01-23-25 MDE 61

1 Relations and Functions
1.1 Sets of Real Numbers and the Cartesian Coordinate Plane
1.1.4 Exercises
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1.2 Relations
1.2.2 Exercises
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1.1: 11

In Exercises 8 - 19, write the set using interval notation.

11. $\{x \mid x \neq 0, 2\}$

graph

interval notation

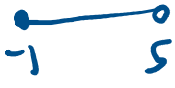
$(-\infty, 0) \cup (0, 2) \cup (2, \infty)$

1.1

1. Fill in the chart below:

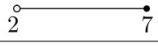
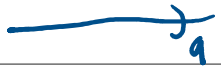
graph

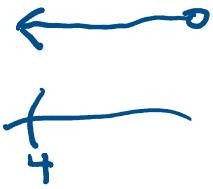
Set of Real Numbers	Interval Notation	Region on the Real Number Line
$\{x \mid -1 \leq x < 5\}$	$[-1, 5)$	
	$[0, 3)$	
		



1. Fill in the chart below:

graph

Set of Real Numbers	Interval Notation	Region on the Real Number Line
$\{x \mid -1 \le x < 5\}$	$[-1, 5)$	
	$[0, 3)$	
		
$\{x \mid -5 < x \le 0\}$		
	$(-3, 3)$	
		
$\{x \mid x \le 3\}$		
$\{x \mid x < 9\}$	$(-\infty, 9)$	
$\{x \mid x > 4\}$	$(4, \infty)$	
$\{x \mid x \ge -3\}$		



1.1: 3

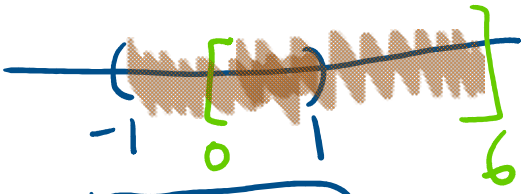
In Exercises 2 - 7, find the indicated intersection or union and simplify if possible. Express your answers in interval notation.

union

3. $(-1, 1) \cup [0, 6]$

intersection

$(-1, 1) \cap [0, 6]$



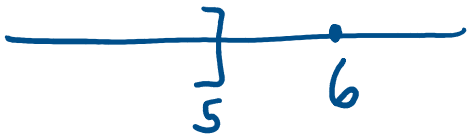
$(-1, 6]$

$[0, 1)$

1.1: 17

In Exercises 8 - 19, write the set using interval notation.

17. $\{x \mid x \le 5 \text{ or } x = 6\}$

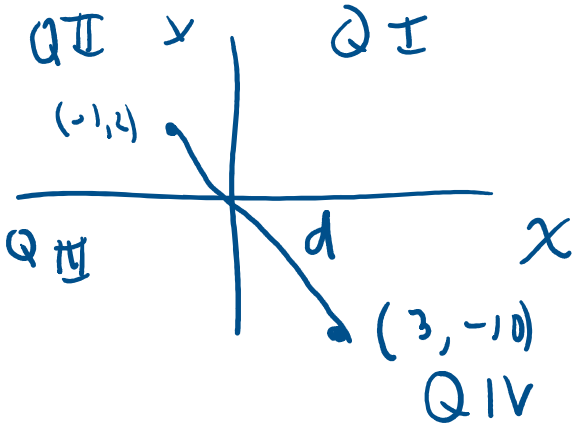


$(-\infty, 5] \cup \{6\}$

1.1: 23

In Exercises 22 - 29, find the distance d between the points and the midpoint M of the line segment which connects them.

23. $(3, -10), (-1, 2)$



$d = \sqrt{(x_1 - x_0)^2 + (y_1 - y_0)^2}$

$d = \sqrt{(-1-3)^2 + (2-(-10))^2}$

$d = \sqrt{(-4)^2 + (12)^2}$

$d = \sqrt{16 + 144}$

$d = \sqrt{160}$

$d = \sqrt{16 \cdot 10}$

$d = \sqrt{16}\sqrt{10}$

$d = 4\sqrt{10}$ exact

$d \approx 12.65$ approximate

4*sqrt(10)=12.64911064067352

1.2

Memorize

Definition 1.4. A **relation** is a set of points in the plane.

$R = \{(1,3), (-5,6), (7,10)\}$

$(1,3) \in R$

$(100,200) \notin R$

$(1,3)$ is R-related to $(-5,6)$

1.2

Example 1.2.1. Graph the following relations.

2. $HLS_1 = \{(x,3) \mid -2 \leq x \leq 4\}$