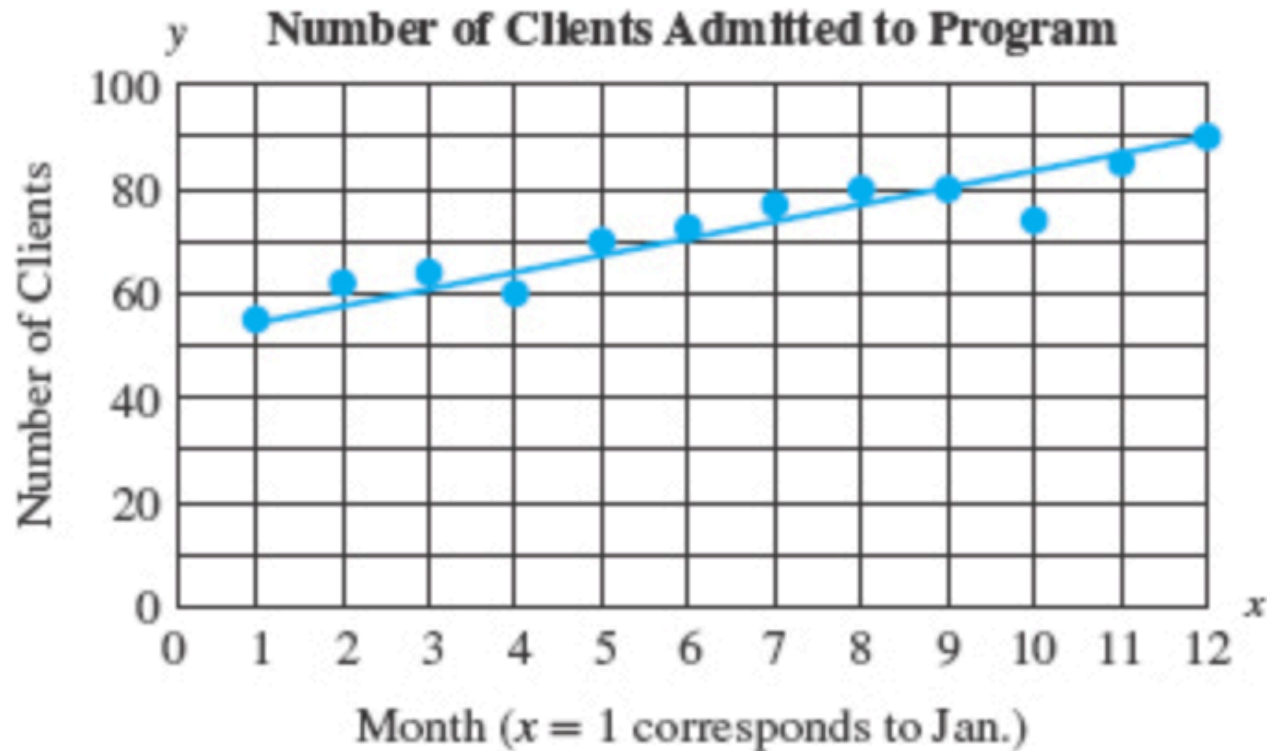
Day 16

# Linear Equations and Graphing

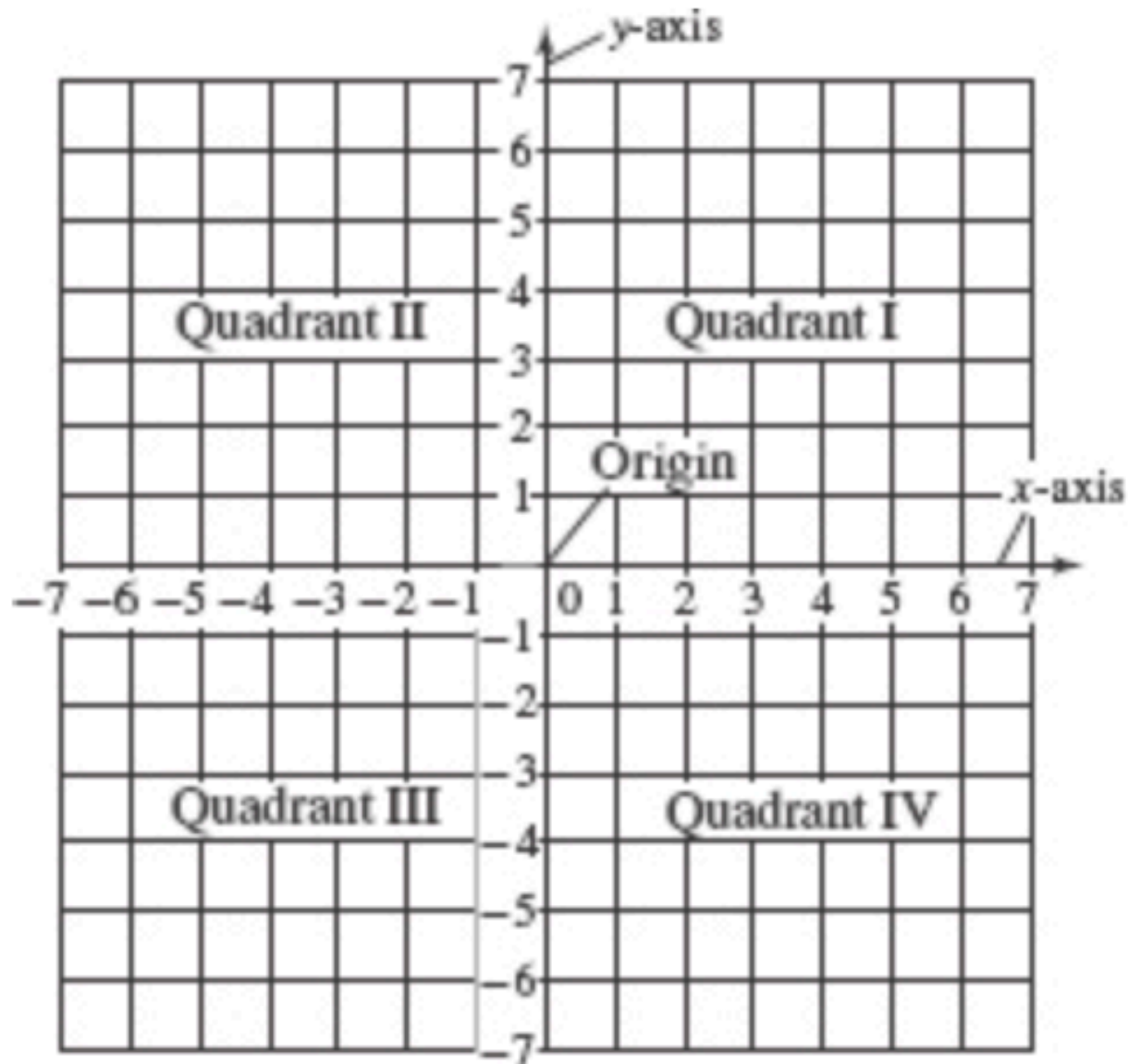


# How to read/interpret a graph...

	Month	Number of Clients
Jan.	1	55
Feb.	2	62
March	3	64
April	4	60
May	5	70
June	6	73
July	7	77
Aug.	8	80
Sept.	9	80
Oct.	10	74
Nov.	11	85
Dec.	12	90



# The Anatomy of a Graph



# Plotting Points on a Graph

- The order pair
  - Written  $(a,b)$
  - Represents the location on a graph where a point exist
  - The first value represents the point's location along the x-axis
  - The second value represents the point's location along the y-axis

Plot the following points:

$$(4, 5)$$

$$\left(\frac{1}{2}, -\frac{7}{3}\right)$$

$$(-4, -5)$$

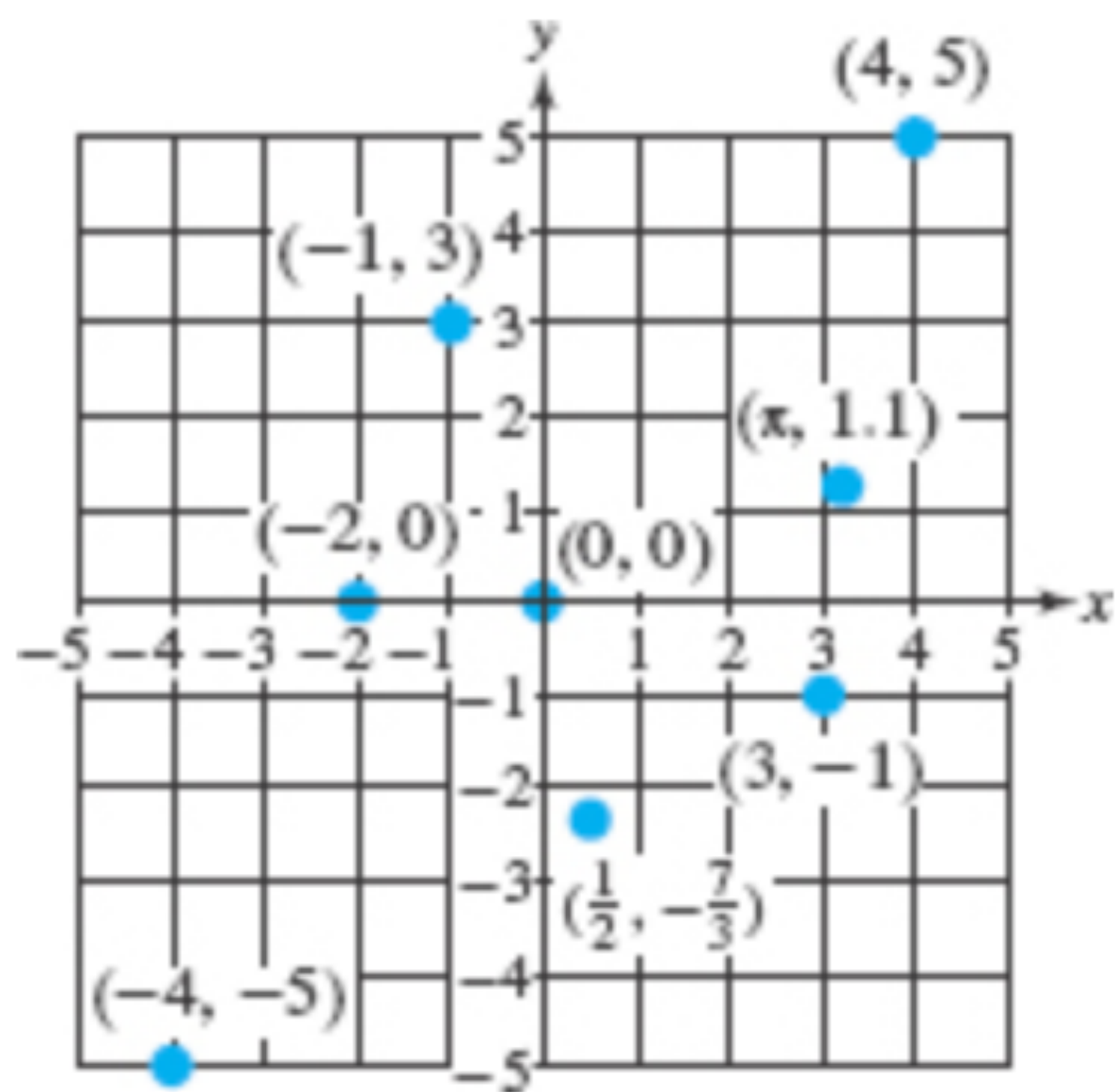
$$(-2, 0)$$

$$(-1, 3)$$

$$(0, 0)$$

$$(3, -1)$$

$$(\pi, 1.1)$$



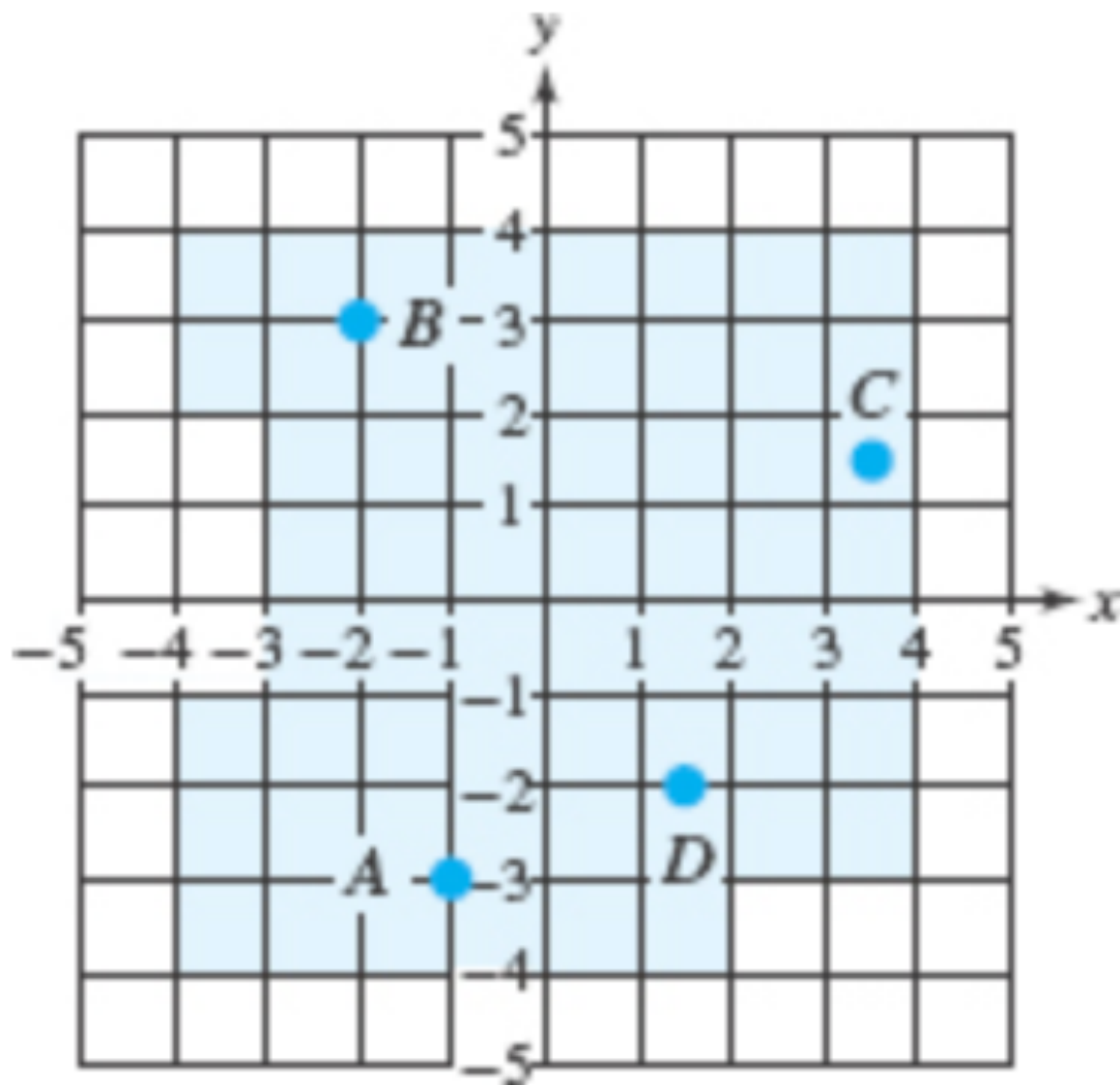
# ProTip

## Avoiding Mistakes

Points that lie on either of the axes do not lie in any quadrant.



Write these points as an order pair



## Solution:

Point  $A$ :  $(-1, -3)$

Point  $B$ :  $(-2, 3)$

Point  $C$ :  $(3\frac{1}{2}, 1\frac{1}{2})$  or  $(\frac{7}{2}, \frac{3}{2})$  or  $(3.5, 1.5)$

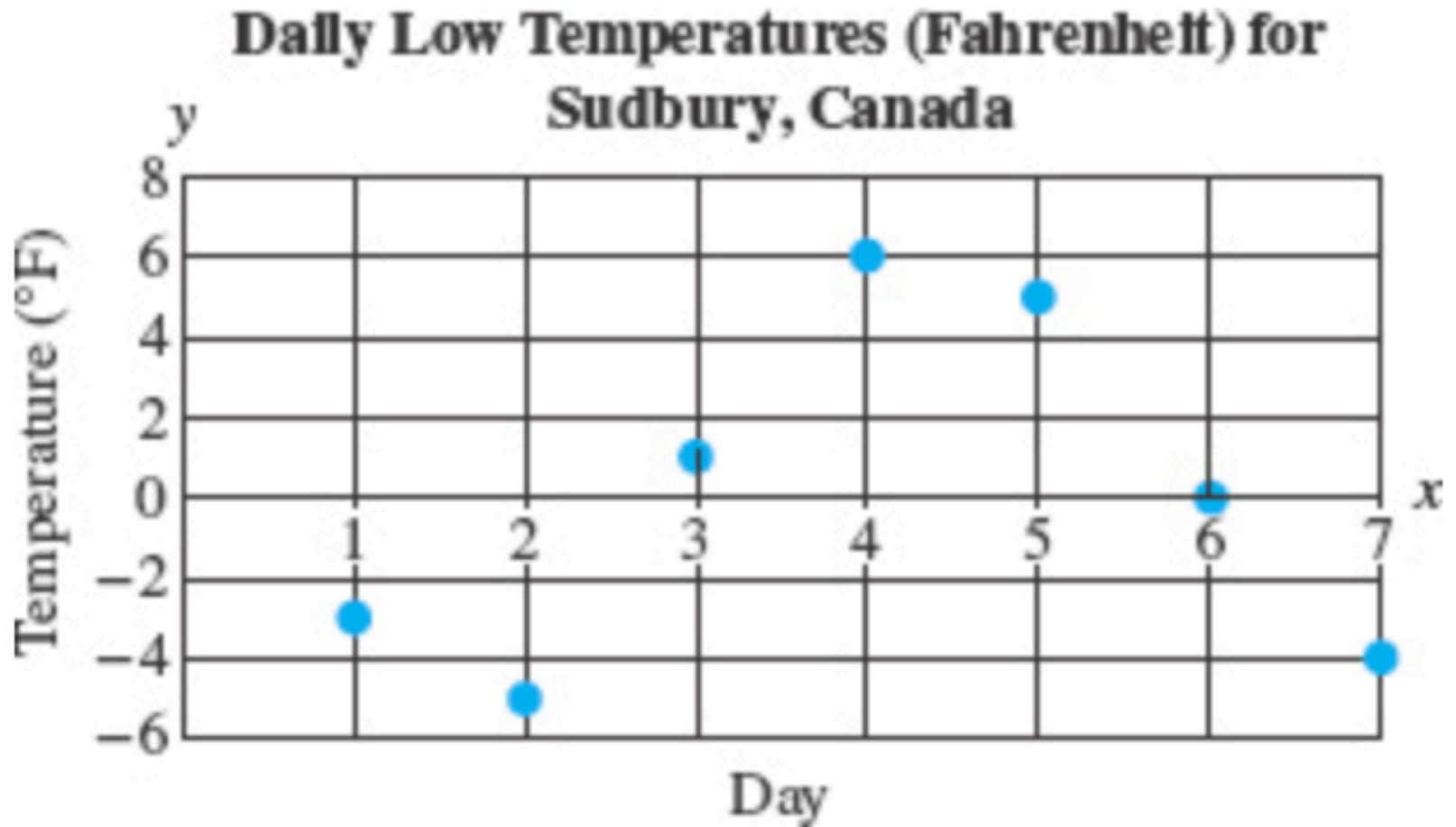
Point  $D$ :  $(1\frac{1}{2}, -2)$  or  $(\frac{3}{2}, -2)$  or  $(1.5, -2)$

# Data set to Order pairs

Day Number, $x$	Temperature ( $^{\circ}\text{F}$ ), $y$
1	-3
2	-5
3	1
4	6
5	5
6	0
7	-4

$(1, -3)$   $(2, -5)$   $(3, 1)$   $(4, 6)$   $(5, 5)$   $(6, 0)$   $(7, -4)$

# Graph of data



# Linear Equations in Two Variables

## Linear Equation in Two Variables

Let  $A$ ,  $B$ , and  $C$  be real numbers such that  $A$  and  $B$  are not both zero. Then, an equation that can be written in the form:

$$Ax + By = C$$

is called a **linear equation in two variables**.

# Linear Equations and their Order Pairs

$$(x, y)$$

$$x + y = 4$$

$$(2, 2)$$

$$(2) + (2) = 4 \checkmark$$

$$(1, 3)$$

$$(1) + (3) = 4 \checkmark$$

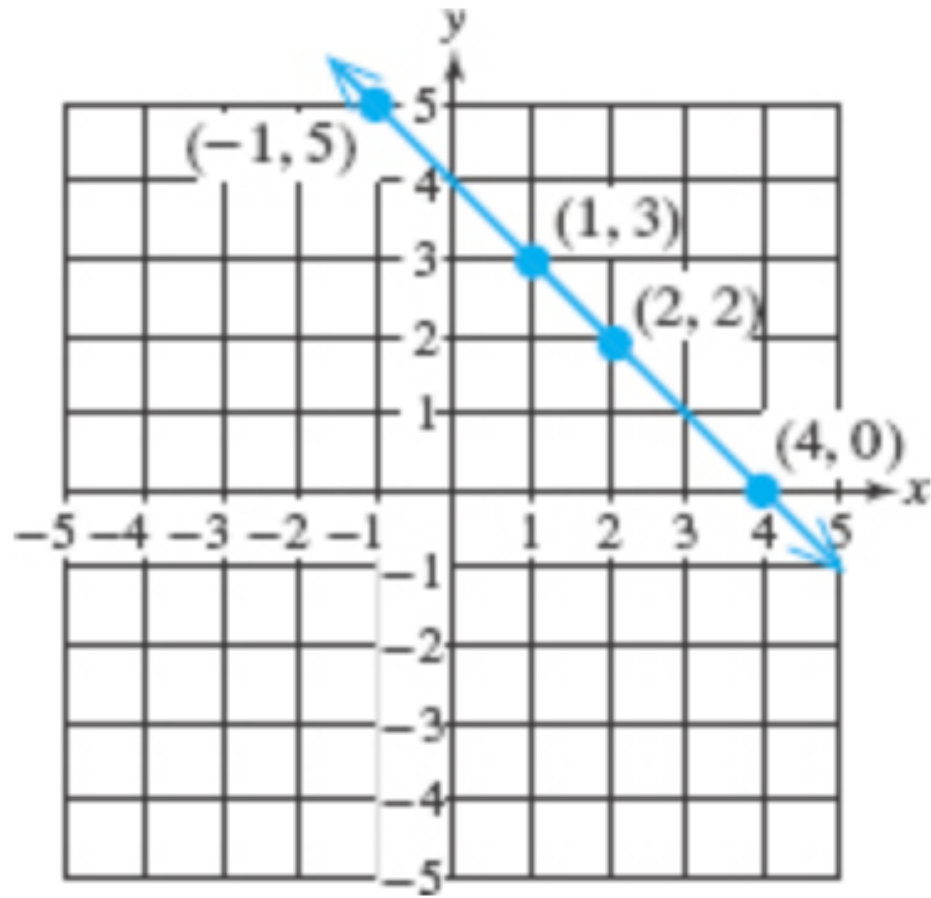
$$(4, 0)$$

$$(4) + (0) = 4 \checkmark$$

$$(-1, 5)$$

$$(-1) + (5) = 4 \checkmark$$

# Linear Equations and their Graphs



## **The Graph of an Equation in Two Variables**

The graph of an equation in two variables is the graph of all ordered pair solutions to the equation.



### Definitions of $x$ - and $y$ -Intercepts

An  **$x$ -intercept** of a graph is a point  $(a, 0)$  where the graph intersects the  $x$ -axis.

A  **$y$ -intercept** of a graph is a point  $(0, b)$  where the graph intersects the  $y$ -axis.

### Finding $x$ - and $y$ -Intercepts

- Find the  $x$ -intercept(s) by substituting  $y = 0$  into the equation and solving for  $x$ .
- Find the  $y$ -intercept(s) by substituting  $x = 0$  into the equation and solving for  $y$ .

## Avoiding Mistakes

Be sure to write the  $x$ - and  $y$ -intercepts as two separate ordered pairs:  
 $(-\frac{8}{3}, 0)$  and  $(0, 4)$ .

## Equations of Vertical and Horizontal Lines

1. A **vertical line** can be represented by an equation of the form  $x = k$ , where  $k$  is a constant.
2. A **horizontal line** can be represented by an equation of the form  $y = k$ , where  $k$  is a constant.