Topic: Inequalities and negative numbers

Question: Solve the inequality.

$$-x + 4 < 9$$

Answer choices:

A $x < -5$

B $x < 13$

C $x > -13$

D $x > -5$

Solution: D

Subtract 4 from both sides.

$$-x + 4 < 9$$

$$-x + 4 - 4 < 9 - 4$$

$$-x < 5$$

Multiply both sides by -1. Because we're multiplying by a negative number, we also have to change the direction of the inequality sign.

$$(-1)(-x) > (-1)(5)$$

$$x > -5$$

Topic: Inequalities and negative numbers

Question: Solve the inequality.

$$-3x + 7 \leq 25$$

Answer choices:

A $x \leq -6$

B $x \geq -6$

C $x \geq 6$

D $x < 6$

Solution: B

Subtract 7 from both sides.

$$-3x + 7 \leq 25$$

$$-3x + 7 - 7 \leq 25 - 7$$

$$-3x \leq 18$$

Divide both sides by -3. Because we're dividing by a negative number, we also have to change the direction of the inequality sign.

$$\frac{-3x}{-3} \geq \frac{18}{-3}$$

$$x \geq -6$$

Topic: Inequalities and negative numbers

Question: Solve the inequality.

$$2(x + 6) \geq 4x + 10$$

Answer choices:

A $x \leq 1$

B $x \geq 1$

C $x \geq -2$

D $x \leq 2$

Solution: A

Use the Distributive Property to expand the left side.

$$2(x + 6) \geq 4x + 10$$

$$2x + 12 \geq 4x + 10$$

Subtract $4x$ from both sides.

$$2x + 12 - 4x \geq 4x + 10 - 4x$$

$$-2x + 12 \geq 10$$

Subtract 12 from both sides.

$$-2x + 12 - 12 \geq 10 - 12$$

$$-2x \geq -2$$

Divide both sides by -2. Because we're dividing by a negative number, remember to flip the direction of the inequality sign.

$$\frac{-2x}{-2} \leq \frac{-2}{-2}$$

$$x \leq 1$$