


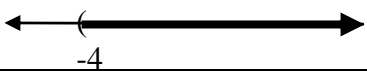
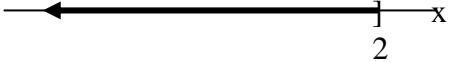
**Interval Notation** We have already used set-builder notation to express an interval or intervals on the real number line. Another way to express intervals is by using **interval notation**. In interval notation, brackets indicate that the endpoints of the interval are included, and parentheses indicate that the endpoints are not included. Brackets and parentheses can also be used on the graph. The following chart shows the relationship between graphs, set-builder notation, and interval notation.

Graph	Set-builder Notation	Interval Notation	Type of Interval
	$\{x a \leq x \leq b\}$	$[a,b]$	Closed interval
	$\{x a < x < b\}$	$(a,b)$	Open interval
	$\{x a < x \leq b\}$	$(a,b]$	Half-open interval
	$\{x a \leq x < b\}$	$[a,b)$	Half-open interval
	$\{x x \geq a\}$	$[a,\infty)$	Infinite interval
	$\{x x > a\}$	$(a,\infty)$	Infinite interval
	$\{x x \leq b\}$	$(-\infty,b]$	Infinite interval
	$\{x x < b\}$	$(-\infty,b)$	Infinite interval

The notation  $(-\infty, \infty)$  is used to represent the entire real number line, that is, all real numbers.

1. A portion of the real number system is represented in each problem using a graph, set-builder notation, or interval notation. Re-express each interval in the two alternative representations.

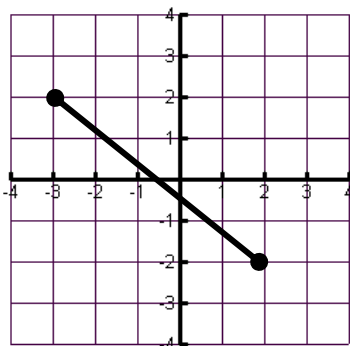
	Graph	Set-builder notation	Interval Notation
(a)		$\{x -3 \leq x \leq 1\}$	$[-3, 1]$
(b)		$\{x 0 < x < 5\}$	$(0, 5)$

	Graph	Set-builder notation	Interval Notation
(c)		$\{x   -8 < x \leq 2\}$	$(-8, 2]$
(d)		$\{x   x > -4\}$	$(-4, \infty)$
(e)		$\{x   x \leq 2\}$	$(-\infty, 2]$

## 2. Using Interval and Set-builder Notation to State Domain and Range

Determine the domain and range of the following functions and state your answers in both interval and set-builder notation.

(a)



Domain (interval notation):

$$[-3, 2]$$

Domain (set-builder notation):

$$\{x | -3 \leq x \leq 2\}$$

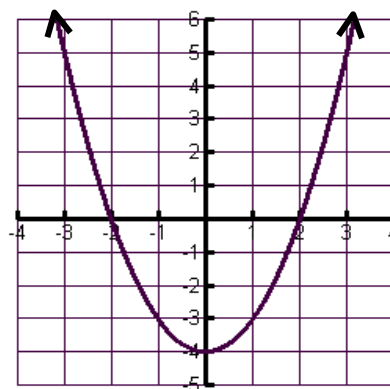
Range (interval notation):

$$\{y | -2 \leq y \leq 2\}$$

Range (set-builder notation):

$$[-2, 2]$$

(b)



Domain (interval notation):

$$(-\infty, \infty)$$

Domain (set-builder notation):

$$\{x | -\infty < x < \infty\}$$

Range (interval notation):

$$[-4, \infty)$$

Range (set-builder notation):

$$\{y | y \geq -4\}$$