9.1 One-Variable Linear Inequalities **Math 55 Professor Busken**

Objectives

- Solve inequalities
- Applications

Exercises

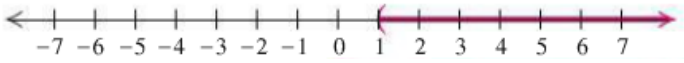
1. Determine if each number is a solution of $x \le 2$

   a) $^-8$ b) $^-3$ c) 6 d) $^-1$

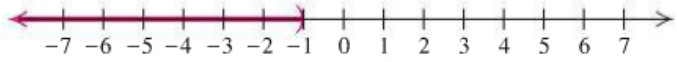
2. Graph each inequality on a number line.

   a) $x < 20$ b) $x > 5$ c) $x \le {}^-3$ d) $4 \ge x$ e) $^-4 \le x \le 9$

3. Describe the graph using both set-builder notation and interval notation.



4. Describe the graph using both set-builder notation and interval notation.



5. Describe the graph using both set-builder notation and interval notation.

6. Write interval notation for each set given below.

   a) $\{x \mid x < 12\}$ b) $\{x \mid x \ge -4\}$ c) $\{x \mid 2 \le x < 12\}$

7. Write set-builder notation for each interval given below.

   a) $(^-\infty, 19]$ b) $[13, \infty)$ c) $(-2.33, 4.56]$

8. Solve each inequality. Use both set-builder notation and interval notation for each answer.

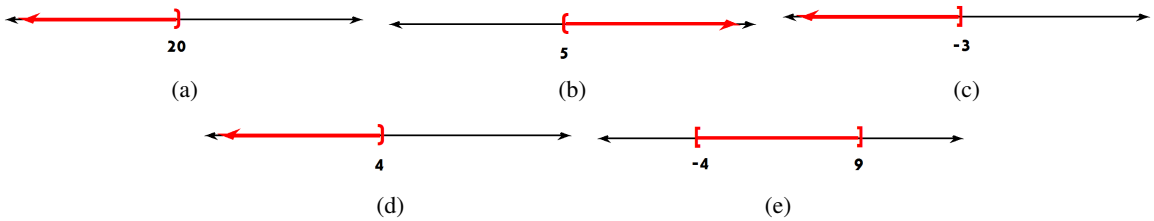
   a) $x - 3 \le 2$ b) $\frac{1}{4} - x > \frac{2}{3}$ c) $7x \ge 28$ d) $^-12x \ge 36$

   e) $^-4x - 3 \le 3 - 2x$ f) $22 - 3x > \frac{2}{3} - 7x$ g) $^-16x \ge 4(1 - 5x)$

9. Jerry's test grades are 79, 82, 88, and 90. What scores on a fifth test will make his average 80 or above?

Answers: 1a) yes, b) yes, c) no , d) yes

2)



(a) (b) (c)

(d) (e)

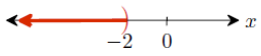
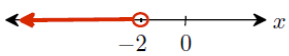
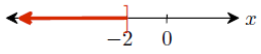
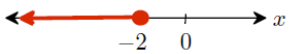
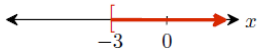
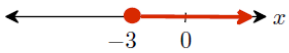
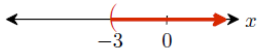
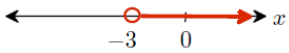
3) $\{x \mid x > 1\}$ or $(1, \infty)$, 4) $\{x \mid x < -1\}$ or $(-\infty, -1)$, 5) $\{x \mid x \geq 0\}$ or $[0, \infty)$, 6a) $(-\infty, 12)$

b) $[-4, \infty)$, c) $[2, 12)$, 7a) $\{x \mid x < 19\}$ b) $\{x \mid x \geq 13\}$ c) $\{x \mid -2.33 < x \leq 4.56\}$

8a) $\{x \mid x \leq 5\}$ or $(-\infty, 5]$ b) $\{x \mid x < -5/12\}$ or $(-\infty, -5/12)$ c) $\{x \mid x \geq 4\}$ or $[4, \infty)$ d) $\{x \mid x \leq -3\}$ or $(-\infty, -3]$ e) $\{x \mid x \geq -3\}$ or $[-3, \infty)$ f) $\{x \mid x > -16/3\}$ or $(-16/3, \infty)$ g) $\{x \mid x \geq 1\}$ or $[1, \infty)$

9) Scores greater than or equal to 61

Interval Notation and Graphing

Inequality Notation	Interval Notation	Graph Using Parenthesis/Brackets	Graph using open and closed circles
$x < -2$	$(-\infty, -2)$		
$x \leq -2$	$(-\infty, -2]$		
$x \geq -3$	$[-3, \infty)$		
$x > -3$	$(-3, \infty)$		

Inequality Notation	Interval Notation	Graph Using Parenthesis/Brackets	Graph using open and closed circles
$-4 < x < 3$	$(-4, 3)$		
$-4 \leq x \leq 3$	$[-4, 3]$		
$-4 < x \leq 3$	$(-4, 3]$		
$-4 \leq x < 3$	$[-4, 3)$