

Solving Inequalities Test

Check whether the given number is a solution of the inequality.

1. $3x + 5x < 33$ $x = 4$

2. $9x \leq 7x - 1$ $x = 11$

Write and solve each inequality.

3. 12 is greater than or equal to 15 divided by x .

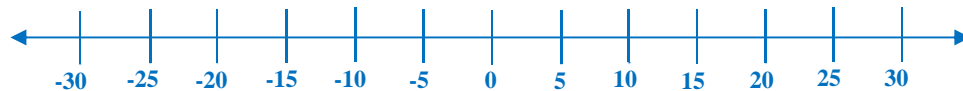
4. The sum of a number x and 13 is greater than or equal to 27.

5. Fifteen times a number is less than or equal to 27.

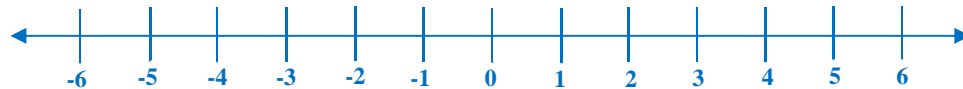
6. In a basketball game, team A and team B currently have a score of 60 and 70, respectively. If there are still 2 minutes remaining in the game, how much additional point should team A have to win the game?

Graph each inequality.

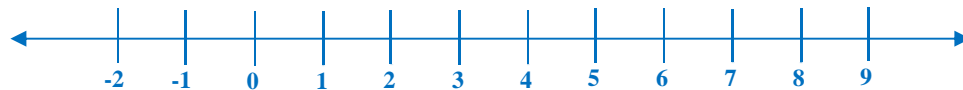
7. $x \leq 20$



8. $x \geq -3$ and $x \leq 1$



9. $x > 7$ or $x < 5$



Solve each inequality.

10. $-5 < 4 + x$

11. $3x < -3 + 2x$

12. $-\frac{y}{12} \leq -\frac{1}{4}$

13. $13 > -2a - 7$

Solving Inequalities Test

14. $-3y - 7 > 5y - 4$

15. $\frac{6y + 9}{4} < 4y$

16. $|3x + 4| - 3 \geq 13$

Solve the equation.

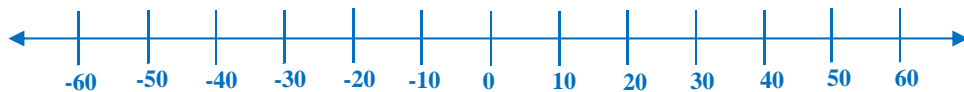
17. $|3x - 7| - 5 = 27$

Solve each compound inequality. Then graph the solution set.

18. $3x + 1 \leq 25$ or $-3x \geq -12$



19. $|x + 11| \geq 21$

**Write the solutions of each inequality in set-builder notation.**

20. $-2(x - 5) + 1 < -24 + 5x$

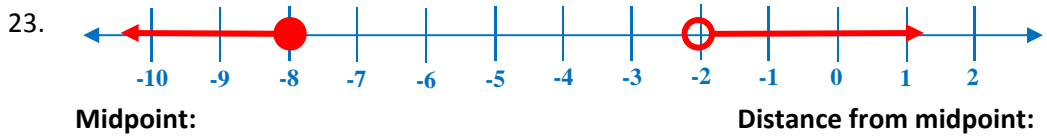
21. Suppose $R = \{\dots, -4, -2, 0, 2, 4, 6, \dots\}$ is the universal set and $S = \{2, 4, 6, \dots\}$. What is S' ?

Write each set in roster form and in set-builder notation.

22. T is the set of natural numbers that are factors of 15.

Solving Inequalities Test

For the graph, write an open sentence involving absolute value.

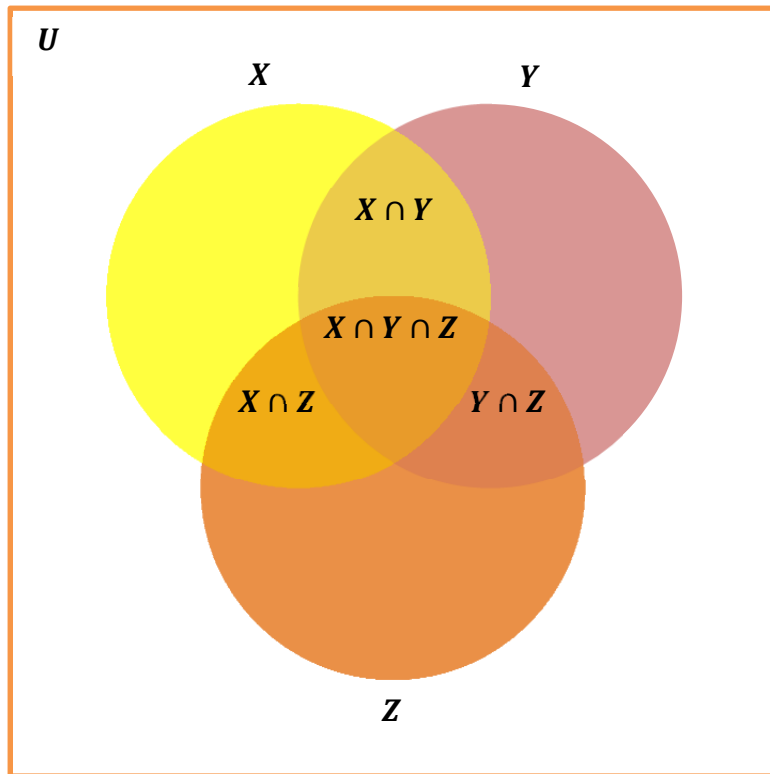


Solve the inequality. Write the solution as either the union or intersection of two sets.

24. $|1.5x - 4.5| < 15$

Draw a Venn diagram to represent the union and intersection of these sets.

25. Let $X = \{9, 10, 11, 12, 13\}$, $Y = \{11, 13, 15, 17\}$ and $Z = \{10, 12, 14, 16\}$. Find $X \cap Y$?



Solving Inequalities Test

ANSWER

Check whether the given number is a solution of the inequality.

1. $3x + 5x < 33$ $x = 4$

$$3(4) + 5(4) < 33$$

$$12 + 20 < 33$$

$$32 < 33$$

2. $9x \leq 7x - 1$ $x = 11$

$$9(11) \leq 7(11) - 1$$

$$99 \leq 77 - 1$$

$$99 \leq 76$$

Write and solve each inequality.

3. 12 is greater than or equal to 15 divided by x .

$$12 \geq \frac{15}{x}$$

4. The sum of a number x and 13 is greater than or equal to 27.

$$x + 13 \geq 27$$

$$x + 13 - 13 \geq 27 - 13$$

$$x \geq 14$$

5. Fifteen times a number is less than or equal to 27.

$$15x \leq 27$$

$$\frac{15x}{15} \leq \frac{27}{15}$$

$$x \leq \frac{9}{5}$$

6. In a basketball game, team A and team B currently have a score of 60 and 70, respectively. If there are still 2 minutes remaining in the game, how much additional point should team A have to win the game?

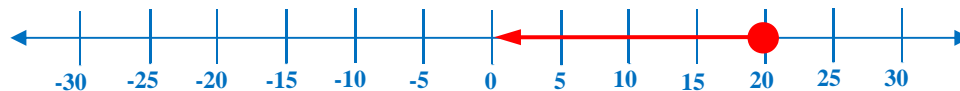
$$60 + x > 70$$

$$60 - 60 + x > 70 - 60$$

$$x > 10$$

Graph each inequality.

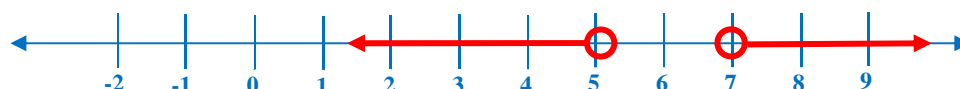
7. $x \leq 20$



8. $x \geq -3$ and $x \leq 1$



9. $x > 7$ or $x < 5$



Solving Inequalities Test

Solve each inequality.

10. $-5 < 4 + x$

$$\begin{aligned} -5 - 4 &< 4 - 4 + x \\ -9 &< x \end{aligned}$$

12. $-\frac{y}{12} \leq -\frac{1}{4}$

$$\begin{aligned} -\frac{y}{12}(-12) &\geq -\frac{1}{4}(-12) \\ y &\geq 3 \end{aligned}$$

14. $-3y - 7 > 5y - 4$

$$\begin{aligned} -3y + 3y - 7 &> 5y + 3y - 4 \\ -7 &> 2y - 4 \\ -7 + 4 &> 2y - 4 + 4 \\ -3 &> 2y \\ \frac{-3}{2} &> \frac{2y}{2} \\ -\frac{3}{2} &> y \end{aligned}$$

16. $|3x + 4| - 3 \geq 13$

$$\begin{aligned} |3x + 4| - 3 + 3 &\geq 13 + 3 \\ |3x + 4| &\geq 16 \end{aligned}$$

11. $3x < -3 + 2x$

$$\begin{aligned} 3x - 2x &< -3 + 2x - 2x \\ x &< -3 \end{aligned}$$

13. $13 > -2a - 7$

$$\begin{aligned} 13 + 7 &> -2a - 7 + 7 \\ 20 &> -2a \\ \frac{20}{-2} &< \frac{-2a}{-2} \\ -10 &< a \end{aligned}$$

15. $\frac{6y + 9}{4} < 4y$

$$\begin{aligned} \frac{6y + 9}{4} (4) &< (4y)(4) \\ 6y + 9 &< 16y \\ 6y - 6y + 9 &< 16y - 6y \\ 9 &< 10y \\ \frac{9}{10} &< \frac{10y}{10} \\ \frac{9}{10} &< y \end{aligned}$$

$3x + 4 \geq 16$

$3x + 4 - 4 \geq 16 - 4$

$3x \geq 12$

$\frac{3x}{3} \geq \frac{12}{3}$

$x \geq 4$

$3x + 4 \leq -16$

$3x + 4 - 4 \leq -16 - 4$

$3x \leq -20$

$\frac{3x}{3} \leq \frac{-20}{3}$

$x \leq -\frac{20}{3}$

Solving Inequalities Test

Solve the equation.

17. $|3x - 7| - 5 = 27$

$$|3x - 7| - 5 + 5 = 27 + 5$$

$$|3x - 7| = 32$$

$$3x - 7 = 32$$

$$3x - 7 + 7 = 32 + 7$$

$$3x = 39$$

$$\frac{3x}{3} = \frac{39}{3}$$

$$x = 13$$

$$3x - 7 = -32$$

$$3x - 7 + 7 = -32 + 7$$

$$3x = -25$$

$$\frac{3x}{3} = \frac{-25}{3}$$

$$x = \frac{-25}{3}$$

Solve each compound inequality. Then graph the solution set.

18. $3x + 1 \leq 25$ or $-3x \geq -12$

$$3x + 1 \leq 25$$

$$3x + 1 - 1 \leq 25 - 1$$

$$3x \leq 24$$

$$\frac{3x}{3} \leq \frac{24}{3}$$

$$x \leq 8$$

$$-3x \geq -12$$

$$\frac{-3x}{-3} \leq \frac{-12}{-3}$$

$$x \leq 4$$

$$x \leq 8$$



19. $|x + 11| \geq 21$

$$x + 11 \geq 21$$

$$x + 11 - 11 \geq 21 - 11$$

$$x \geq 10$$

$$x + 11 \leq -21$$

$$x + 11 - 11 \leq -21 - 11$$

$$x \leq -32$$



Solving Inequalities Test

Write the solutions of each inequality in set-builder notation.

20. $-2(x - 5) + 1 < -24 + 5x$

$$\begin{aligned}
 -2(x - 5) + 1 &< -24 + 5x \\
 -2x + 10 + 1 &< -24 + 5x \\
 -2x + 11 &< -24 + 5x \\
 -2x + 2x + 11 &< -24 + 5x + 2x \\
 11 &< -24 + 7x \\
 11 + 24 &< -24 + 24 + 7x \\
 35 &< 7x \\
 \frac{35}{7} &< \frac{7x}{7} \\
 5 &< x \\
 \{x|x > 5\}
 \end{aligned}$$

21. Suppose $R = \{\dots, -4, -2, 0, 2, 4, 6, \dots\}$ is the universal set and $S = \{2, 4, 6, \dots\}$. What is S' ?

$$S' = \{\dots, -4, -2, 0\}$$

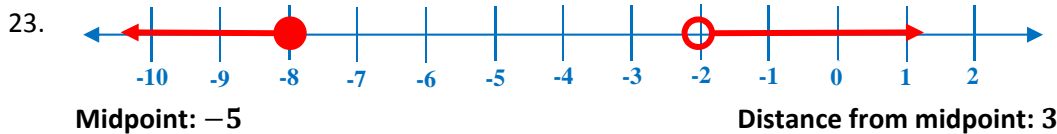
Write each set in roster form and in set-builder notation.

22. T is the set of natural numbers that are factors of 15.

$$T = \{15, 30, 45, 60, \dots\}$$

$$T = \{x|x \text{ is a natural number factor of } 15\}$$

For the graph, write an open sentence involving absolute value.



$$|x + 5| > 3$$

OR

$$|x + 5| \leq -3$$

Solving Inequalities Test

Solve the inequality. Write the solution as either the union or intersection of two sets.

24. $|1.5x - 4.5| < 15$

$\{x|x < 39\} \cap \{x|x > -21\}$

$0.5x - 4.5 < 15$

$0.5x - 4.5 + 4.5 < 15 + 4.5$

$0.5x < 19.5$

$\frac{0.5x}{0.5} < \frac{19.5}{0.5}$

$x < 39$

$\{x|x < 39\}$

$0.5x - 4.5 > -15$

$0.5x - 4.5 + 4.5 > -15 + 4.5$

$0.5x > -10.5$

$\frac{0.5x}{0.5} > \frac{-10.5}{0.5}$

$x > -21$

$\{x|x > -21\}$

Draw a Venn diagram to represent the union and intersection of these sets.

25. Let $X = \{9, 10, 11, 12, 13\}$, $Y = \{11, 13, 15, 17\}$ and $Z = \{10, 12, 14, 16\}$. Find $X \cap Y$?

$X \cap Y = \{11, 13\}$

$X \cap Z = \{10, 12\}$

$Y \cap Z = \{ \}$

$X \cap Y \cap Z = \{ \}$

