5.1-5.2
Solve Inequalities Using Addition, Subtraction, Multiplication, & Division

When graphing inequalities,
make sure the variable is on the left.
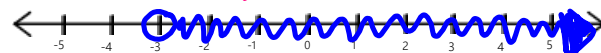
● closed circle

$\geq$ $\leq$
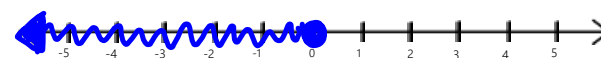
○ open circle

$>$ $<$

Graph the following:

1. x < 2
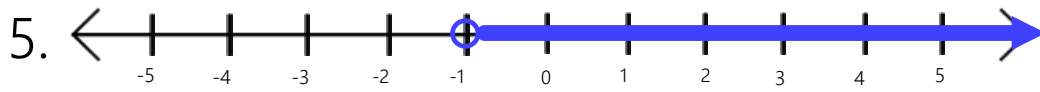

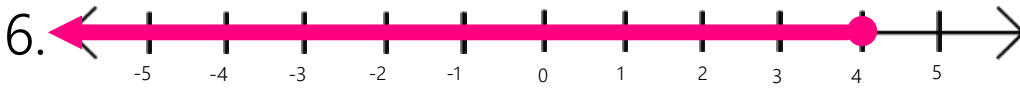2. x ≥ -1

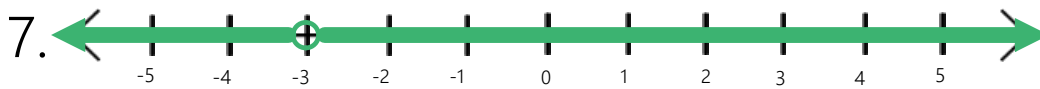3. -3 < x   **x > -3**

4. x ≤ 0

Write an inequality represented by each graph.

5.

$$x > -1$$

6.

$$x \leq 4$$

7.

$$x \neq -3$$

Use inverse operations to solve the inequalities.

Solve and graph.

8. x + 4 < 17

$$\frac{-4 \quad | \quad -4}{x \qquad < 13}$$

12   13   14

9. 3.5 + n ≥ 2

$$\frac{-3.5 \qquad | \quad -3.5}{n \geq -1.5}$$

-2   -1

10. -5 > a - 5

$$\frac{+5 \quad | \quad +5}{0 > a}$$
$$a < 0$$

-1   0   1

11. -22 ≤ k - (-34)

$$\frac{-34 \qquad | \quad -34}{-56 \leq k}$$
$$k \geq -56$$

-57   -56   -55

Verbal problems containing phrases like greater than or less than can often be solved by using inequalities. The following chart shows some other phrases that indicate inequalities.

<	>	≤	≥
• less than • fewer than	• greater than • more than	• at most • no more than • less than or equal to	• at least • no less than • greater than or equal to

12. The sum *(addition)* of -14 and d is less than -22.
    Write an an inequality and solve.

$$-14 + d < -22$$
$$\underline{+14 \qquad\qquad +14}$$
$$d < -8$$

13. The difference *(subtraction)* of 8 and g is at least -17.
    Write an an inequality and solve.

$$8 - g \geq -17$$
$$\underline{-8 \qquad\qquad -8}$$
$$-g \geq -25$$
$$\underline{-1 \qquad -1}$$
$$g \leq 25$$

← Flip inequality when multiply/divide by a negative number

Solve and graph.

14. $\dfrac{4y}{4} > \dfrac{-22}{4}$

$y > -5.5$

-6   -5

15. $2 \cdot \dfrac{g}{2} \geq 31 \cdot 2$

$g \geq 62$

61   62   63

16. $\dfrac{-8}{6} < \dfrac{6b}{6}$

$-\dfrac{4}{3} < b$

$b > -\dfrac{4}{3}$

-2   -1

17. $2 \cdot 1.6 \leq \dfrac{c}{2} \cdot 2$

$3.2 \leq c$

$c \geq 3.2$

3   4

When you multiply or divide BOTH sides of an inequality by a NEGATIVE value, you must FLIP the inequality sign!!

18. $\dfrac{-15h}{-15} > \dfrac{5}{-15}$

$h < -\dfrac{1}{3}$

-1   0

19. $-4 \cdot \dfrac{p}{-4} \geq -5 \cdot -4$

$p \leq 20$

19   20   21

20. $-7m \le 28$
$$\frac{-7m}{-7} \mid \frac{28}{-7}$$
$$m \ge -4$$

21. $7m \le -28$
$$\frac{7m}{7} \mid \frac{-28}{7}$$
$$m \le -4$$

22. $-9 \cdot \dfrac{p}{-9} > -3 \cdot -9$
$$p < 27$$

23. $\dfrac{4}{3}x < 14$

$$\frac{3}{4} \cdot \frac{4}{3}x < 14\frac{3}{4}$$

$$\frac{\frac{4}{3}x}{\frac{4}{3}} \mid \frac{14}{\frac{4}{3}}$$

$$x < \frac{21}{2} \text{ or } 10.5$$

24. The <u>quotient</u> of x and -4
    is greater than or equal to 8.
    Write an an inequality and solve.

$$-4 \cdot \frac{x}{-4} \ge 8 \cdot -4$$
$$x \le -32$$

(division)

25. The <u>product</u> of 12 and h is at most 16.
    Write an an inequality and solve.

$$\frac{12h}{12} \le \frac{16}{12}$$
$$h \le \frac{4}{3}$$

(multiplication)