General Algebra II Lesson #2 Unit 1

Class CWS #2

For Worksheets #3 & #4

General Algebra II Unit 1 Intervals Any convex set of real numbers is called an interval.

Any **convex set** of real numbers is called an **interval**. So, what is a **convex set**?

Any convex set of real numbers is called an interval.

So, what is a **convex set**?

Consider geometric shapes called polygons.

Any convex set of real numbers is called an interval.

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Consider geometric shapes called polygons. They can be convex or non-convex. Here some examples of each.

Convex polygons

Non-convex polygons

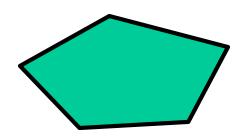
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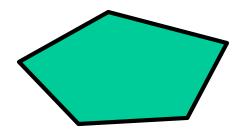


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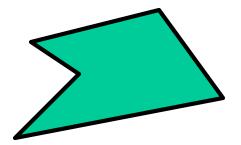
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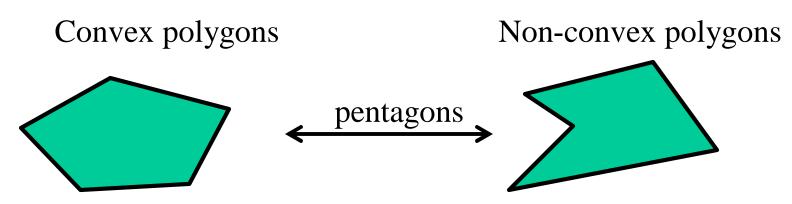


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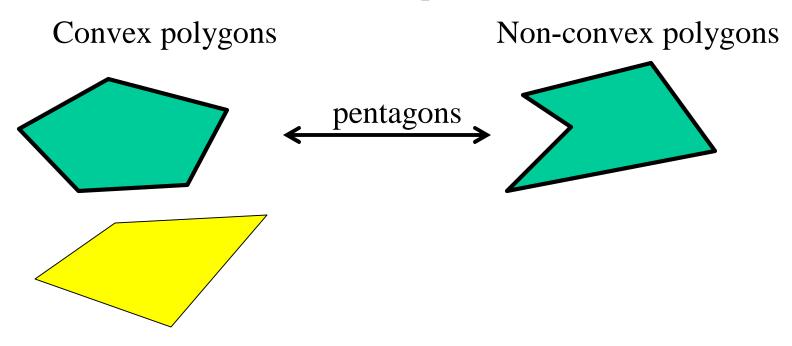
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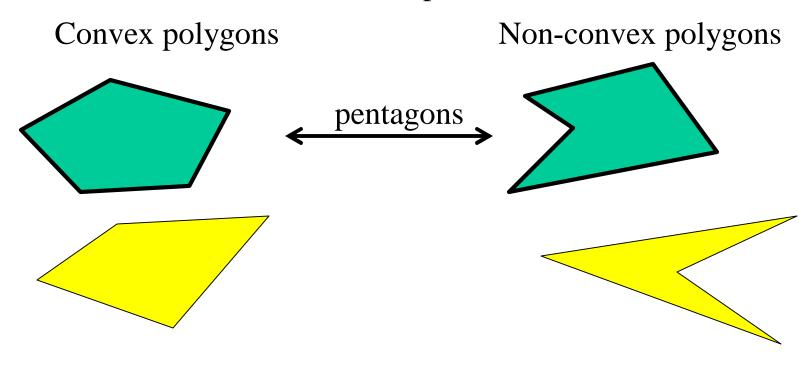
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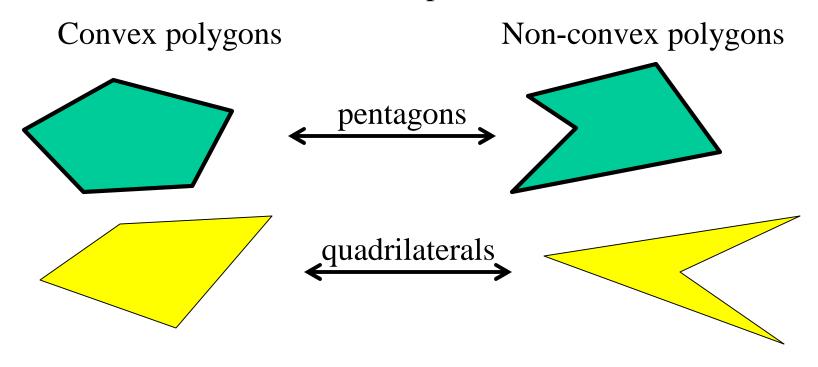
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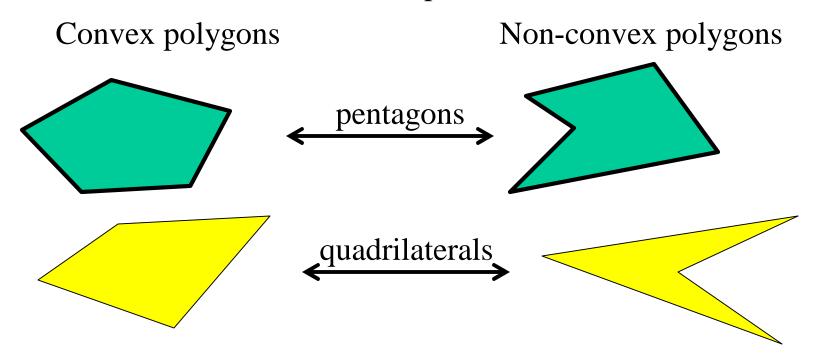
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A polygon is a **convex polygon** if and only if its **interior** is a **convex set** of points.

Any **convex set** of real numbers is called an **interval**. So, what is a **convex set**?

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So, what is a **convex set**?

Here is the test for a convex set of points.

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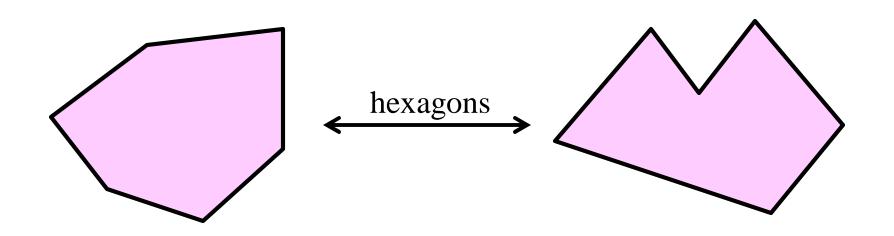
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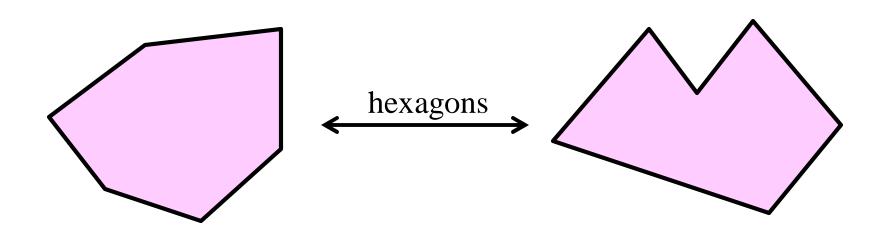
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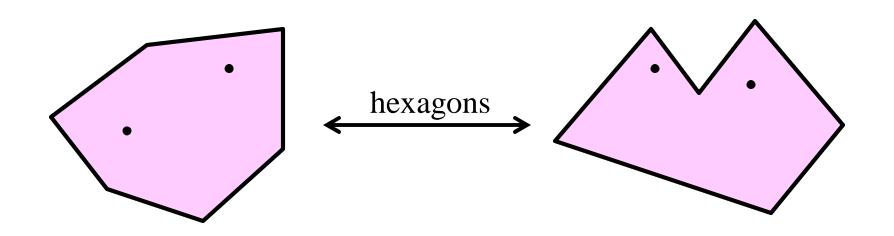
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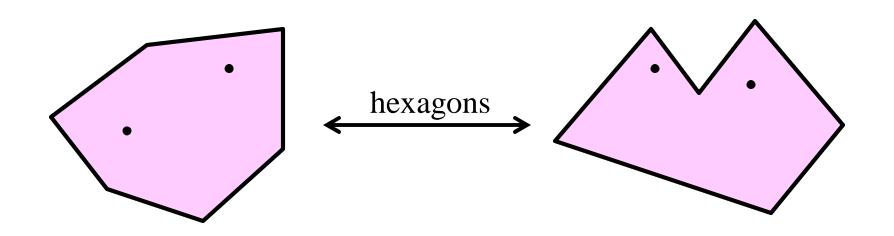
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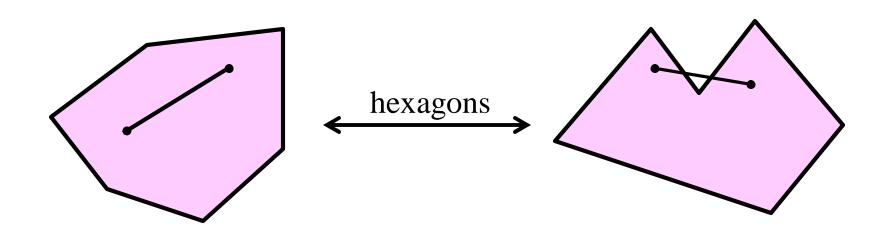
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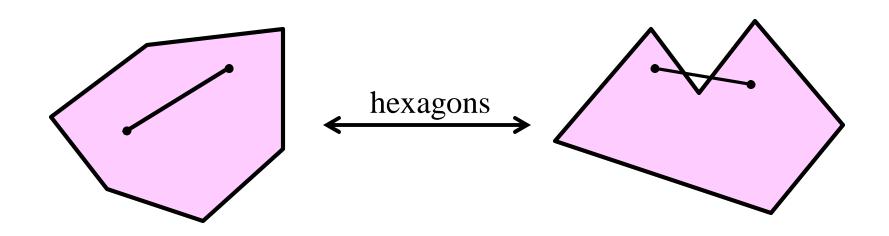
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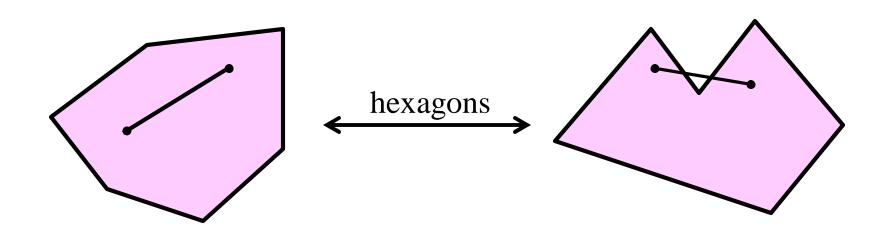
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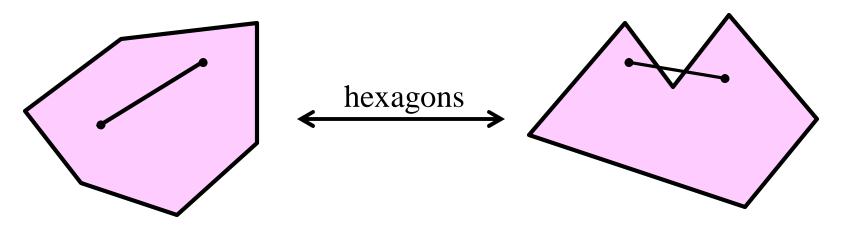
Here is the test for a convex set of points. If a set of points contains more than one point you can use this simple test. First, chose any two points in the set. Draw a line segment connecting those two points. Is the line segment you drew a subset of the set? (Is every point on the line segment also in the set?)



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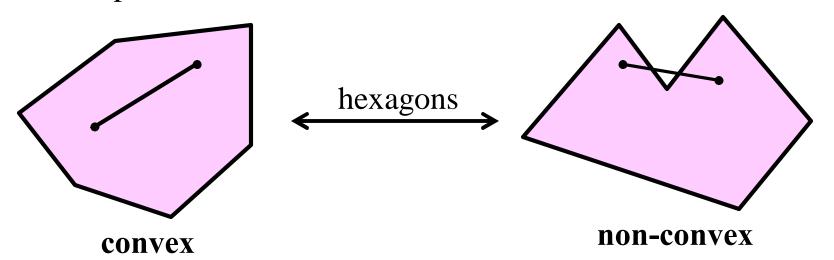
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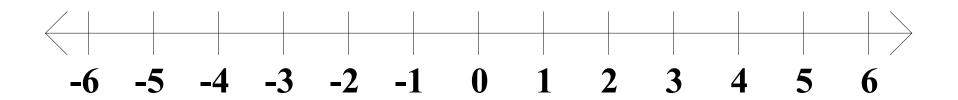
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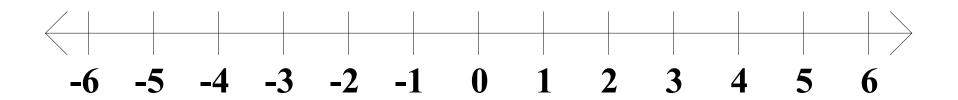
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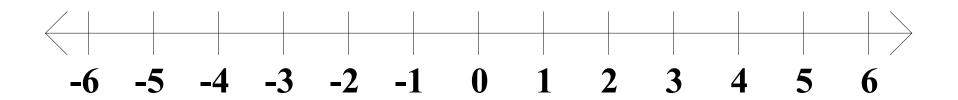
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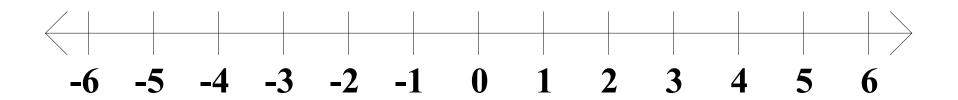
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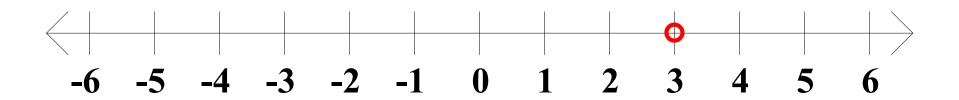


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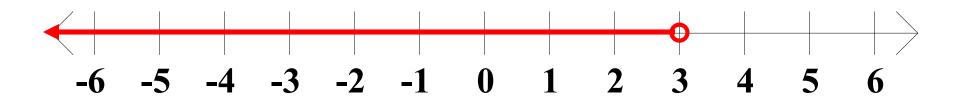


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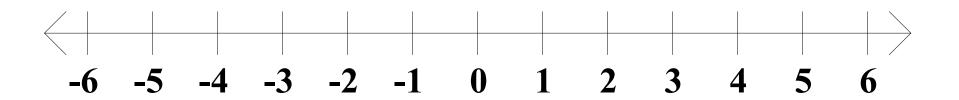


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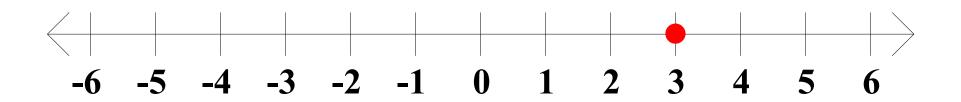


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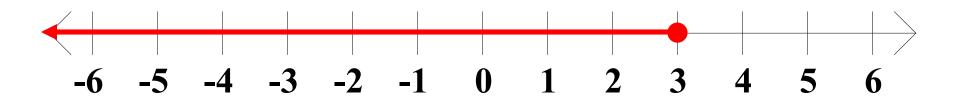


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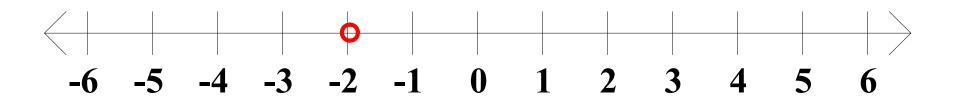
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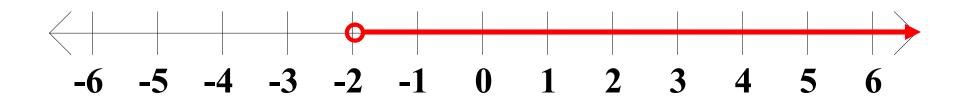
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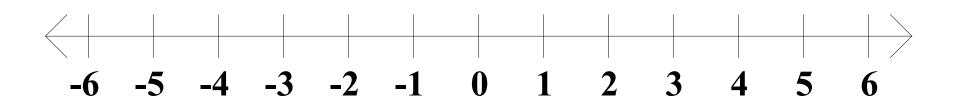
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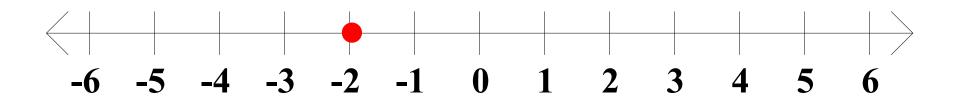
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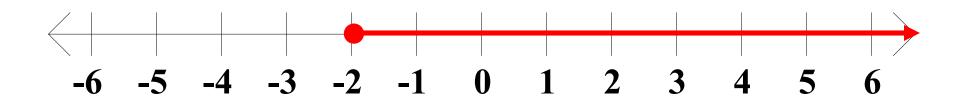
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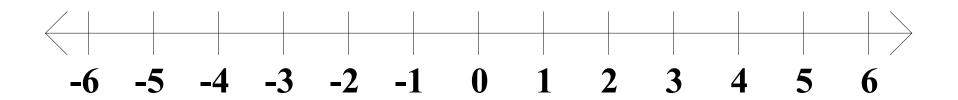
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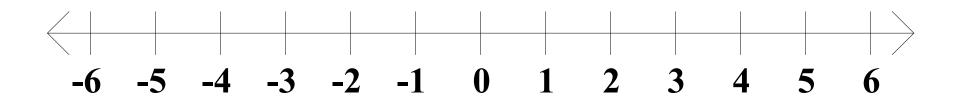
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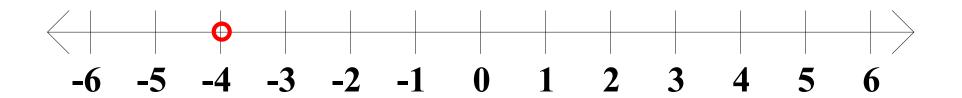


Continued inequalities also define intervals.

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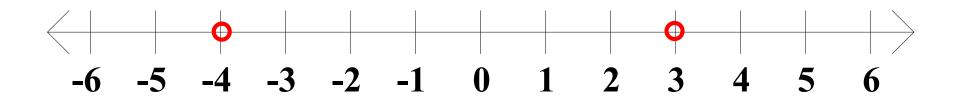


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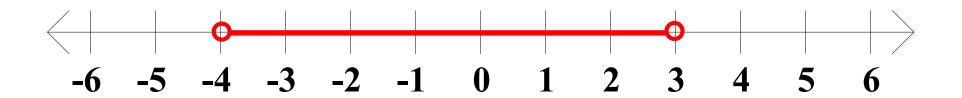


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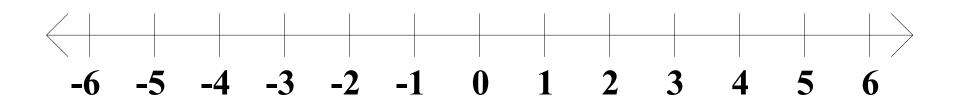


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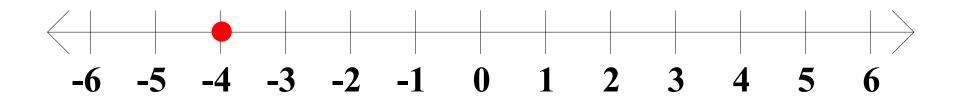
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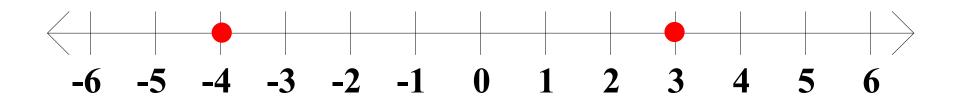
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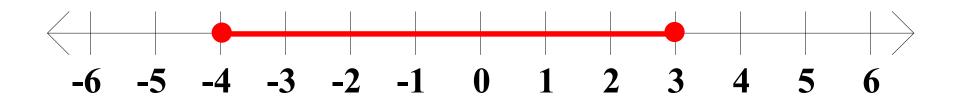
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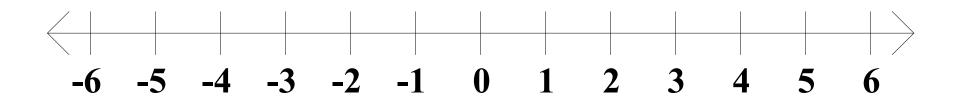
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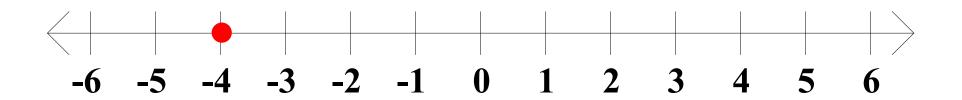
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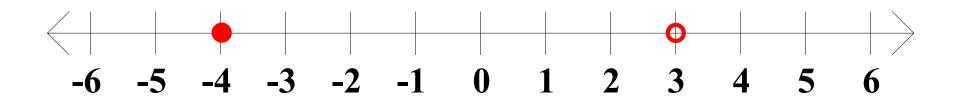
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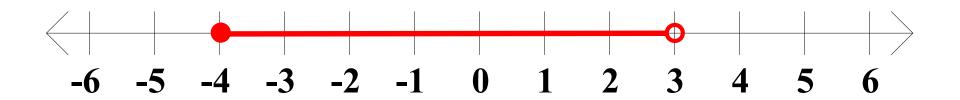
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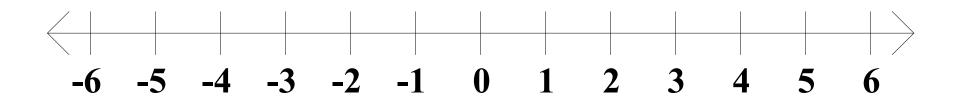
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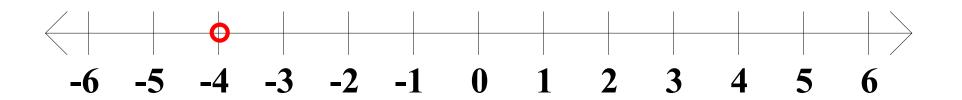
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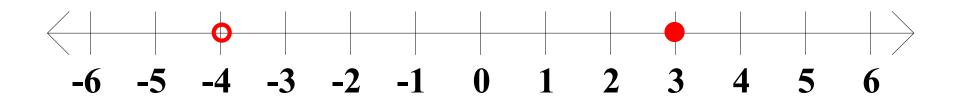
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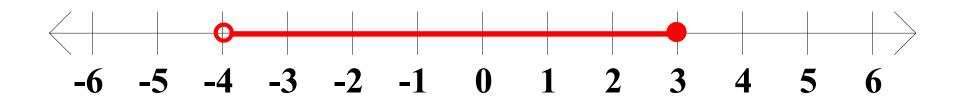
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Interval Notation:

Interval Notation: Intervals can be defined using special notation.

1.
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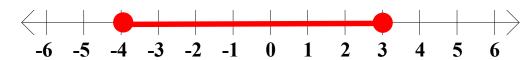


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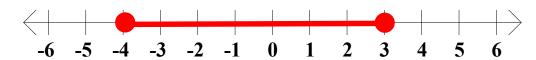
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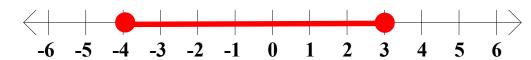
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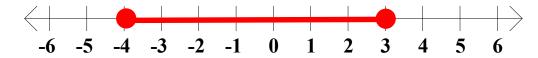
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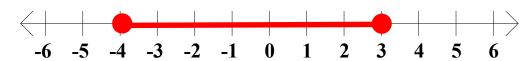
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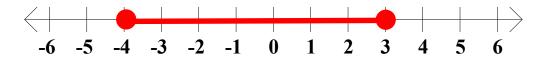
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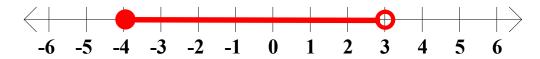
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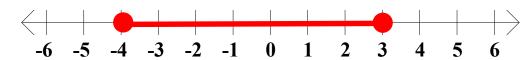


3.
$$-4 \le x < 3$$



1.
$$-4 < x < 3$$
 $S = (-4, 3)$

2.
$$-4 \le x \le 3$$
 $S = [-4, 3]$



3.
$$-4 \le x < 3$$
 S =



1.
$$-4 < x < 3$$
 $S = (-4, 3)$

2.
$$-4 \le x \le 3$$
 $S = [-4, 3]$

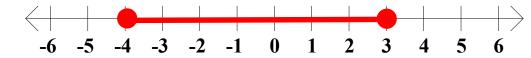


3.
$$-4 \le x < 3$$
 $S = [$



1.
$$-4 < x < 3$$
 $S = (-4, 3)$

2.
$$-4 \le x \le 3$$
 $S = [-4, 3]$



3.
$$-4 \le x < 3$$
 $S = [-4,$



1.
$$-4 < x < 3$$
 $S = (-4, 3)$

2.
$$-4 \le x \le 3$$
 $S = [-4, 3]$



3.
$$-4 \le x < 3$$
 $S = [-4, 3]$

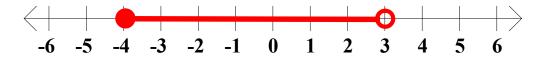


1.
$$-4 < x < 3$$
 $S = (-4, 3)$

2.
$$-4 \le x \le 3$$
 $S = [-4, 3]$



3.
$$-4 \le x < 3$$
 $S = [-4, 3)$



1.
$$-4 < x < 3$$
 $S = (-4, 3)$

2.
$$-4 \le x \le 3$$
 $S = [-4, 3]$

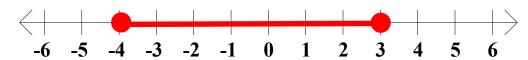


3.
$$-4 \le x < 3$$
 $S = [-4, 3)$

4.
$$-4 < x \le 3$$

1.
$$-4 < x < 3$$
 $S = (-4, 3)$

2.
$$-4 \le x \le 3$$
 $S = [-4, 3]$



3.
$$-4 \le x < 3$$
 $S = [-4, 3)$

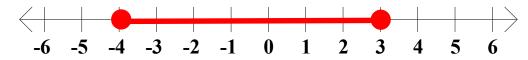


4.
$$-4 < x \le 3$$



1.
$$-4 < x < 3$$
 $S = (-4, 3)$

2.
$$-4 \le x \le 3$$
 $S = [-4, 3]$



3.
$$-4 \le x < 3$$
 $S = [-4, 3)$



4.
$$-4 < x \le 3$$
 S =



1.
$$-4 < x < 3$$
 $S = (-4, 3)$

2.
$$-4 \le x \le 3$$
 $S = [-4, 3]$



3.
$$-4 \le x < 3$$
 $S = [-4, 3)$

4.
$$-4 < x \le 3$$
 S = (



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$$-4 < x < 3$$
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$$-4 \le x < 3$$
 $S = [-4, 3)$



4.
$$-4 < x \le 3$$
 S = (-4,

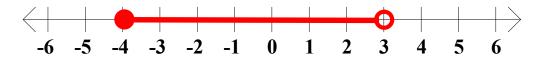


1.
$$-4 < x < 3$$
 $S = (-4, 3)$

2.
$$-4 \le x \le 3$$
 $S = [-4, 3]$



3.
$$-4 \le x < 3$$
 $S = [-4, 3)$

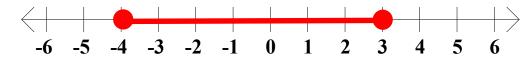


4.
$$-4 < x \le 3$$
 S = (-4, 3)



1.
$$-4 < x < 3$$
 $S = (-4, 3)$

2.
$$-4 \le x \le 3$$
 $S = [-4, 3]$



3.
$$-4 \le x < 3$$
 $S = [-4, 3)$

4.
$$-4 < x \le 3$$
 $S = (-4, 3]$



Interval Notation: Intervals can be defined using special notation. Consider the following examples.

1.
$$-4 < x < 3$$
 $S = (-4, 3)$

$$S = (-4, 3)$$



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$$-4 \le x \le 3$$
 $S = [-4, 3]$

$$S = [-4, 3]$$



3.
$$-4 \le x < 3$$
 $S = [-4, 3)$

$$S = [-4, 3)$$



4.
$$-4 < x \le 3$$
 $S = (-4, 3]$

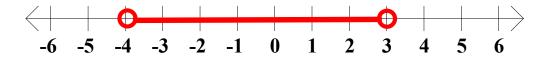


These are examples of bounded intervals.

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1.
$$-4 < x < 3$$
 $S = (-4, 3)$

$$S = (-4, 3)$$



2.
$$-4 \le x \le 3$$
 $S = [-4, 3]$

$$S = [-4, 3]$$



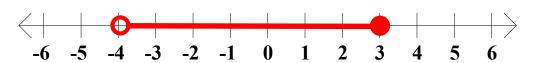
3.
$$-4 \le x < 3$$
 $S = [-4, 3)$

$$S = [-4, 3)$$



4.
$$-4 < x \le 3$$
 $S = (-4, 3)$

$$S = (-4, 3]$$



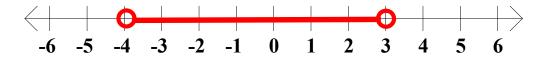
These are examples of bounded intervals.

Bounded intervals have two endpoints.

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1.
$$-4 < x < 3$$
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 $S = [-4, 3]$

$$S = [-4, 3]$$



3.
$$-4 \le x < 3$$
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$$S = [-4, 3)$$



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$$-4 < x \le 3$$
 S = (-4, 3)

$$S = (-4, 3]$$



These are examples of bounded intervals.

Bounded intervals have two endpoints.

Interval Notation: Intervals can be defined using special notation. Consider the following examples.

5.
$$x < 3$$

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Consider the following examples.

5. x < 3

Interval Notation: Intervals can be defined using special notation.

Consider the following examples.

5. x < 3



Interval Notation: Intervals can be defined using special notation.

Consider the following examples.

5.
$$x < 3$$

$$S =$$



Interval Notation: Intervals can be defined using special notation.

Consider the following examples.

5.
$$x < 3$$

$$S = ($$



Interval Notation: Intervals can be defined using special notation.

Consider the following examples.

5.
$$x < 3$$

$$S = (-\infty,$$

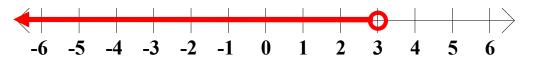


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Consider the following examples.

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$$x < 3$$

$$S = (-\infty, 3)$$



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$$S = (-\infty, 3)$$



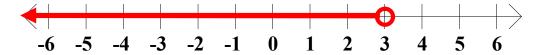
6. $x \le 3$

Interval Notation: Intervals can be defined using special notation.

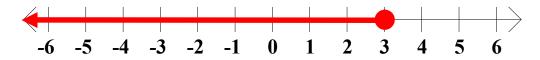
Consider the following examples.

5.
$$x < 3$$

$$S = (-\infty, 3)$$



6.
$$x \le 3$$

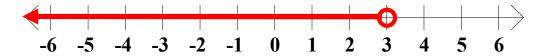


Interval Notation: Intervals can be defined using special notation.

Consider the following examples.

5. x < 3

$$S = (-\infty, 3)$$



6.
$$x \le 3$$

$$S =$$

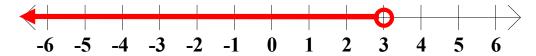


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Consider the following examples.

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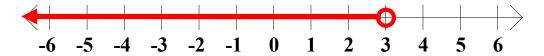


Interval Notation: Intervals can be defined using special notation.

Consider the following examples.

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6.
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$$S = (-\infty, 3)$$

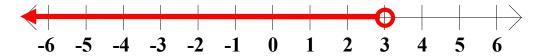


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6.
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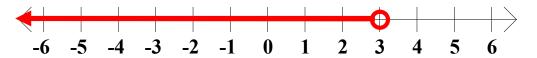


Interval Notation: Intervals can be defined using special notation.

Consider the following examples.

5.
$$x < 3$$

$$S = (-\infty, 3)$$



6.
$$x \le 3$$

$$S = (-\infty, 3]$$



7.
$$x > -4$$

Interval Notation: Intervals can be defined using special notation.

Consider the following examples.

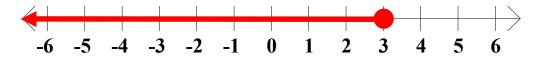
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$$x < 3$$

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7.
$$x > -4$$

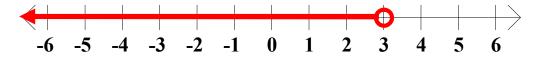


Interval Notation: Intervals can be defined using special notation.

Consider the following examples.

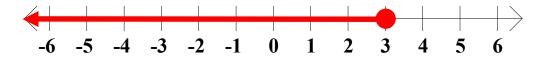
5. x < 3

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7.
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$$S =$$

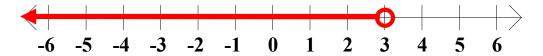


Interval Notation: Intervals can be defined using special notation.

Consider the following examples.

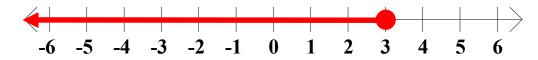
5. x < 3

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7.
$$x > -4$$

$$S = ($$

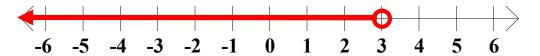


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Consider the following examples.

5. x < 3

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Consider the following examples.

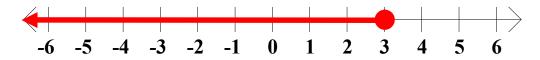
5.
$$x < 3$$

$$S = (-\infty, 3)$$



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7.
$$x > -4$$

$$S = (-4, \infty)$$

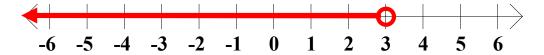


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Consider the following examples.

5. x < 3

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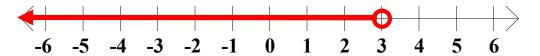


Interval Notation: Intervals can be defined using special notation.

Consider the following examples.

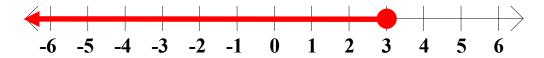
5.
$$x < 3$$

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6.
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7.
$$x > -4$$

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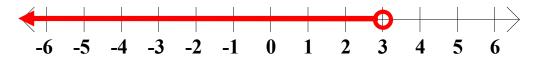
8.
$$x \ge -4$$

Interval Notation: Intervals can be defined using special notation.

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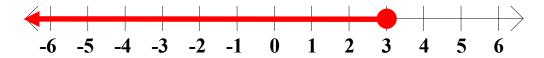
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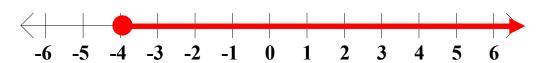


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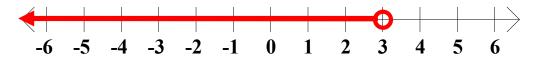


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Consider the following examples.

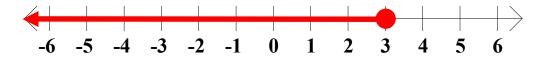
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$$S =$$

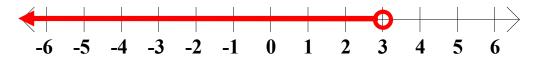


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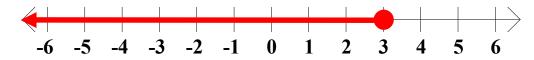
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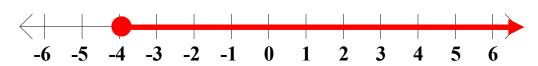
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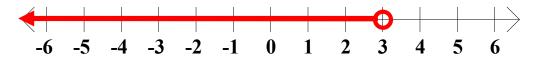


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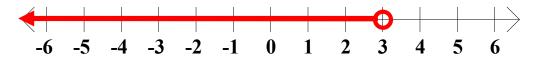


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Consider the following examples.

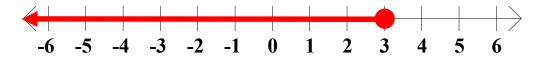
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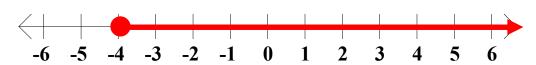
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$$S = [-4, \infty)$$



Interval Notation: Intervals can be defined using special notation.

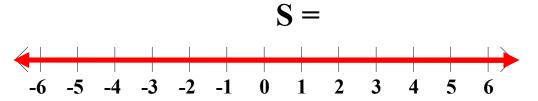
Interval Notation: Intervals can be defined using special notation. There are three other intervals to consider.

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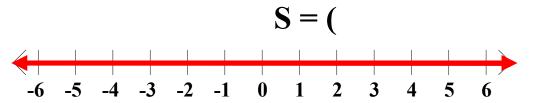
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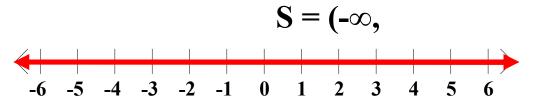
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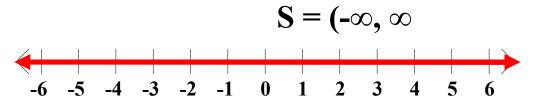
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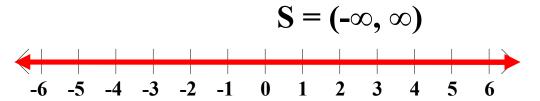
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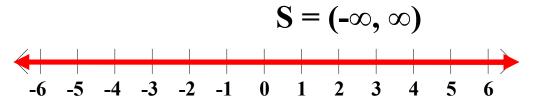


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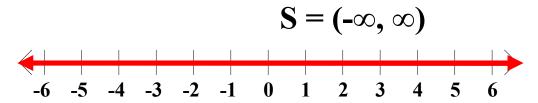
1. The entire set of real numbers is an unbounded interval.



2. A set containing exactly one number is an interval.

Interval Notation: Intervals can be defined using special notation. There are three other intervals to consider.

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Interval Notation: Intervals can be defined using special notation. There are three other intervals to consider.

1. The entire set of real numbers is an unbounded interval.

$$S = (-\infty, \infty)$$
-6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6

2. A set containing exactly one number is an interval.

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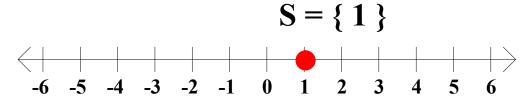
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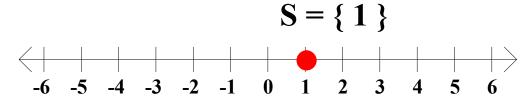


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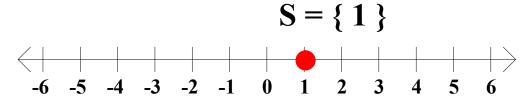
$$S = \{ \}$$
-6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6

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1. The entire set of real numbers is an unbounded interval.

$$S = (-\infty, \infty)$$
-6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6

2. A set containing exactly one number is an interval.



$$S = \{ \} \text{ or } S = \emptyset$$
-6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6

For each of the following graphs, (a) write an appropriate inequality and (b) represent the graph using interval notation.

- 1. (a) _____
 - (b) _____



For each of the following graphs, (a) write an appropriate inequality and (b) represent the graph using interval notation.

- 1. (a) X
 - (b) _____



For each of the following graphs, (a) write an appropriate inequality and (b) represent the graph using interval notation.

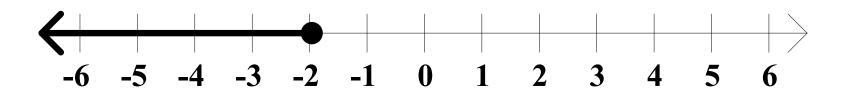
1. (a)
$$X \leq$$



For each of the following graphs, (a) write an appropriate inequality and (b) represent the graph using interval notation.

1. (a)
$$x \le -2$$

(b) _____



1. (a)
$$x \le -2$$



1. (a)
$$x \le -2$$

(p)
$$(-\infty)$$



1. (a)
$$x \le -2$$

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



1. (a)
$$x \le -2$$

(b)
$$(-\infty, -2)$$



1. (a)
$$x \le -2$$

(b)
$$(-\infty, -2]$$



- 2. (a) _____
 - (b) _____





2. (a)
$$-5 \le$$



2. (a)
$$-5 \le x$$



2. (a)
$$-5 \le x \le$$



2. (a)
$$-5 \le x \le 4$$



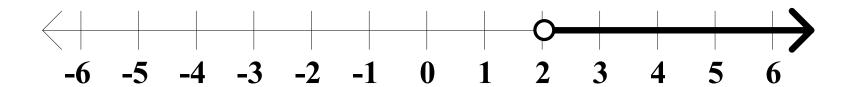
2. (a)
$$-5 \le x \le 4$$



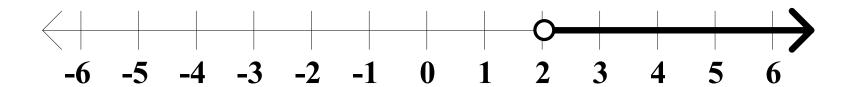
2. (a)
$$-5 \le x \le 4$$



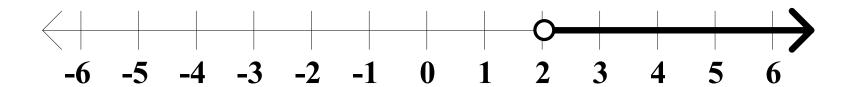
- 3. (a) _____
 - (b) _____



- 3. (a) X
 - (b) _____



- 3. (a) X >
 - (b) _____



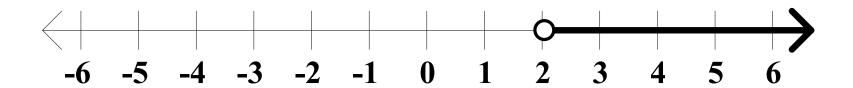
For each of the following graphs, (a) write an appropriate inequality and (b) represent the graph using interval notation.

3. (a)
$$x > 2$$

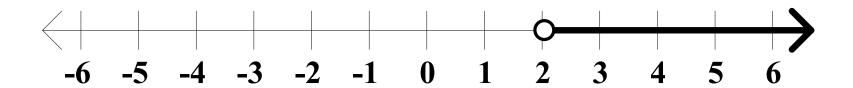
(b) _____



3. (a)
$$x > 2$$



3. (a)
$$x > 2$$

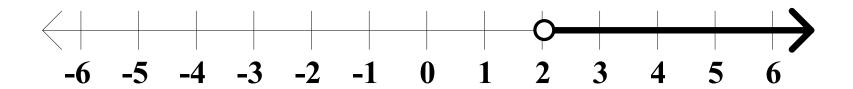


3. (a)
$$x > 2$$



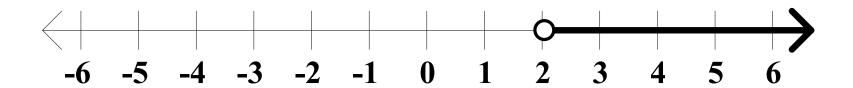
3. (a)
$$x > 2$$

(b)
$$(2, \infty)$$

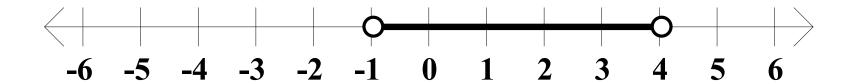


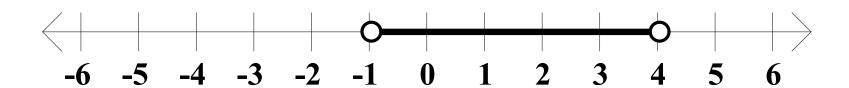
3. (a)
$$x > 2$$

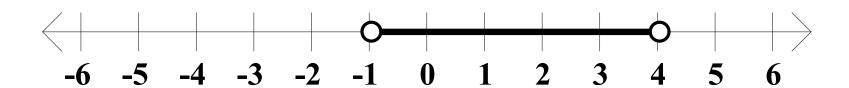
(b)
$$(2,\infty)$$



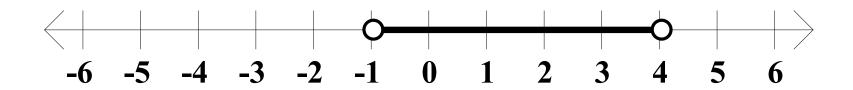
- 4. (a) _____
 - (b) _____







4. (a)
$$-1 < x$$



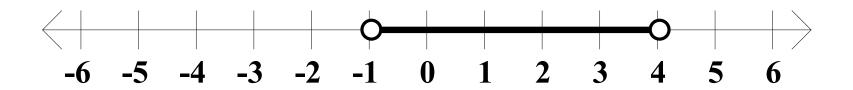
4. (a)
$$-1 < x <$$



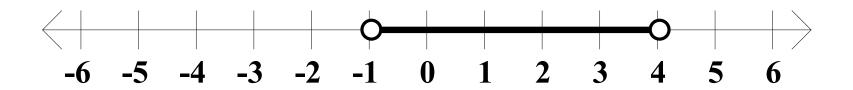
4. (a)
$$-1 < x < 4$$



4. (a)
$$-1 < x < 4$$



4. (a)
$$-1 < x < 4$$



4. (a)
$$-1 < x < 4$$



4. (a)
$$-1 < x < 4$$

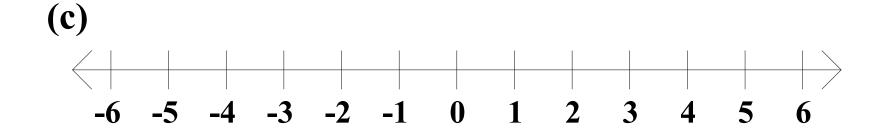


4. (a)
$$-1 < x < 4$$

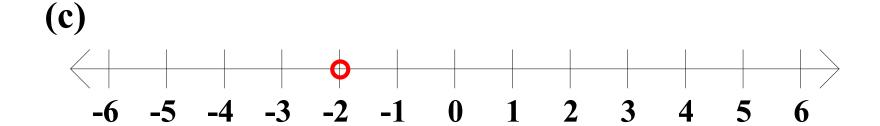
$$(b)$$
 $(-1,4)$



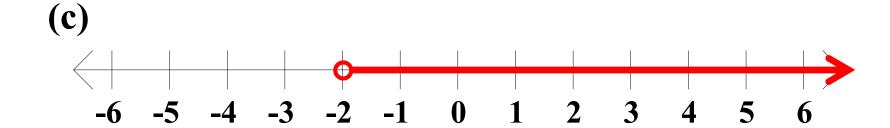
5.
$$(-2, \infty)$$



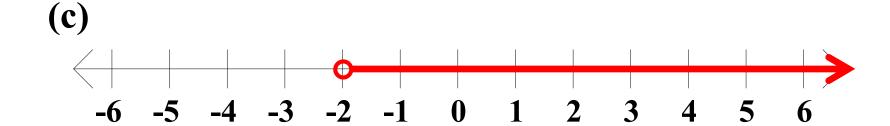
5.
$$(-2, \infty)$$



5.
$$(-2, \infty)$$

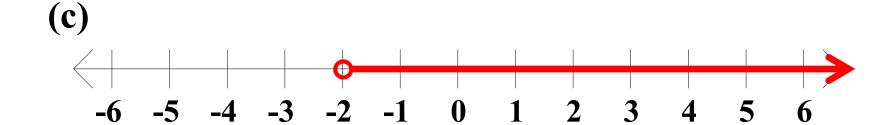


5.
$$(-2, \infty)$$



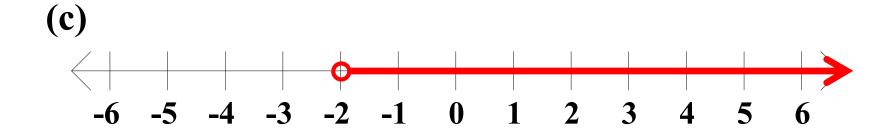
5.
$$(-2, \infty)$$

$$(a) \underline{\qquad \qquad x >}$$



5.
$$(-2, \infty)$$

$$(a) \underline{\qquad \qquad x > -2}$$

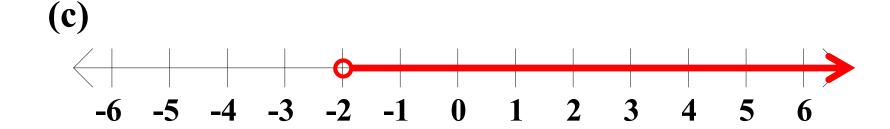


For each of the following intervals, (a) write an appropriate inequality, (b) tell whether it is bounded or unbounded, and (c) sketch its graph.

5.
$$(-2, \infty)$$

$$(a) \underline{\qquad \qquad x > -2}$$

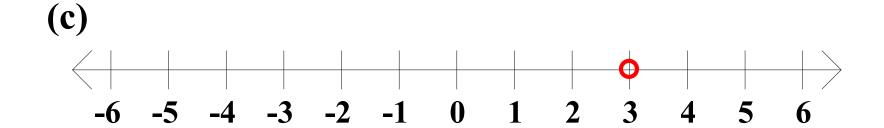
(b) <u>unbounded</u>



6.
$$(3,5)$$



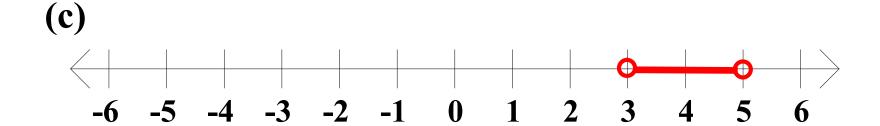
6.
$$(3,5)$$



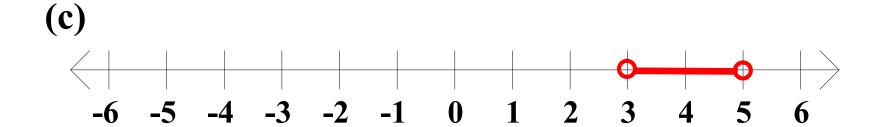
6.
$$(3,5)$$



6.
$$(3,5)$$

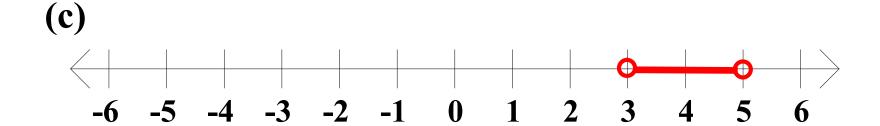


6.
$$(3,5)$$



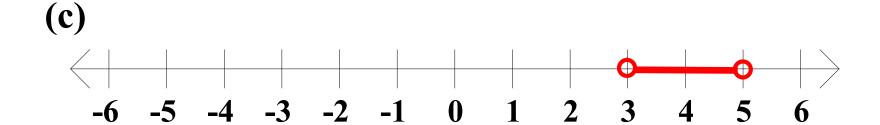
6.
$$(3,5)$$

$$(a) \underline{\qquad \qquad 3 < \qquad \qquad }$$

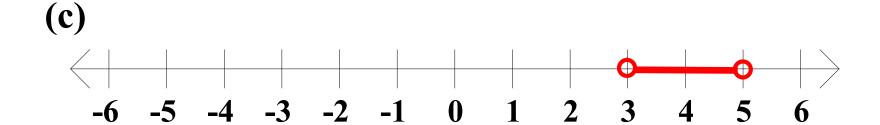


6.
$$(3,5)$$

$$(a) \underline{\qquad \qquad 3 < x}$$



6.
$$(3,5)$$



6.
$$(3,5)$$

(a)
$$3 < x < 5$$

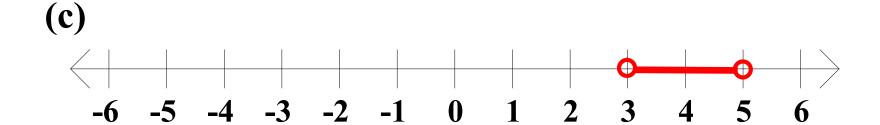


For each of the following intervals, (a) write an appropriate inequality, (b) tell whether it is bounded or unbounded, and (c) sketch its graph.

6.
$$(3,5)$$

$$(a) 3 < x < 5$$

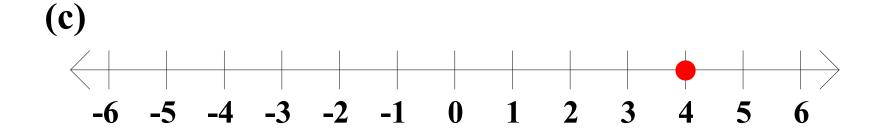
(b) <u>bounded</u>



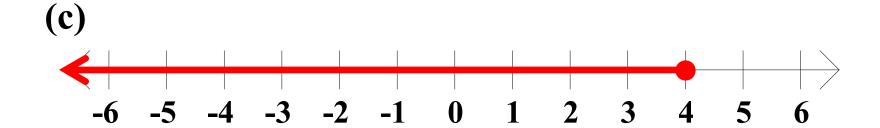
7.
$$(-\infty, 4]$$



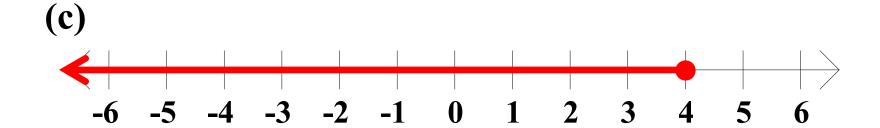
7.
$$(-\infty, 4]$$



7.
$$(-\infty, 4]$$

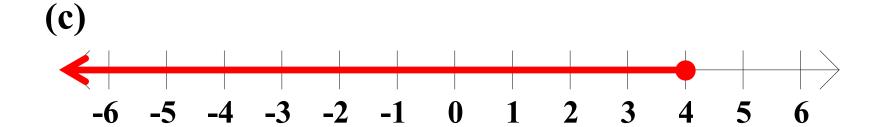


7.
$$(-\infty, 4]$$



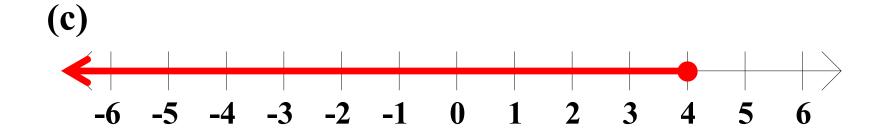
7.
$$(-\infty, 4]$$

$$(a) \underline{\qquad x \leq \qquad}$$



7.
$$(-\infty, 4]$$

$$(a) \underline{\qquad x \leq 4}$$

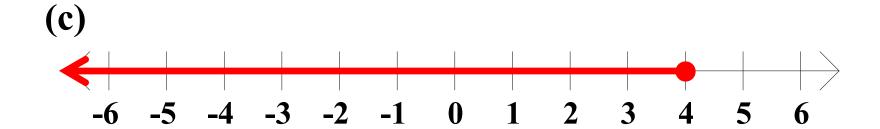


For each of the following intervals, (a) write an appropriate inequality, (b) tell whether it is bounded or unbounded, and (c) sketch its graph.

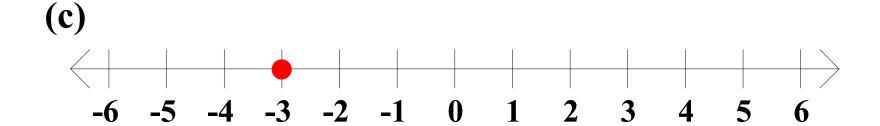
7.
$$(-\infty, 4]$$

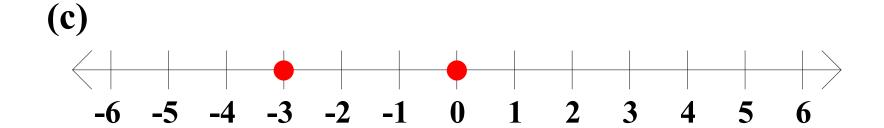
$$(a) \underline{\qquad x \leq 4}$$

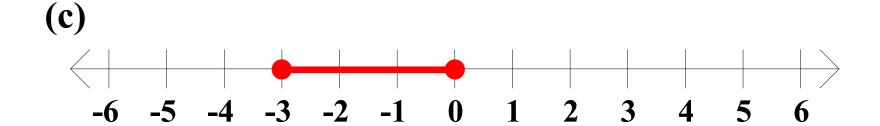
(b) <u>unbounded</u>

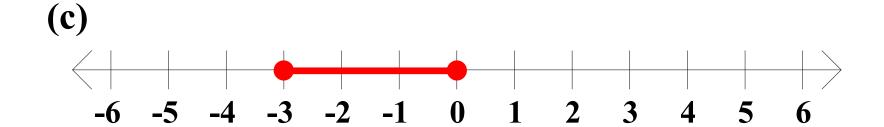




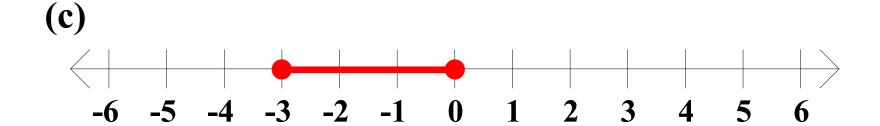




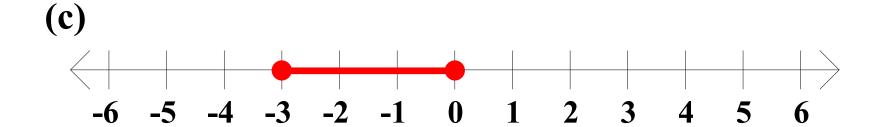




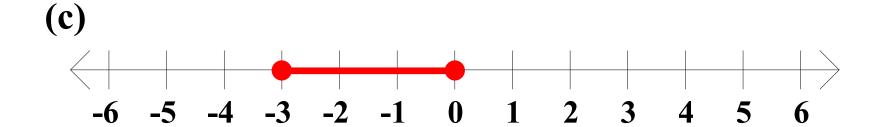
(a)
$$-3 \leq$$



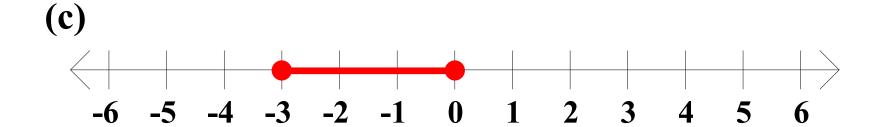
(a)
$$-3 \le x$$



$$(a) \underline{\qquad -3 \leq x \leq}$$



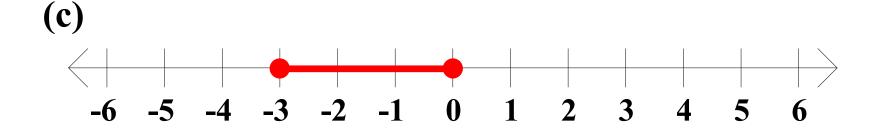
(a)
$$-3 \le x \le 0$$



For each of the following intervals, (a) write an appropriate inequality, (b) tell whether it is bounded or unbounded, and (c) sketch its graph.

$$(a) \quad -3 \le x \le 0$$

(b) <u>bounded</u>



Solve each of the following inequalities. Then express the solution set using interval notation and sketch its graph.

9.
$$6x - 15 \le 9$$

Solve each of the following inequalities. Then express the solution set using interval notation and sketch its graph.

$$9. \quad 6x - 15 \le 9$$

$$6x$$

$$9. \quad 6x - 15 \le 9$$
$$6x \le$$

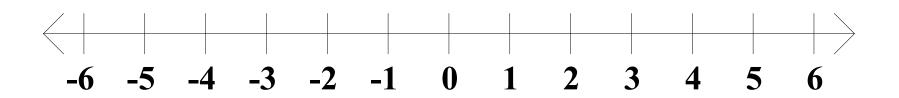
$$9. \quad 6x - 15 \le 9$$
$$6x \le 24$$

9.
$$6x - 15 \le 9$$
$$6x \le 24$$

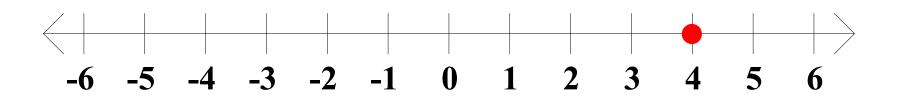
9.
$$6x - 15 \le 9$$
$$6x \le 24$$
$$x \le$$

9.
$$6x - 15 \le 9$$
$$6x \le 24$$
$$x \le 4$$

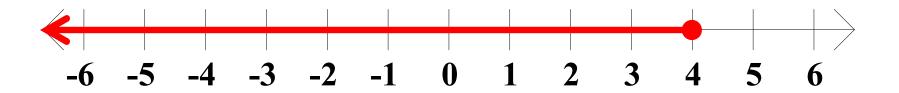
9.
$$6x - 15 \le 9$$
$$6x \le 24$$
$$x \le 4$$



9.
$$6x - 15 \le 9$$
$$6x \le 24$$
$$x \le 4$$

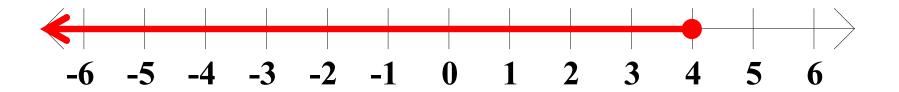


9.
$$6x - 15 \le 9$$
$$6x \le 24$$
$$x \le 4$$

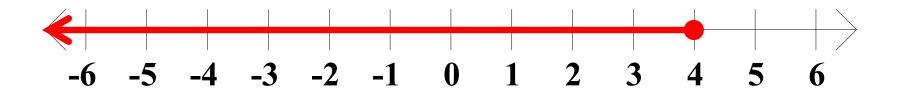


9.
$$6x - 15 \le 9$$
$$6x \le 24$$
$$x \le 4$$

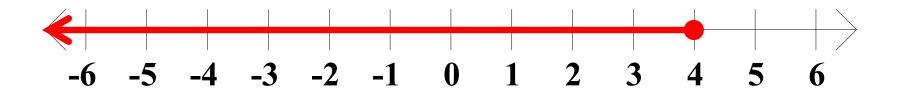
$$S =$$



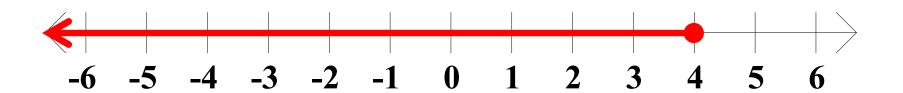
9.
$$6x - 15 \le 9$$
 $6x \le 24$
 $x \le 4$
 $S = ($



9.
$$6x - 15 \le 9$$
$$6x \le 24$$
$$x \le 4$$
$$S = (-\infty)$$

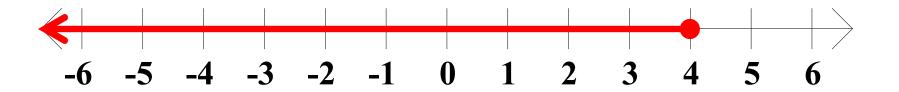


9.
$$6x - 15 \le 9$$
$$6x \le 24$$
$$x \le 4$$
$$S = (-\infty, 4)$$



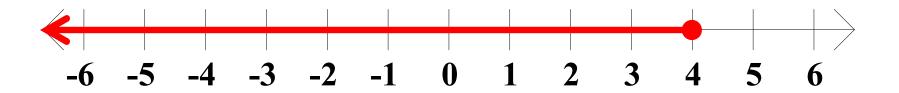
9.
$$6x - 15 \le 9$$

 $6x \le 24$
 $x \le 4$
 $S = (-\infty, 4]$



9.
$$6x - 15 \le 9$$
$$6x \le 24$$
$$x \le 4$$

$$S = (-\infty, 4]$$



10.
$$2x + 7 > -1$$

10.
$$2x + 7 > -1$$
 $2x$

10.
$$2x + 7 > -1$$

 $2x >$

10.
$$2x + 7 > -1$$

 $2x > -8$

10.
$$2x + 7 > -1$$

 $2x > -8$

10.
$$2x + 7 > -1$$

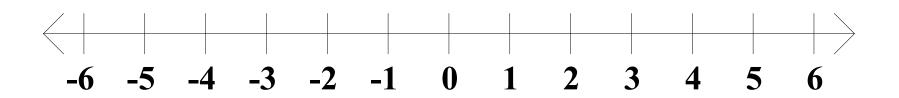
 $2x > -8$
 $x >$

10.
$$2x + 7 > -1$$

 $2x > -8$
 $x > -4$

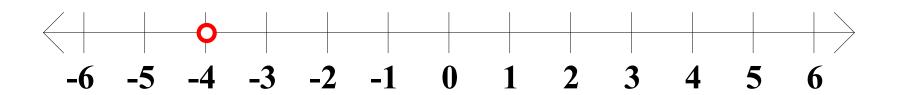
10.
$$2x + 7 > -1$$

 $2x > -8$
 $x > -4$



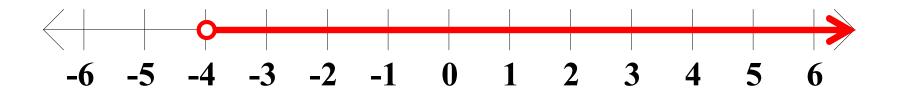
10.
$$2x + 7 > -1$$

 $2x > -8$
 $x > -4$



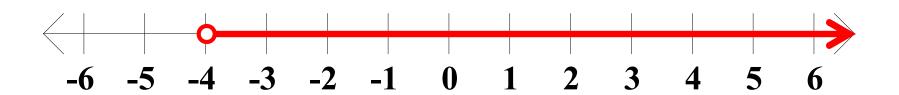
10.
$$2x + 7 > -1$$

 $2x > -8$
 $x > -4$



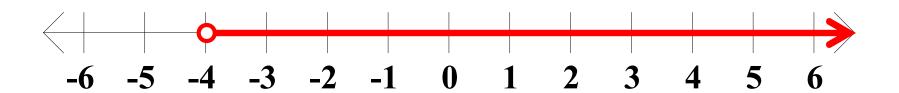
10.
$$2x + 7 > -1$$

 $2x > -8$
 $x > -4$



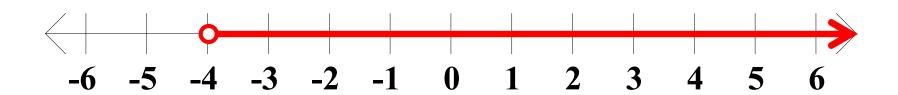
10.
$$2x + 7 > -1$$

 $2x > -8$
 $x > -4$
 $S = ($



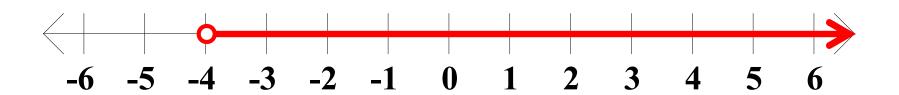
10.
$$2x + 7 > -1$$

 $2x > -8$
 $x > -4$
 $S = (-4,$



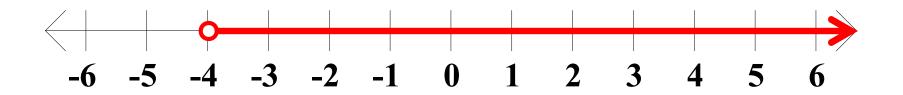
10.
$$2x + 7 > -1$$

 $2x > -8$
 $x > -4$
 $S = (-4, \infty)$



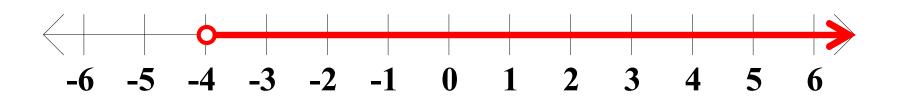
10.
$$2x + 7 > -1$$

 $2x > -8$
 $x > -4$
 $S = (-4, \infty)$



10.
$$2x + 7 > -1$$

 $2x > -8$
 $x > -4$
 $S = (-4, \infty)$



11.
$$-8x + 12 \le 28$$

11.
$$-8x + 12 \le 28$$
 $-8x$

11.
$$-8x + 12 \le 28$$

 $-8x \le$

11.
$$-8x + 12 \le 28$$

 $-8x \le 16$

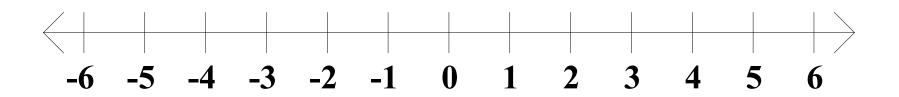
11.
$$-8x + 12 \le 28$$
 $-8x \le 16$

11.
$$-8x + 12 \le 28$$
 $-8x \le 16$
 $x \ge$

11.
$$-8x + 12 \le 28$$
 $-8x \le 16$
 $x \ge -2$

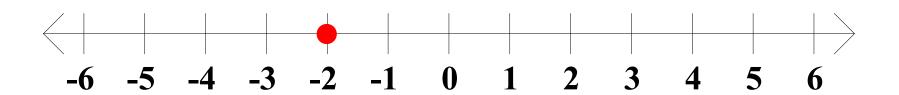
11.
$$-8x + 12 \le 28$$

 $-8x \le 16$
 $x \ge -2$



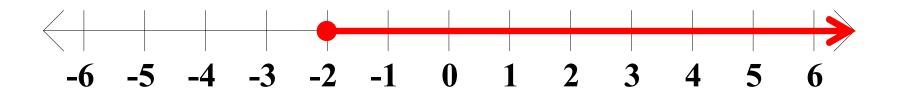
11.
$$-8x + 12 \le 28$$

 $-8x \le 16$
 $x \ge -2$



11.
$$-8x + 12 \le 28$$

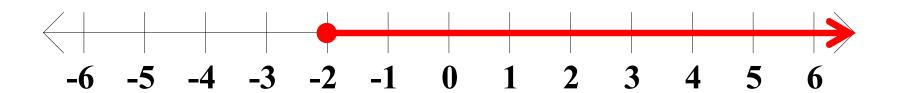
 $-8x \le 16$
 $x \ge -2$



11.
$$-8x + 12 \le 28$$
 $-8x \le 16$
 $x \ge -2$
 $S =$

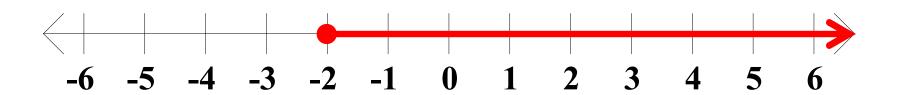


11.
$$-8x + 12 \le 28$$
 $-8x \le 16$
 $x \ge -2$
 $S = [$



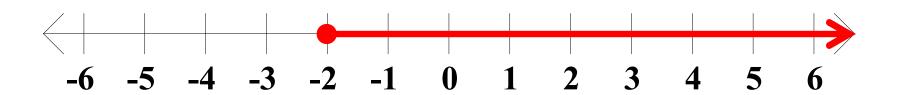
11.
$$-8x + 12 \le 28$$

 $-8x \le 16$
 $x \ge -2$
 $S = [-2,$



11.
$$-8x + 12 \le 28$$

 $-8x \le 16$
 $x \ge -2$
 $S = [-2, \infty]$



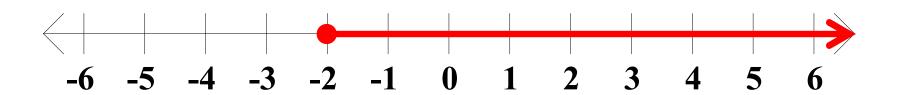
11.
$$-8x + 12 \le 28$$

 $-8x \le 16$
 $x \ge -2$
 $S = [-2, \infty)$



11.
$$-8x + 12 \le 28$$

 $-8x \le 16$
 $x \ge -2$
 $S = [-2, \infty)$



12.
$$-4x - 18 > -6$$

12.
$$-4x - 18 > -6$$
 $-4x$

12.
$$-4x - 18 > -6$$
 $-4x >$

12.
$$-4x - 18 > -6$$

 $-4x > 12$

Solve each of the following inequalities. Then express the solution set using interval notation and sketch its graph.

12.
$$-4x - 18 > -6$$

 $-4x > 12$

X

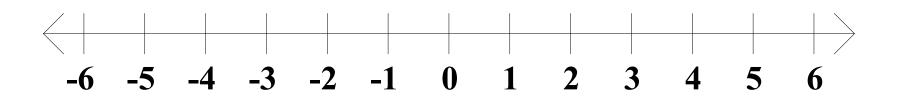
12.
$$-4x - 18 > -6$$
 $-4x > 12$
 $x <$

12.
$$-4x - 18 > -6$$

 $-4x > 12$
 $x < -3$

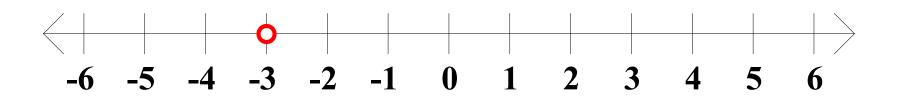
12.
$$-4x - 18 > -6$$

 $-4x > 12$
 $x < -3$



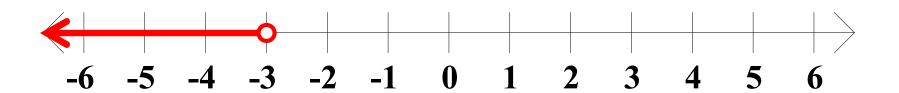
12.
$$-4x - 18 > -6$$

 $-4x > 12$
 $x < -3$

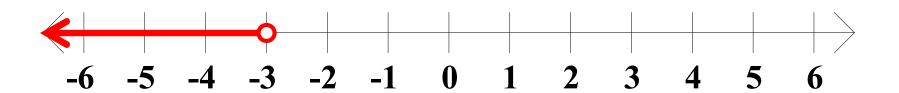


12.
$$-4x - 18 > -6$$

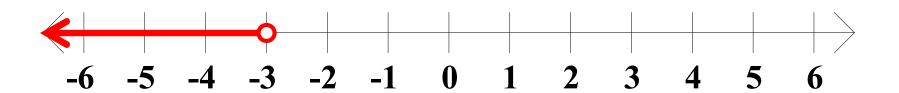
 $-4x > 12$
 $x < -3$



12.
$$-4x - 18 > -6$$
 $-4x > 12$
 $x < -3$



12.
$$-4x - 18 > -6$$
 $-4x > 12$
 $x < -3$



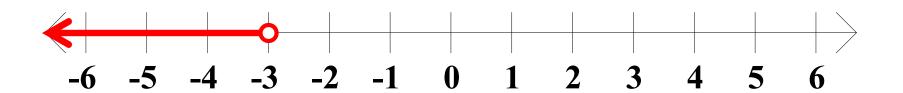
12.
$$-4x - 18 > -6$$

 $-4x > 12$
 $x < -3$
 $S = (-\infty,$



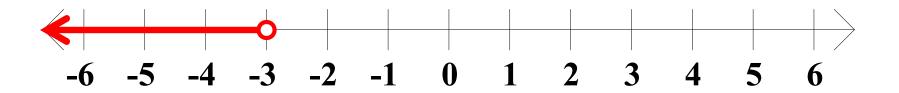
12.
$$-4x - 18 > -6$$

 $-4x > 12$
 $x < -3$
 $S = (-\infty, -3)$



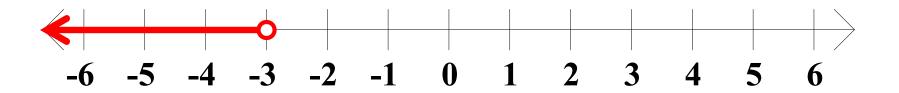
12.
$$-4x - 18 > -6$$

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12.
$$-4x - 18 > -6$$
 $-4x > 12$
 $x < -3$

$$S = (-\infty, -3)$$



13.
$$7x - 8 < 2x + 7$$

13.
$$7x - 8 < 2x + 7$$
 $5x$

13.
$$7x - 8 < 2x + 7$$
 $5x <$

13.
$$7x - 8 < 2x + 7$$

 $5x < 15$

Solve each of the following inequalities. Then express the solution set using interval notation and sketch its graph.

13.
$$7x - 8 < 2x + 7$$

 $5x < 15$

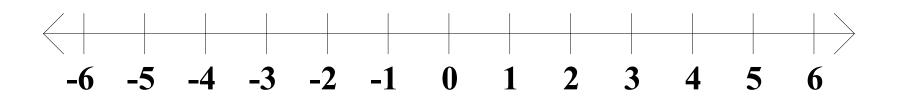
X

13.
$$7x - 8 < 2x + 7$$
 $5x < 15$
 $x < 1$

13.
$$7x - 8 < 2x + 7$$
 $5x < 15$
 $x < 3$

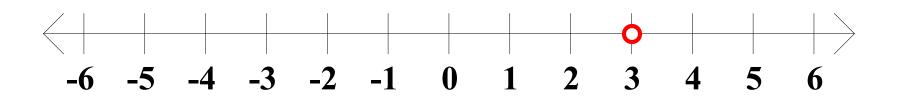
13.
$$7x - 8 < 2x + 7$$

 $5x < 15$
 $x < 3$



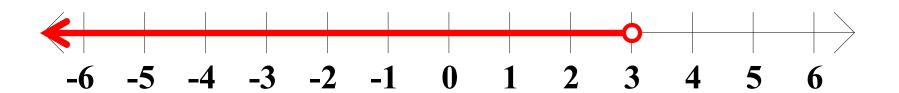
13.
$$7x - 8 < 2x + 7$$

 $5x < 15$
 $x < 3$



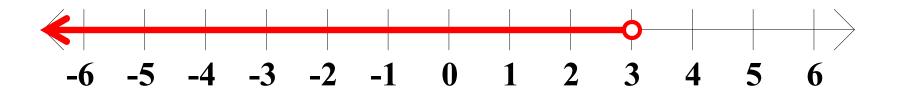
13.
$$7x - 8 < 2x + 7$$

 $5x < 15$
 $x < 3$

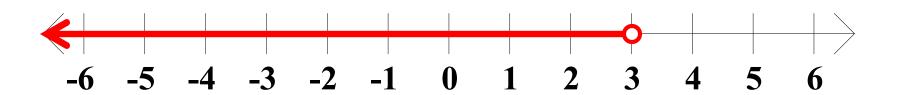


13.
$$7x - 8 < 2x + 7$$
 $5x < 15$
 $x < 3$

$$S =$$

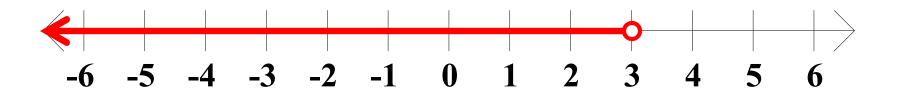


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 $x < 3$



13.
$$7x-8 < 2x + 7$$
 $5x < 15$
 $x < 3$

$$S = (-\infty)$$



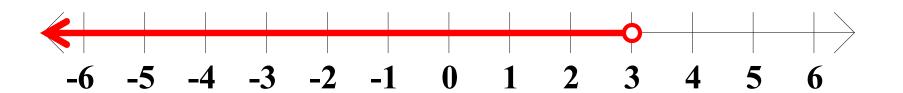
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$$7x-8 < 2x + 7$$
 $5x < 15$
 $x < 3$

$$S = (-\infty, 3)$$



13.
$$7x-8 < 2x + 7$$
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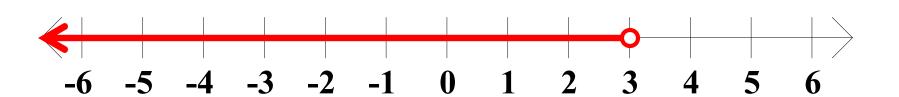
$$S = (-\infty, 3)$$



Solve each of the following inequalities. Then express the solution set using interval notation and sketch its graph.

13.
$$7x - 8 < 2x + 7$$
 $5x < 15$
 $x < 3$

 $S = (-\infty, 3)$



14.
$$4(3x + 2) - 2(x + 5) \ge 8$$

14.
$$4(3x + 2) - 2(x + 5) \ge 8$$

12x

14.
$$4(3x + 2) - 2(x + 5) \ge 8$$

12x +

14.
$$4(3x + 2) - 2(x + 5) \ge 8$$

 $12x + 8$

14.
$$4(3x + 2) - 2(x + 5) \ge 8$$

 $12x + 8 -$

14.
$$4(3x + 2) - 2(x + 5) \ge 8$$

 $12x + 8 - 2x$

14.
$$4(3x + 2) - 2(x + 5) \ge 8$$

 $12x + 8 - 2x -$

14.
$$4(3x + 2) - 2(x + 5) \ge 8$$

 $12x + 8 - 2x - 10$

14.
$$4(3x + 2) - 2(x + 5) \ge 8$$

 $12x + 8 - 2x - 10 \ge$

14.
$$4(3x + 2) - 2(x + 5) \ge 8$$

 $12x + 8 - 2x - 10 \ge 8$

14.
$$4(3x + 2) - 2(x + 5) \ge 8$$

 $12x + 8 - 2x - 10 \ge 8$
 $10x$

14.
$$4(3x + 2) - 2(x + 5) \ge 8$$

 $12x + 8 - 2x - 10 \ge 8$
 $10x -$

14.
$$4(3x + 2) - 2(x + 5) \ge 8$$

 $12x + 8 - 2x - 10 \ge 8$
 $10x - 2$

14.
$$4(3x + 2) - 2(x + 5) \ge 8$$

 $12x + 8 - 2x - 10 \ge 8$
 $10x - 2 \ge$

14.
$$4(3x + 2) - 2(x + 5) \ge 8$$

 $12x + 8 - 2x - 10 \ge 8$
 $10x - 2 \ge 8$

14.
$$4(3x + 2) - 2(x + 5) \ge 8$$

 $12x + 8 - 2x - 10 \ge 8$
 $10x - 2 \ge 8$
 $10x$

14.
$$4(3x + 2) - 2(x + 5) \ge 8$$

 $12x + 8 - 2x - 10 \ge 8$
 $10x - 2 \ge 8$
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14.
$$4(3x + 2) - 2(x + 5) \ge 8$$

 $12x + 8 - 2x - 10 \ge 8$
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 $10x \ge 10$

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$$4(3x + 2) - 2(x + 5) \ge 8$$

 $12x + 8 - 2x - 10 \ge 8$
 $10x - 2 \ge 8$
 $10x \ge 10$

14.
$$4(3x + 2) - 2(x + 5) \ge 8$$

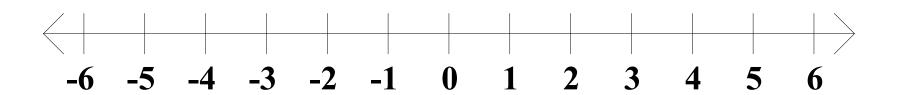
 $12x + 8 - 2x - 10 \ge 8$
 $10x - 2 \ge 8$
 $10x \ge 10$
 $x \ge 10$

14.
$$4(3x + 2) - 2(x + 5) \ge 8$$

 $12x + 8 - 2x - 10 \ge 8$
 $10x - 2 \ge 8$
 $10x \ge 10$
 $x \ge 1$

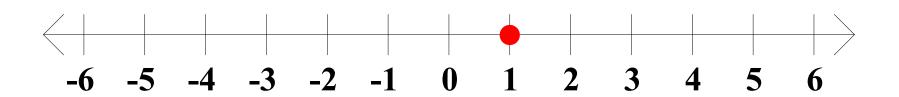
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$$4(3x + 2) - 2(x + 5) \ge 8$$

 $12x + 8 - 2x - 10 \ge 8$
 $10x - 2 \ge 8$
 $10x \ge 10$
 $x \ge 1$



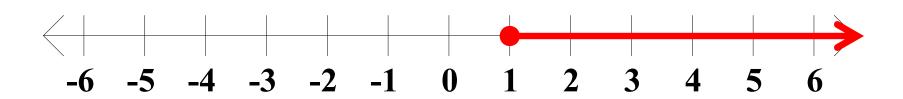
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$$4(3x + 2) - 2(x + 5) \ge 8$$

 $12x + 8 - 2x - 10 \ge 8$
 $10x - 2 \ge 8$
 $10x \ge 10$
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$$4(3x + 2) - 2(x + 5) \ge 8$$

 $12x + 8 - 2x - 10 \ge 8$
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14.
$$4(3x + 2) - 2(x + 5) \ge 8$$

 $12x + 8 - 2x - 10 \ge 8$
 $10x - 2 \ge 8$
 $10x \ge 10$
 $x \ge 1$
 $S =$

14.
$$4(3x + 2) - 2(x + 5) \ge 8$$

 $12x + 8 - 2x - 10 \ge 8$
 $10x - 2 \ge 8$
 $10x \ge 10$
 $x \ge 1$
 $S = [$

14.
$$4(3x + 2) - 2(x + 5) \ge 8$$

 $12x + 8 - 2x - 10 \ge 8$
 $10x - 2 \ge 8$
 $10x \ge 10$
 $x \ge 1$
 $S = \begin{bmatrix} 1 \end{bmatrix}$

14.
$$4(3x + 2) - 2(x + 5) \ge 8$$

 $12x + 8 - 2x - 10 \ge 8$
 $10x - 2 \ge 8$
 $10x \ge 10$
 $x \ge 1$
 $S = \begin{bmatrix} 1 \\ 4 \end{bmatrix}$

14.
$$4(3x + 2) - 2(x + 5) \ge 8$$

 $12x + 8 - 2x - 10 \ge 8$
 $10x - 2 \ge 8$
 $10x \ge 10$
 $x \ge 1$
 $S = \begin{bmatrix} 1, \infty \end{bmatrix}$

14.
$$4(3x + 2) - 2(x + 5) \ge 8$$

 $12x + 8 - 2x - 10 \ge 8$
 $10x - 2 \ge 8$
 $10x \ge 10$
 $x \ge 1$
 $S = [1, \infty)$

14.
$$4(3x + 2) - 2(x + 5) \ge 8$$

 $12x + 8 - 2x - 10 \ge 8$
 $10x - 2 \ge 8$
 $10x \ge 10$
 $x \ge 1$
 $S = [1, \infty)$

15.
$$5(3x+1)-4(5x-3)>2$$

15.
$$5(3x + 1) - 4(5x - 3) > 2$$

15x

15.
$$5(3x + 1) - 4(5x - 3) > 2$$

15x +

15.
$$5(3x + 1) - 4(5x - 3) > 2$$

15x + 5

15.
$$5(3x + 1) - 4(5x - 3) > 2$$

15x + 5 -

15.
$$5(3x + 1) - 4(5x - 3) > 2$$

 $15x + 5 - 20x$

15.
$$5(3x + 1) - 4(5x - 3) > 2$$

15x + 5 - 20x +

15.
$$5(3x + 1) - 4(5x - 3) > 2$$

 $15x + 5 - 20x + 12$

15.
$$5(3x + 1) - 4(5x - 3) > 2$$

 $15x + 5 - 20x + 12 >$

15.
$$5(3x + 1) - 4(5x - 3) > 2$$

 $15x + 5 - 20x + 12 > 2$

15.
$$5(3x + 1) - 4(5x - 3) > 2$$

 $15x + 5 - 20x + 12 > 2$
 $-5x$

15.
$$5(3x + 1) - 4(5x - 3) > 2$$

 $15x + 5 - 20x + 12 > 2$
 $-5x +$

15.
$$5(3x + 1) - 4(5x - 3) > 2$$

 $15x + 5 - 20x + 12 > 2$
 $-5x + 17$

15.
$$5(3x + 1) - 4(5x - 3) > 2$$

 $15x + 5 - 20x + 12 > 2$
 $-5x + 17 >$

15.
$$5(3x + 1) - 4(5x - 3) > 2$$

 $15x + 5 - 20x + 12 > 2$
 $-5x + 17 > 2$

15.
$$5(3x + 1) - 4(5x - 3) > 2$$

 $15x + 5 - 20x + 12 > 2$
 $-5x + 17 > 2$

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$$5(3x + 1) - 4(5x - 3) > 2$$

 $15x + 5 - 20x + 12 > 2$
 $-5x + 17 > 2$

15.
$$5(3x + 1) - 4(5x - 3) > 2$$

 $15x + 5 - 20x + 12 > 2$
 $-5x + 17 > 2$
 $-5x > -15$

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$$5(3x + 1) - 4(5x - 3) > 2$$

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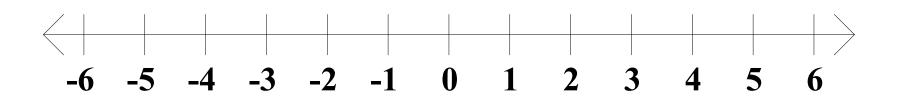
 $15x + 5 - 20x + 12 > 2$
 $-5x + 17 > 2$
 $-5x > -15$
 $x <$

15.
$$5(3x + 1) - 4(5x - 3) > 2$$

 $15x + 5 - 20x + 12 > 2$
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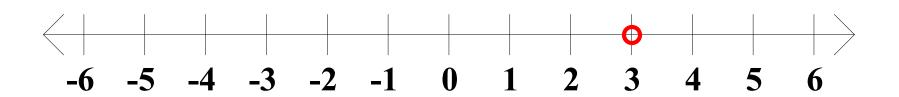
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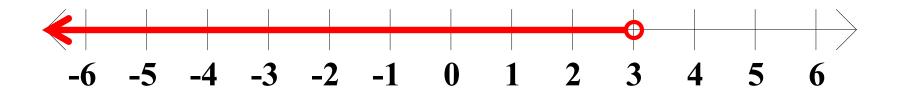
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 $15x + 5 - 20x + 12 > 2$
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15.
$$5(3x + 1) - 4(5x - 3) > 2$$

 $15x + 5 - 20x + 12 > 2$
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 $S = (-\infty)$

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$$5(3x + 1) - 4(5x - 3) > 2$$

 $15x + 5 - 20x + 12 > 2$
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$$5(3x + 1) - 4(5x - 3) > 2$$

 $15x + 5 - 20x + 12 > 2$
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 $15x + 5 - 20x + 12 > 2$
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15.
$$5(3x + 1) - 4(5x - 3) > 2$$

 $15x + 5 - 20x + 12 > 2$
 $-5x + 17 > 2$
 $-5x > -15$
 $x < 3$
 $S = (-\infty, 3)$

16.
$$3(4x-3)-4(2x-3) \le 4(x-3)-5(2x-1)$$

16.
$$3(4x-3)-4(2x-3) \le 4(x-3)-5(2x-1)$$

12x

16.
$$3(4x-3)-4(2x-3) \le 4(x-3)-5(2x-1)$$

 $12x-$

16.
$$3(4x-3)-4(2x-3) \le 4(x-3)-5(2x-1)$$

 $12x-9$

16.
$$3(4x-3)-4(2x-3) \le 4(x-3)-5(2x-1)$$

 $12x-9-$

16.
$$3(4x-3)-4(2x-3) \le 4(x-3)-5(2x-1)$$

 $12x-9-8x$

16.
$$3(4x-3)-4(2x-3) \le 4(x-3)-5(2x-1)$$

 $12x-9-8x+$

16.
$$3(4x-3)-4(2x-3) \le 4(x-3)-5(2x-1)$$

 $12x-9-8x+12$

16.
$$3(4x-3)-4(2x-3) \le 4(x-3)-5(2x-1)$$

 $12x-9-8x+12 \le$

16.
$$3(4x-3)-4(2x-3) \le 4(x-3)-5(2x-1)$$

 $12x-9-8x+12 \le 4x$

16.
$$3(4x-3)-4(2x-3) \le 4(x-3)-5(2x-1)$$

 $12x-9-8x+12 \le 4x-$

16.
$$3(4x-3)-4(2x-3) \le 4(x-3)-5(2x-1)$$

 $12x-9-8x+12 \le 4x-12$

16.
$$3(4x-3)-4(2x-3) \le 4(x-3)-5(2x-1)$$

 $12x-9-8x+12 \le 4x-12-$

16.
$$3(4x-3)-4(2x-3) \le 4(x-3)-5(2x-1)$$

 $12x-9-8x+12 \le 4x-12-10x$

16.
$$3(4x-3)-4(2x-3) \le 4(x-3)-5(2x-1)$$

 $12x-9-8x+12 \le 4x-12-10x+$

16.
$$3(4x-3)-4(2x-3) \le 4(x-3)-5(2x-1)$$

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16.
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 $4x+$

16.
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 $12x-9-8x+12 \le 4x-12-10x+5$
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16.
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 $12x-9-8x+12 \le 4x-12-10x+5$
 $4x+3 \le$

16.
$$3(4x-3)-4(2x-3) \le 4(x-3)-5(2x-1)$$

 $12x-9-8x+12 \le 4x-12-10x+5$
 $4x+3 \le -6x$

16.
$$3(4x-3)-4(2x-3) \le 4(x-3)-5(2x-1)$$

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$$3(4x-3)-4(2x-3) \le 4(x-3)-5(2x-1)$$

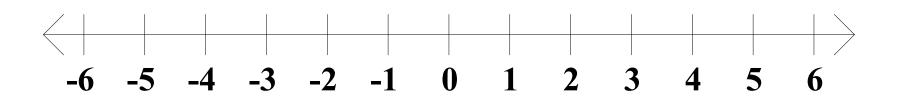
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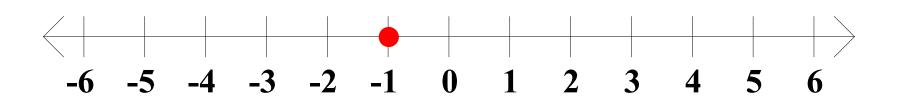
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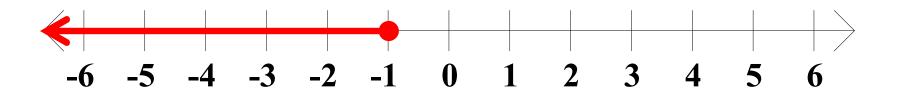
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 $12x-9-8x+12 \le 4x-12-10x+5$
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16.
$$3(4x-3)-4(2x-3) \le 4(x-3)-5(2x-1)$$

 $12x-9-8x+12 \le 4x-12-10x+5$
 $4x+3 \le -6x-7$
 $10x \le -10$
 $x \le -1$
 $S =$

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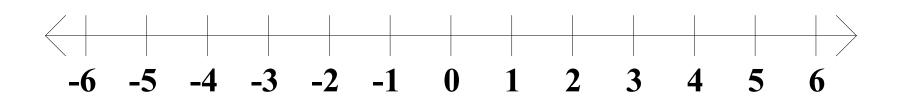
 $12x-9-8x+12 \le 4x-12-10x+5$
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Express each of the following as a single interval.

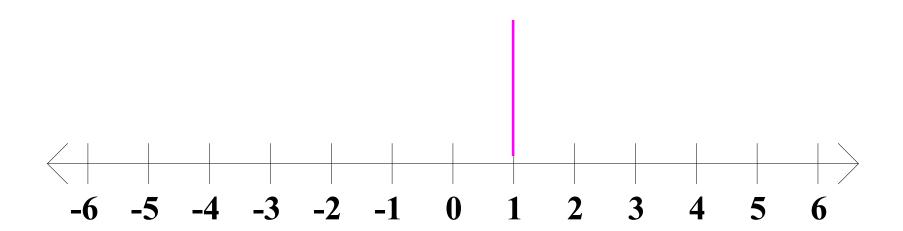
17.
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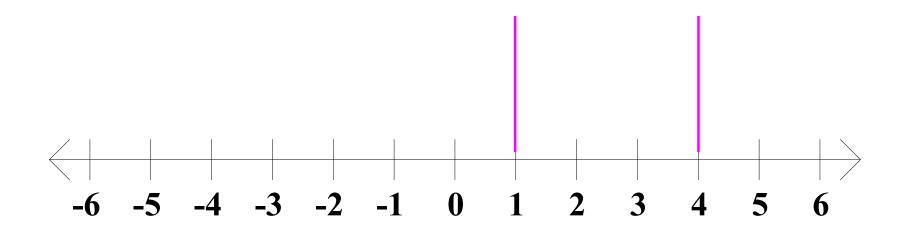
17.
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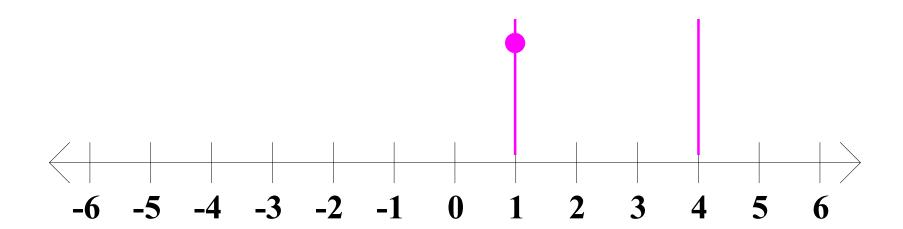
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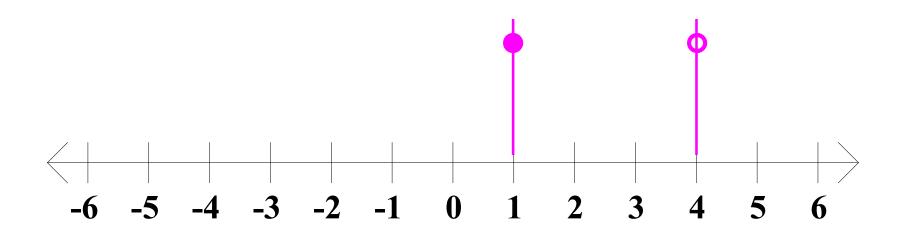
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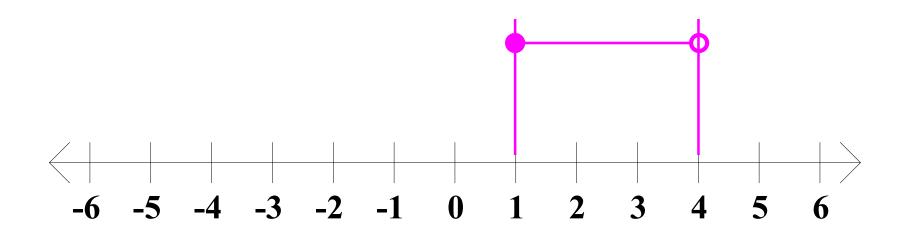
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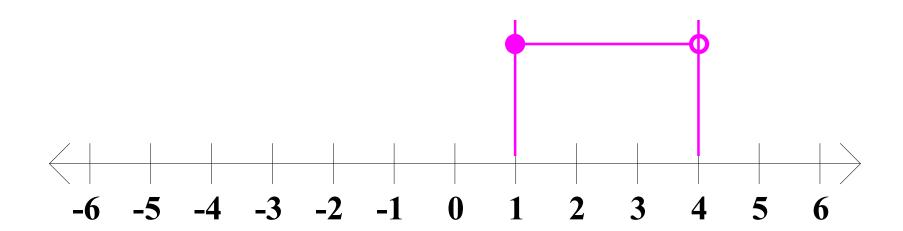
17.
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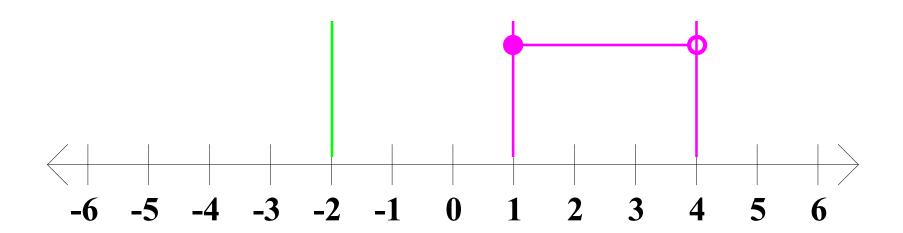
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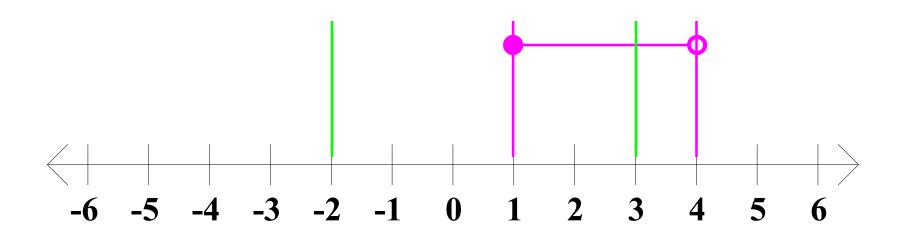
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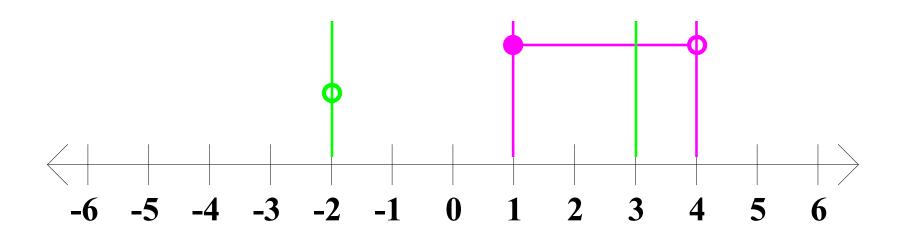
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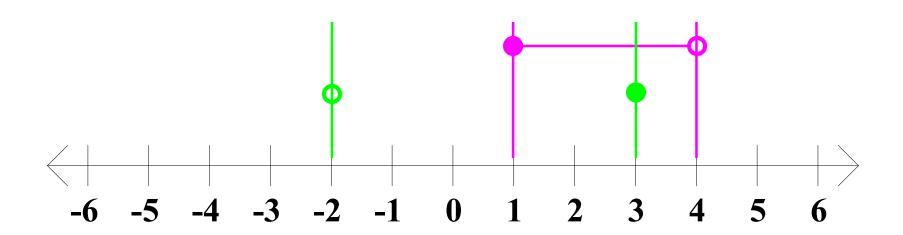
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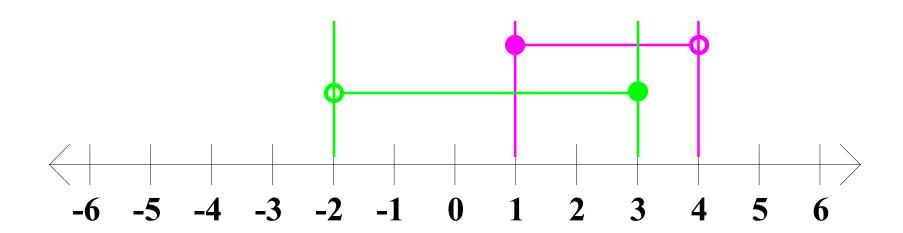
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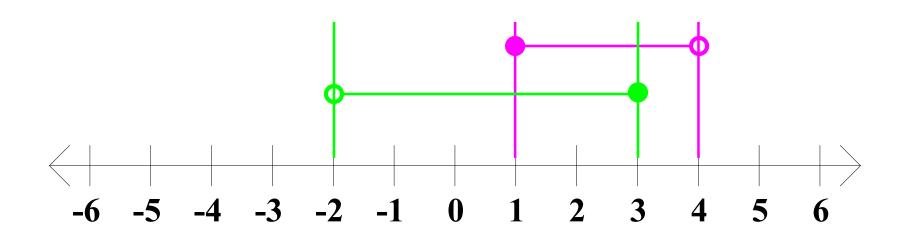
17.
$$[1,4) \cap (-2,3] =$$

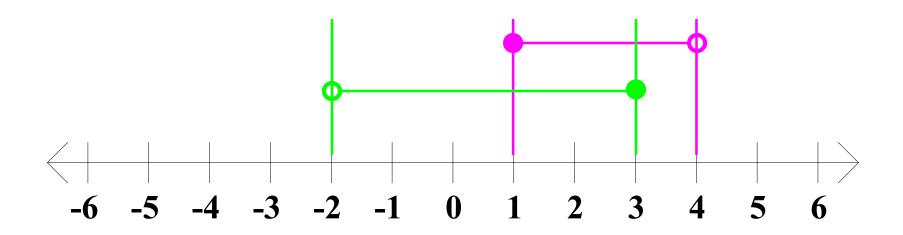


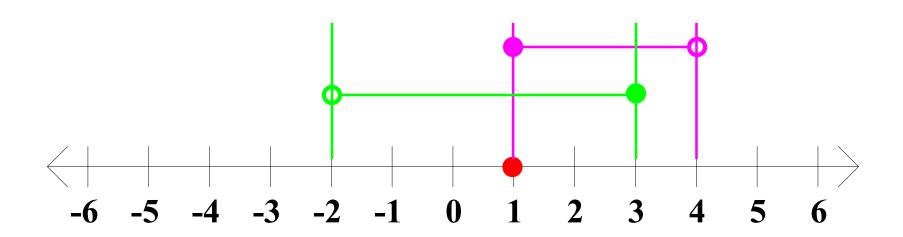
17.
$$[1,4) \cap (-2,3] =$$

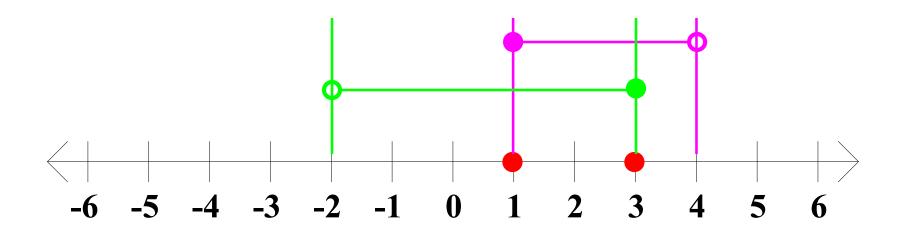


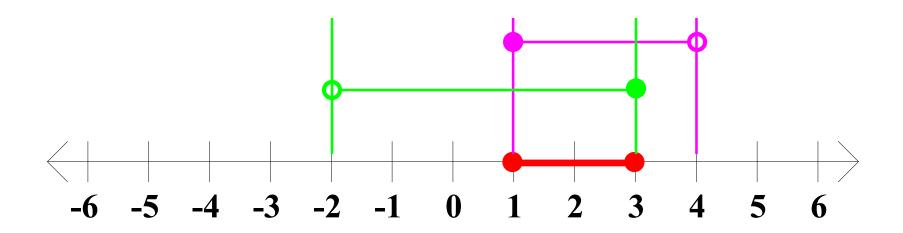
17.
$$[1,4)$$
 $(-2,3]$ = _____



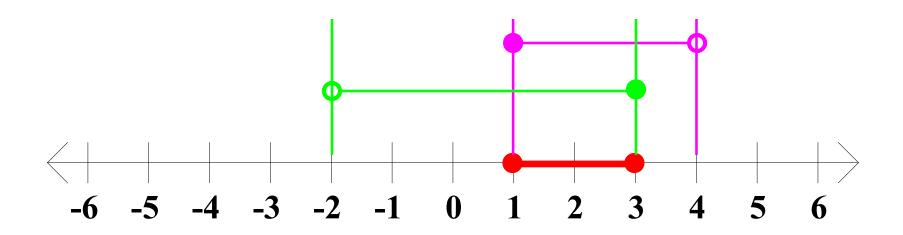




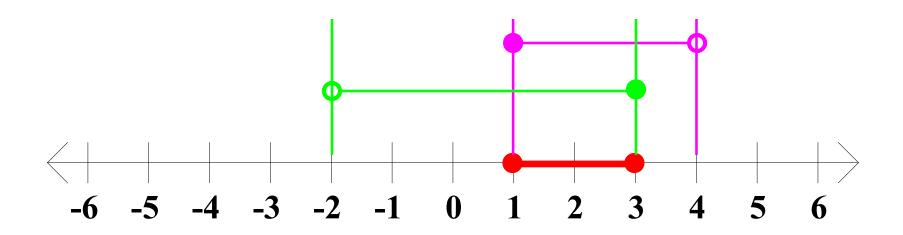




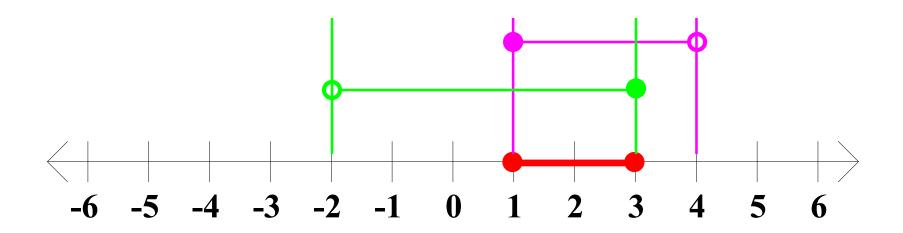
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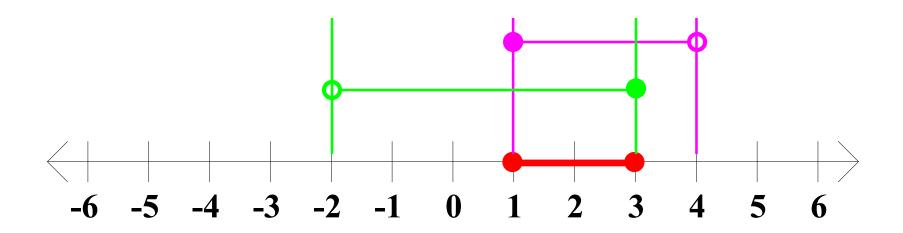
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 (-2,3] = $[1]$ intersection



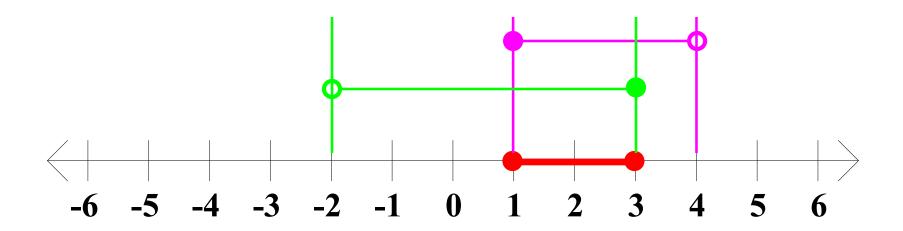
17.
$$[1,4)$$
 (-2,3] = $[1,$ intersection



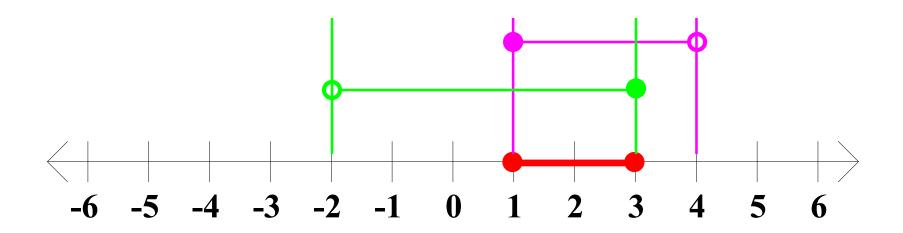
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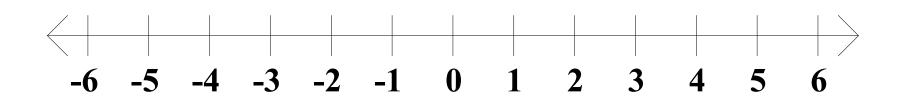
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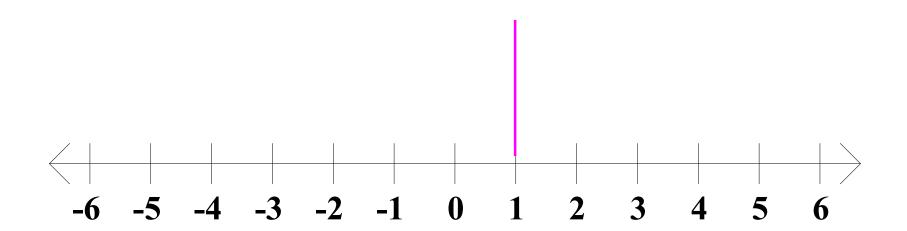
18.
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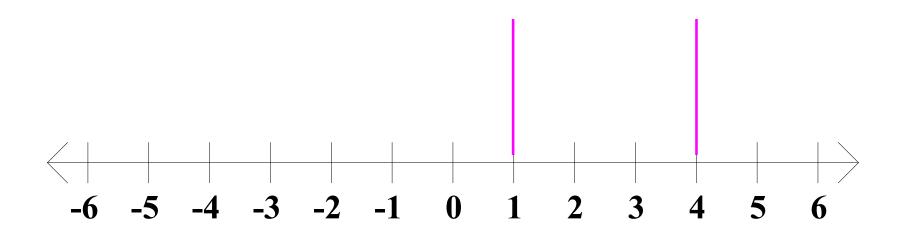
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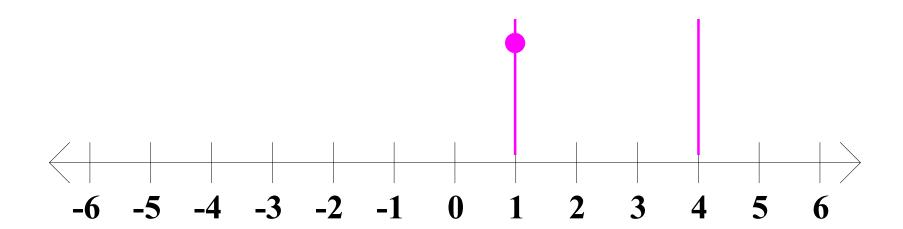
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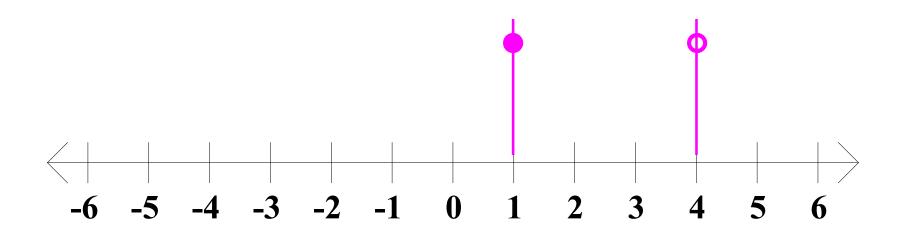
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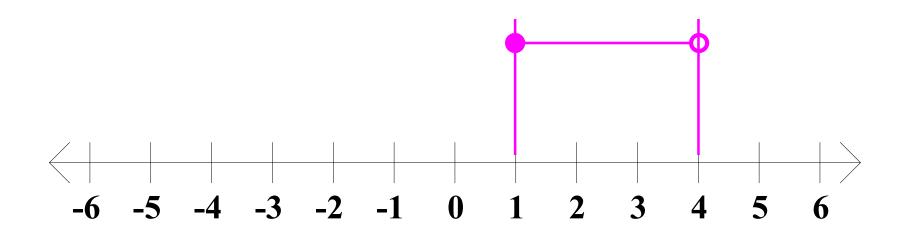
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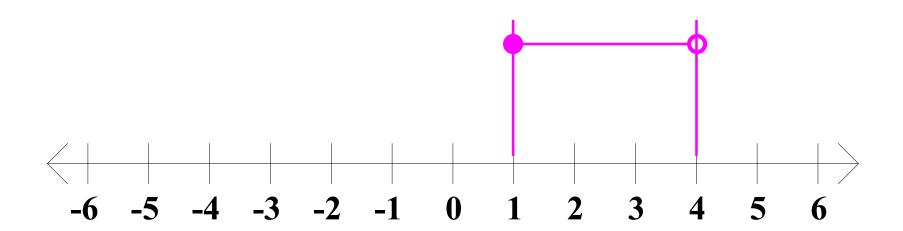
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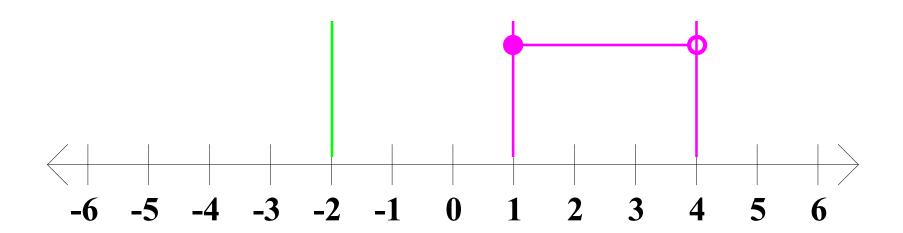
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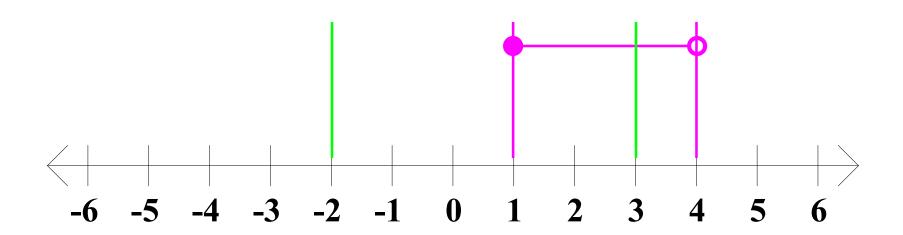
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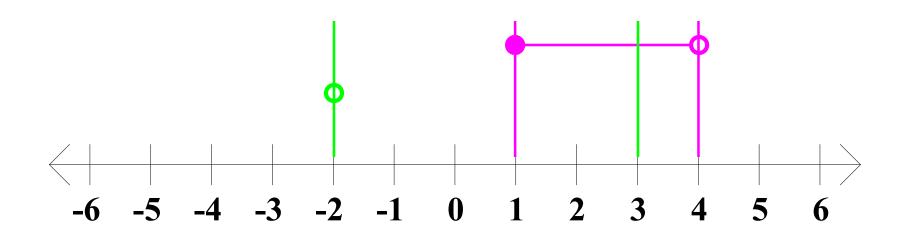
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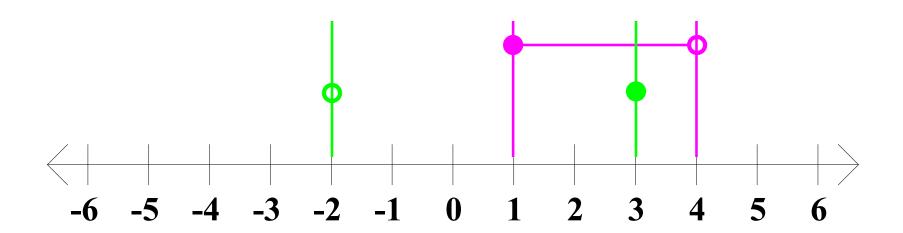
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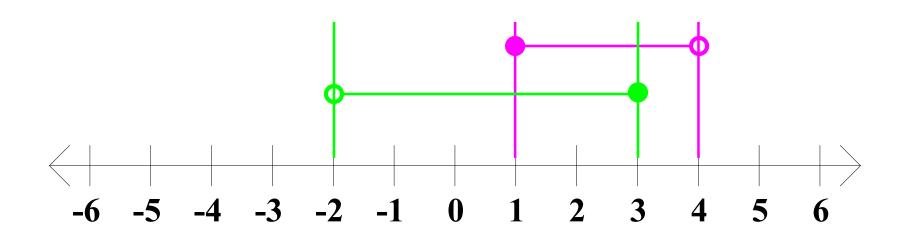
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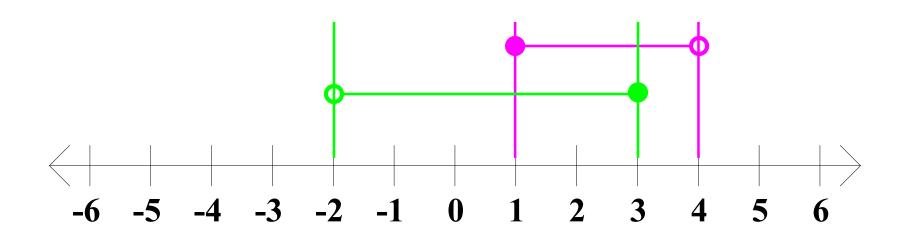


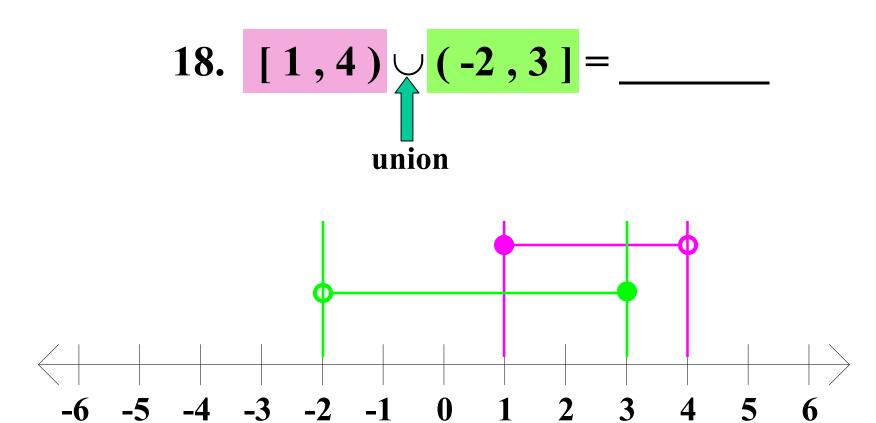
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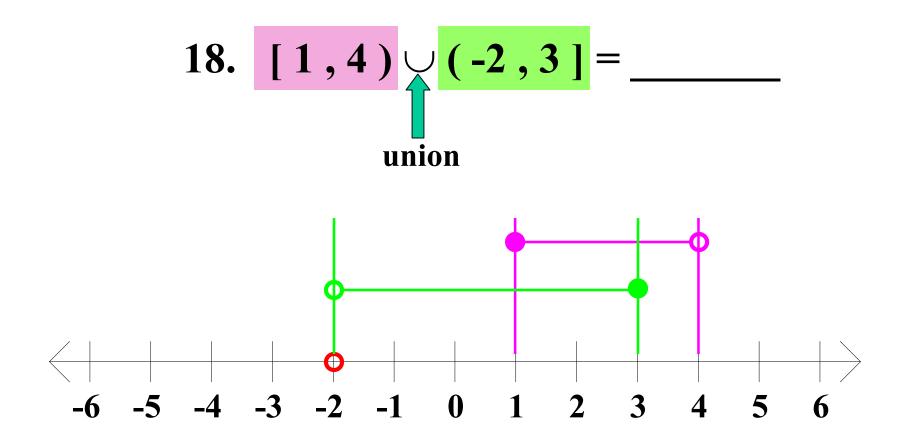


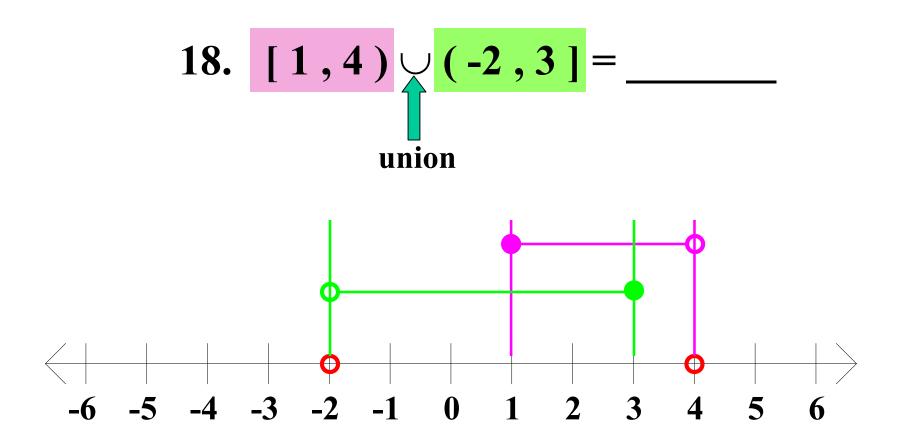
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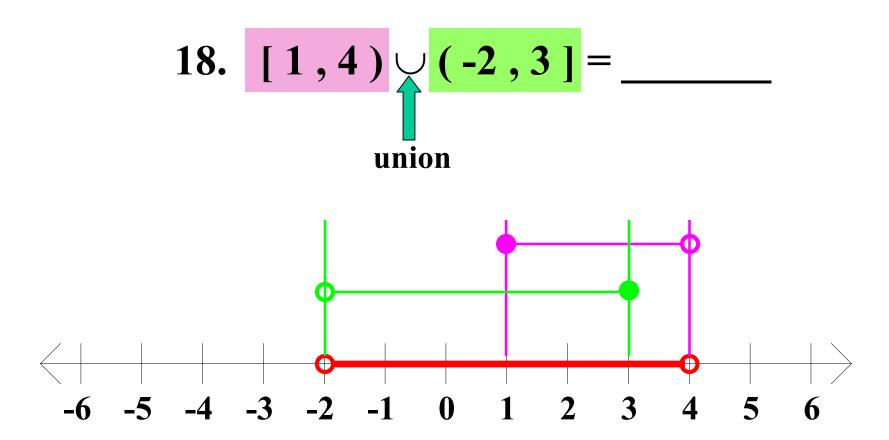






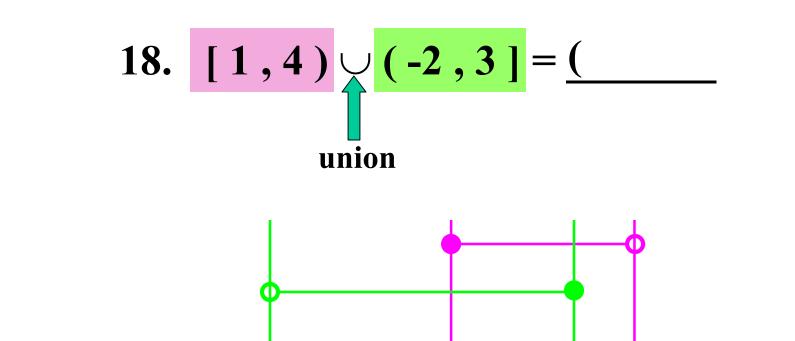


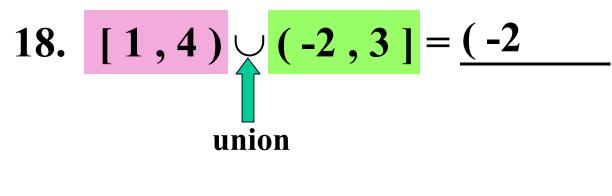


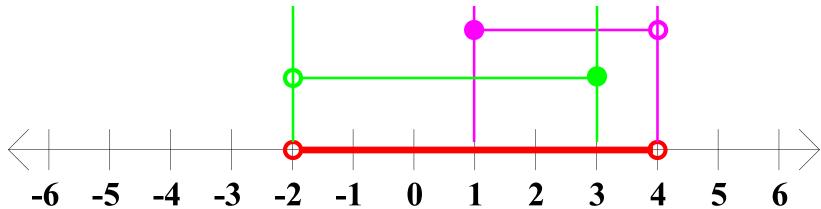


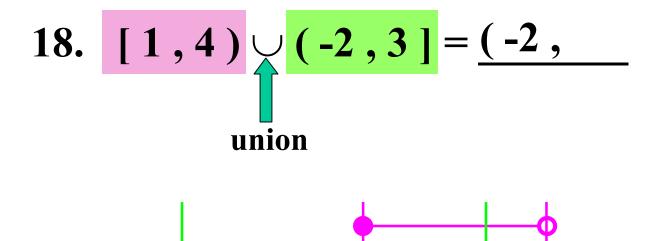
Express each of the following as a single interval.

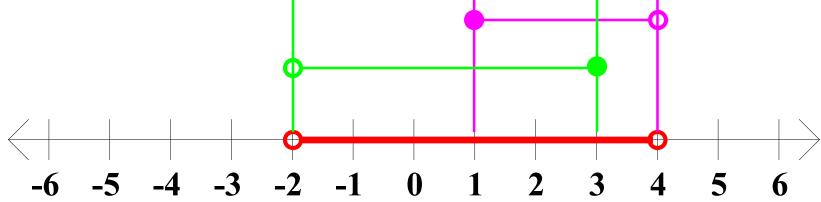
-6 -5 -4 -3 -2 -1 0 1 2

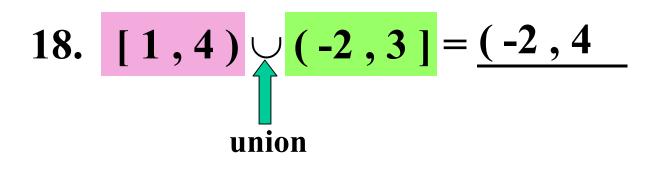


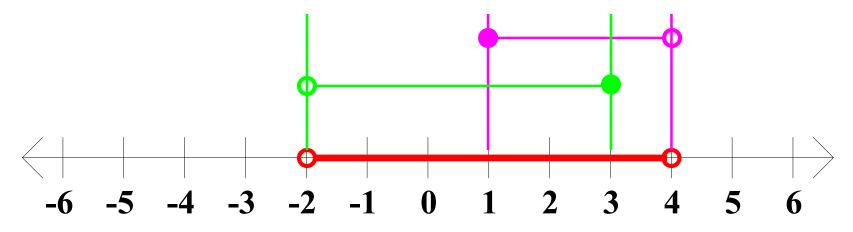


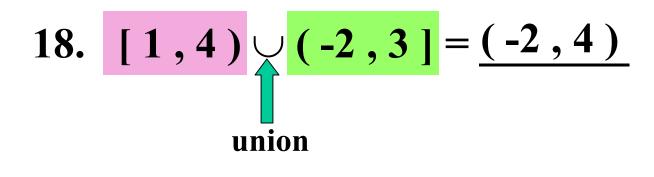


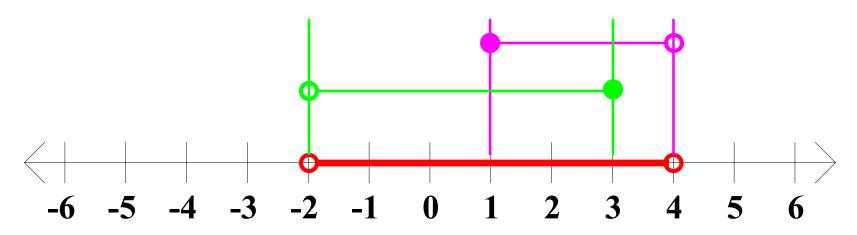


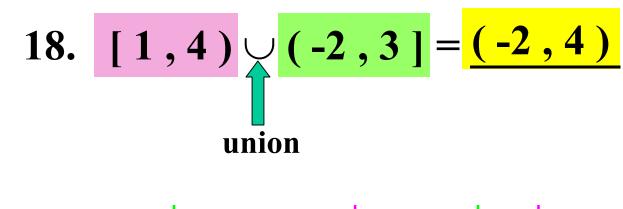


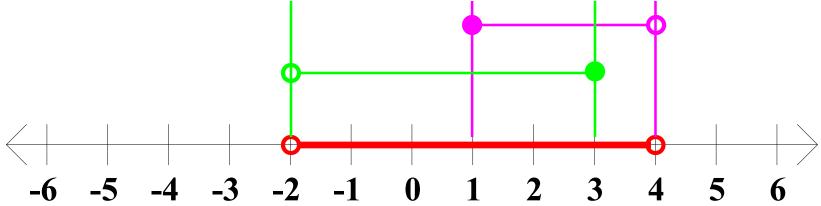








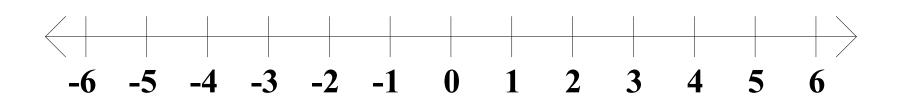




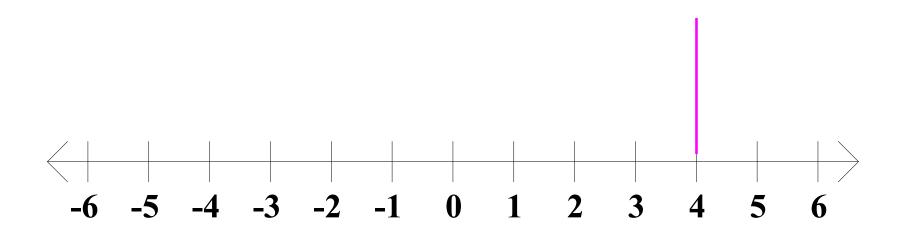
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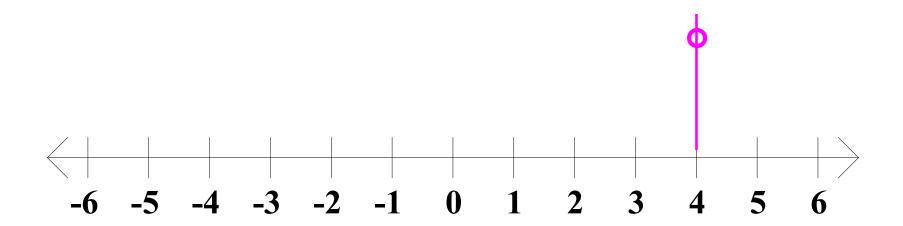
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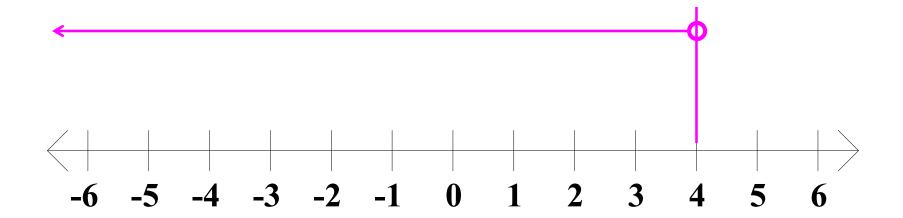
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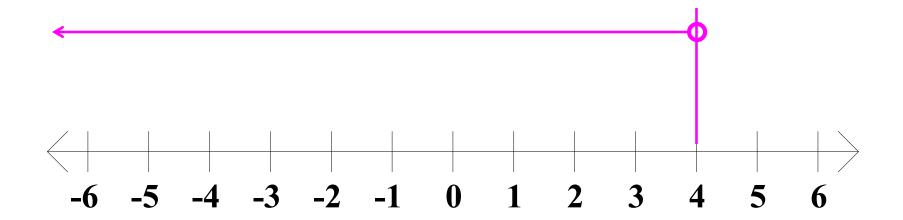
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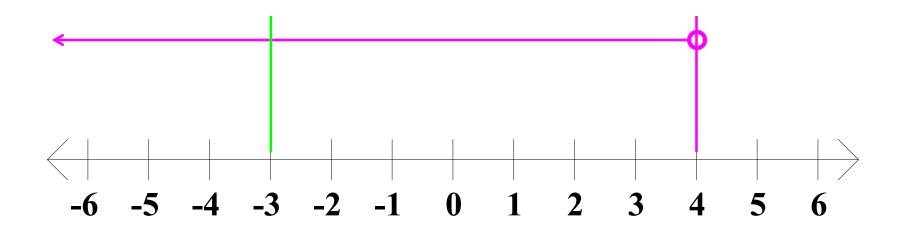
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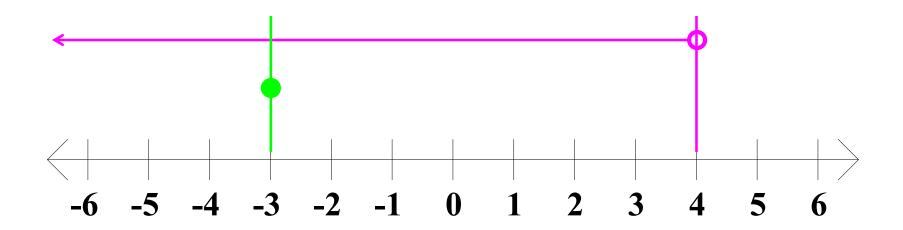
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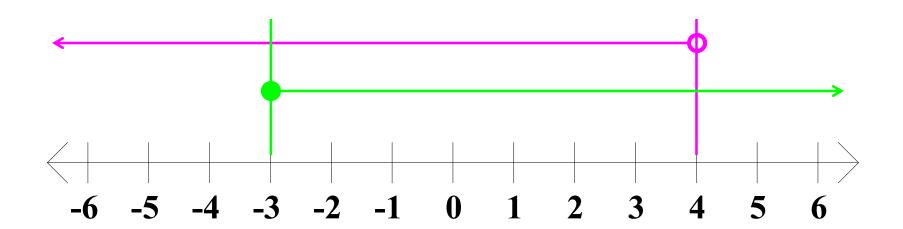
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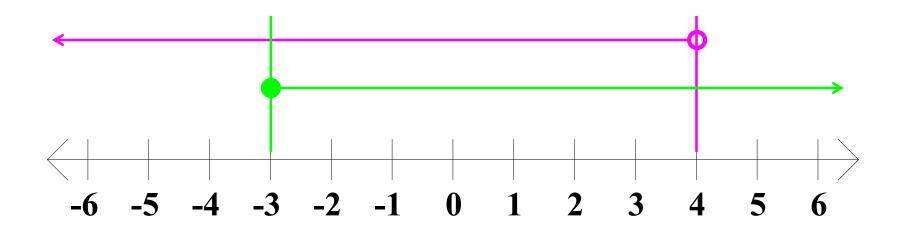
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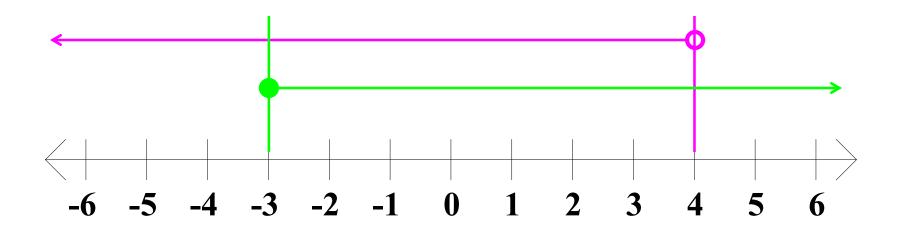


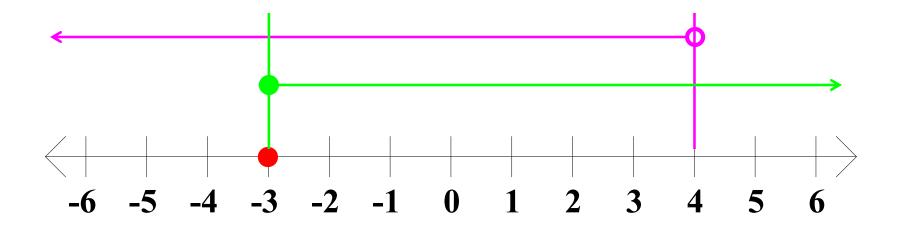
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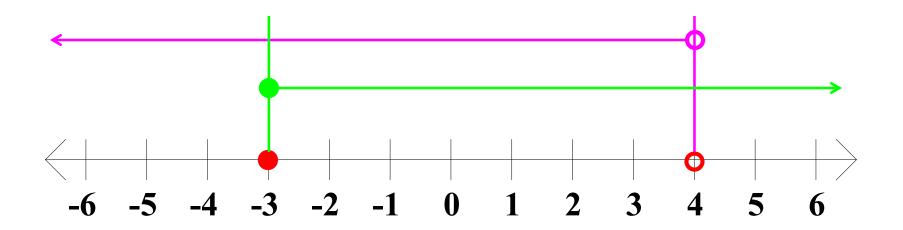


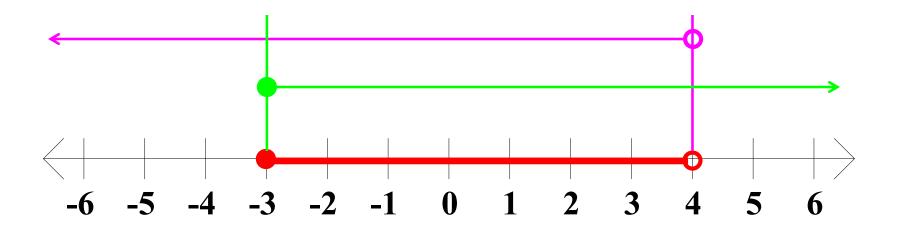
19.
$$(-\infty, 4)$$
 $=$ $[-3, \infty)$



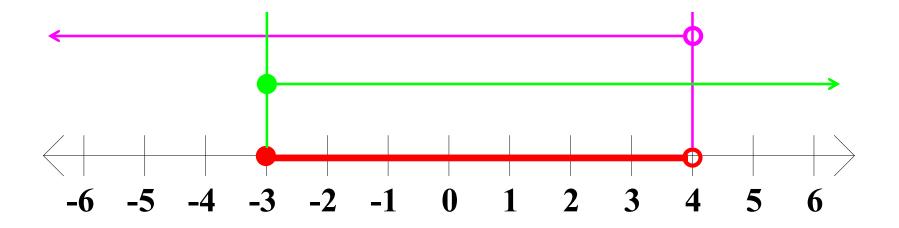




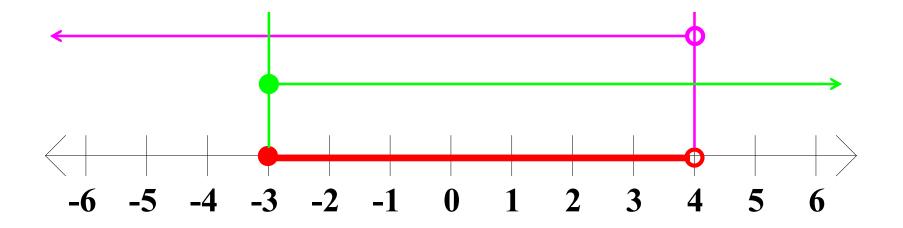




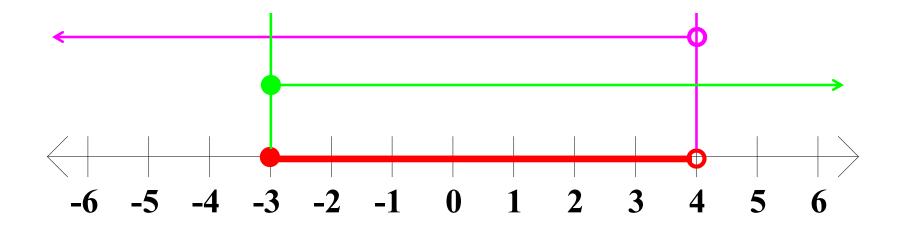
19.
$$(-\infty, 4)$$
 $[-3, \infty) = [$ intersection



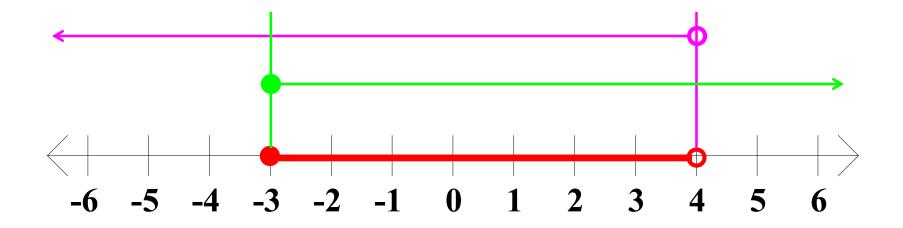
19.
$$(-\infty, 4)$$
 $(-3, \infty) = [-3]$ intersection



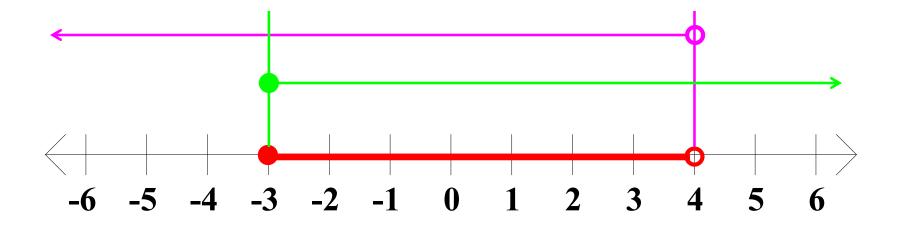
19.
$$(-\infty, 4)$$
 $(-3, \infty) = [-3, \infty)$ intersection



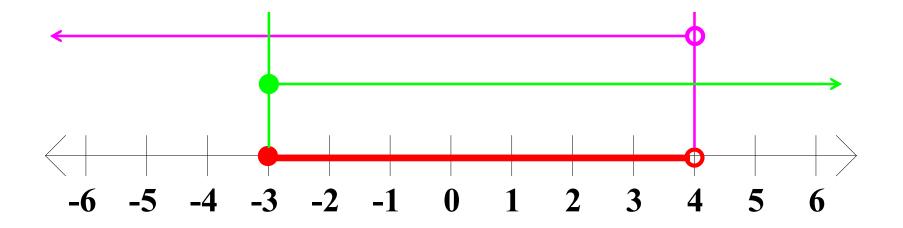
19.
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intersection



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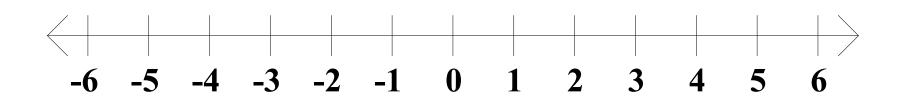
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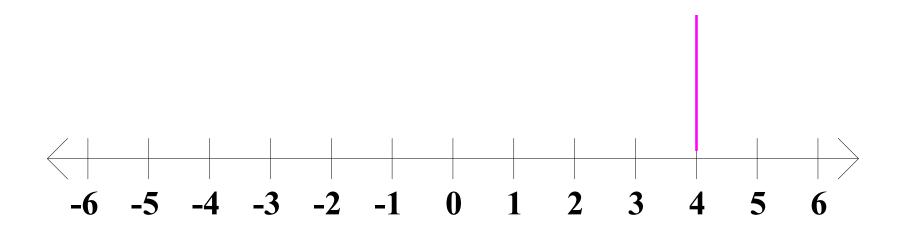
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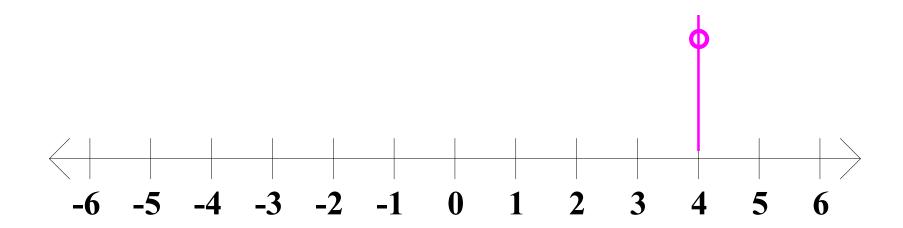
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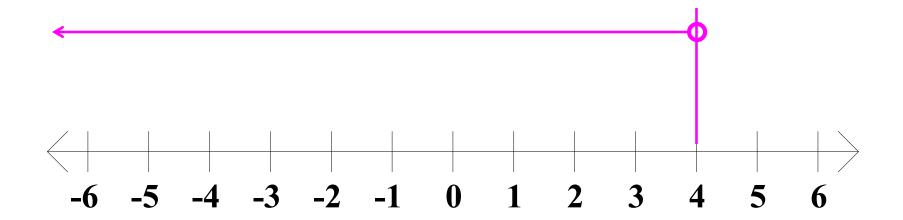
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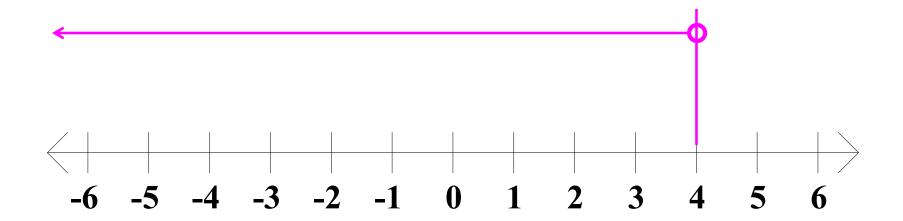
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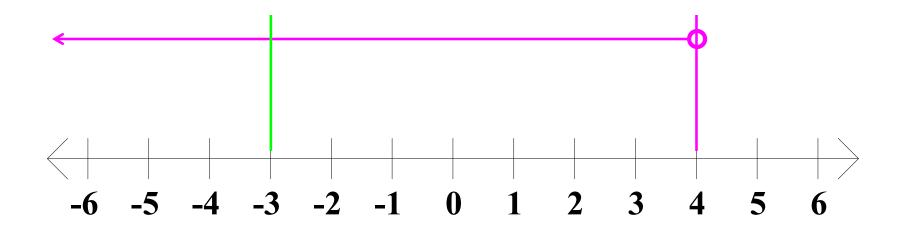
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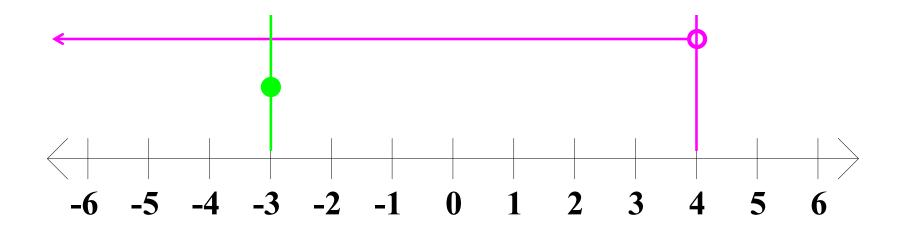
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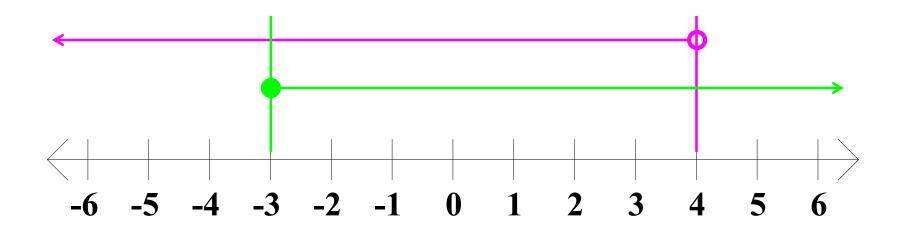
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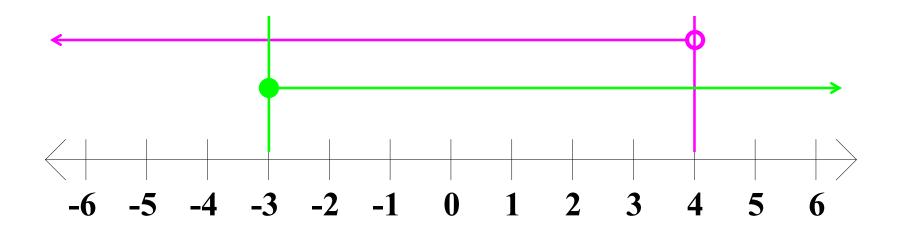
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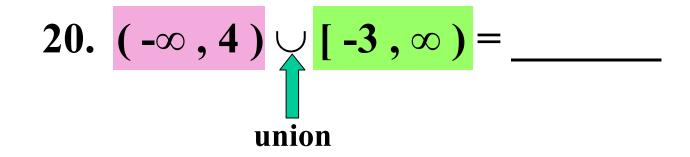


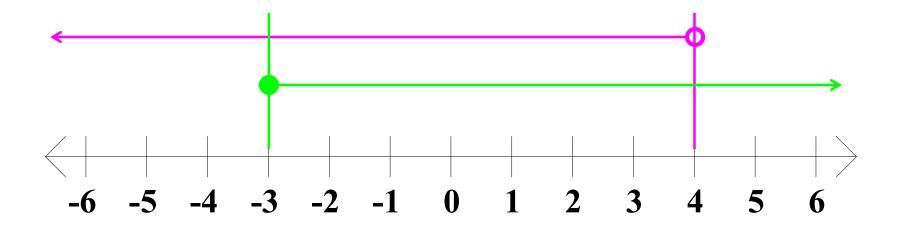
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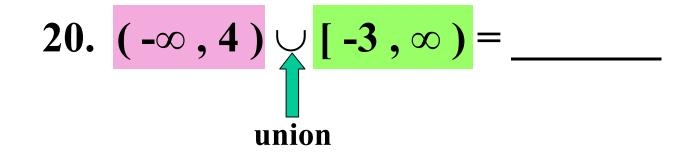


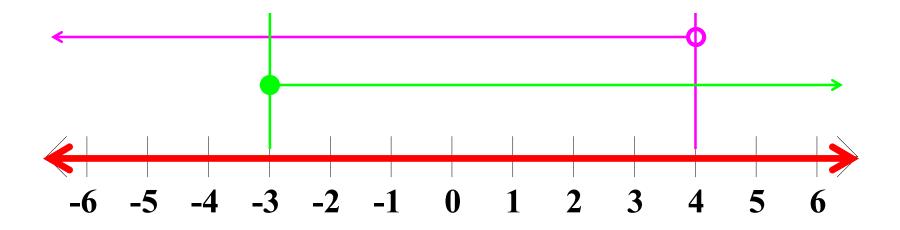
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$$(-\infty, 4)$$
 $[-3, \infty) =$

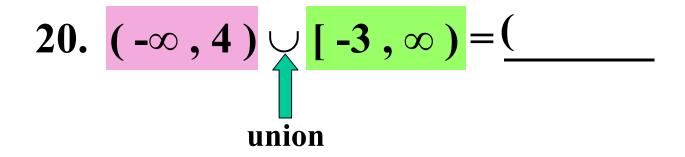


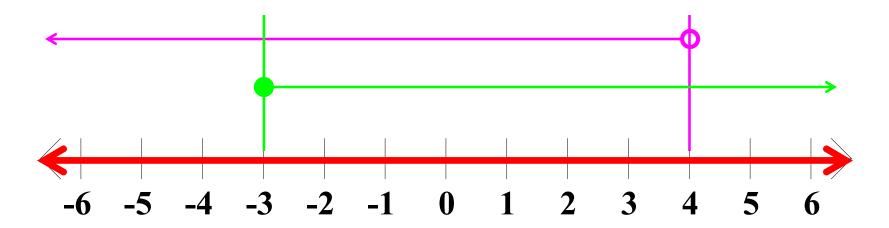


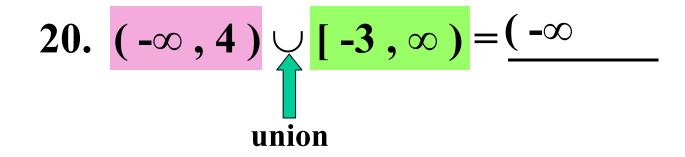


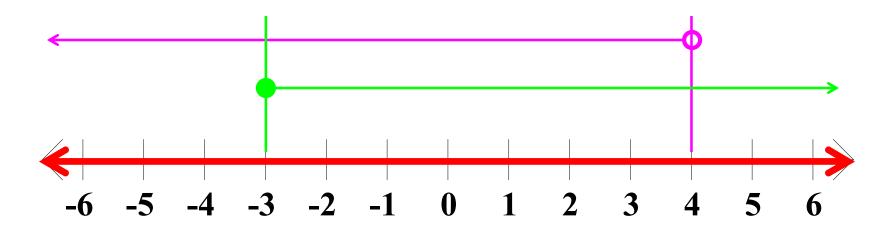


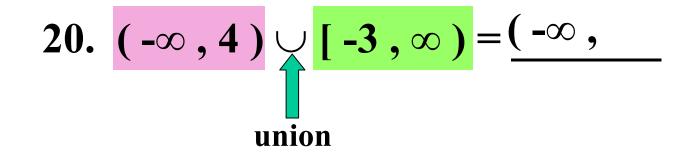


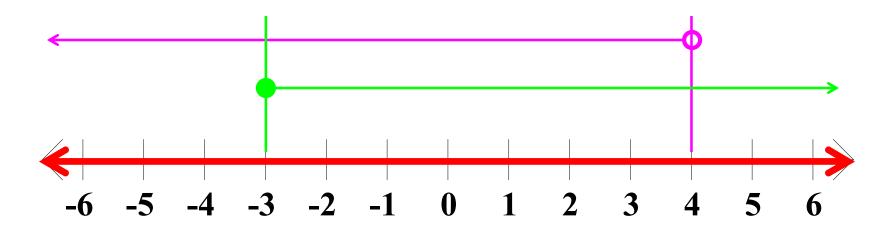




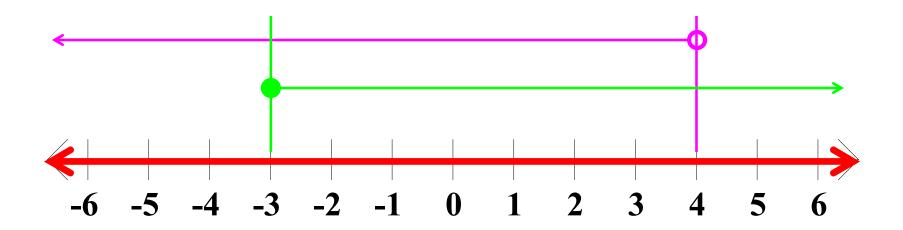








20.
$$(-\infty, 4)$$
 $(-\infty, \infty) = (-\infty, \infty)$ union



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