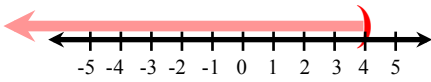


2.6 Solving Inequalities

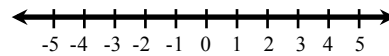
Solutions

Solve each inequality. Graph the solution set.

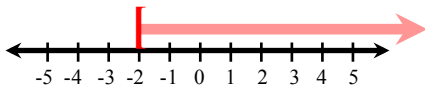
1.
$$\begin{aligned} x + 3 &< 7 \\ \underline{-3} \quad \underline{-3} \\ x &< 4 \end{aligned}$$



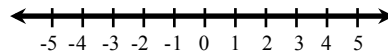
2.
$$x - 2 < 1$$



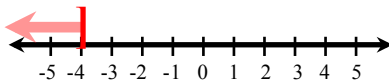
3.
$$\begin{aligned} 3x &\geq -6 \\ \frac{3x}{3} &\geq \frac{-6}{3} \\ x &\geq -2 \end{aligned}$$



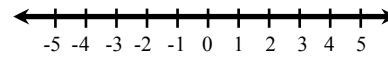
4.
$$5x > -15$$



5.
$$\begin{aligned} -3x + 5 &\geq 17 \\ \underline{-5} \quad \underline{-5} \\ -3x &\geq 12 \\ \frac{-3x}{-3} &\leq \frac{12}{-3} \\ x &\leq -4 \end{aligned}$$



6.
$$-2x - 3 > -11$$



Answers: 1. ; 3. ; 5.

Write an equivalent inequality with x on the left side.

7. $2 < x$
 $x > 2$

8. $-3 > x$

Solve each inequality. Write the solution set in interval notation.

9. $x - 1.9 < -4.6$
 $\quad \underline{+1.9} \quad \underline{+1.9}$
 $\quad \quad \quad x < -2.7$

$(-\infty, -2.7)$

10. $x + 2.4 < -6.5$

11. $-3 \leq -x - 8$
 $\quad \underline{+8} \quad \quad \underline{+8}$
 $\quad \quad \quad 5 \leq -x$

$-1 \cdot 5 \geq -1 \cdot -x$

$-5 \geq x$

$x \leq -5$

$(-\infty, -5]$

12. $11 \leq -4x + 2$

13. $\frac{1}{4}x > \frac{3}{8}$
 $\frac{4}{1} \cdot \frac{1}{4}x > \frac{4}{1} \cdot \frac{3}{8}$
 $\quad \quad \quad x > \frac{3}{2}$

$\left(\frac{3}{2}, +\infty\right)$

14. $\frac{2}{3}x \geq \frac{3}{5}$

Answers: 7. $x > 2$; 9. $(-\infty, -2.7)$; 11. $(-\infty, -5]$; 13. $\left(\frac{3}{2}, +\infty\right)$

Solve each inequality.

$$\begin{aligned}
 15. \quad & 3x + 7 > 7x - 5 \\
 & \underline{-3x} \quad \underline{-3x} \\
 & 7 > 4x - 5 \\
 & \underline{+5} \quad \underline{+5} \\
 & 12 > 4x \\
 & \frac{12}{4} > \frac{4x}{4} \\
 & 3 > x \\
 & x < 3
 \end{aligned}$$

$$16. \quad 7x - 3 \geq 5x - 8$$

$$\begin{aligned}
 17. \quad & -3 + 2x + 4 \leq 7 \\
 & 2x - 3 + 4 \leq 7 \\
 & 2x + 1 \leq 7 \\
 & \underline{-1} \quad \underline{-1} \\
 & 2x \leq 8 \\
 & \frac{2x}{2} \leq \frac{8}{2} \\
 & x \leq 4
 \end{aligned}$$

$$18. \quad -3x - 5 + x \geq 3$$

$$\begin{aligned}
 19. \quad & -3(2x + 1) \leq 9 \\
 & -6x - 3 \leq 9 \\
 & \underline{+3} \quad \underline{+3} \\
 & -6x \leq 12 \\
 & \frac{-6x}{-6} \geq \frac{12}{-6} \\
 & x \geq -2
 \end{aligned}$$

$$20. \quad -2(3x - 2) > -14$$

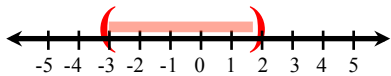
$$\begin{aligned}
 21. \quad & \frac{1}{8}x - \frac{3}{4} \leq -\frac{1}{2} \\
 & \frac{8}{1} \cdot \left(\frac{1}{8}x - \frac{3}{4} \right) \leq \frac{8}{1} \cdot -\frac{1}{2} \\
 & \frac{8}{1} \cdot \frac{1}{8}x - \frac{8}{1} \cdot \frac{3}{4} \leq \frac{8}{1} \cdot -\frac{1}{2} \\
 & x - 6 \leq -4 \\
 & \underline{+6} \quad \underline{+6} \\
 & x \leq 2
 \end{aligned}$$

$$22. \quad \frac{1}{2}x - \frac{2}{3} > \frac{5}{6}x - 1$$

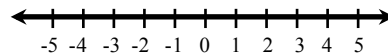
Answers: 15. $x < 3$; 17. $x \leq 4$; 19. $x \geq -2$; 21. $x \leq 2$

Solve each inequality. Graph the solution set.

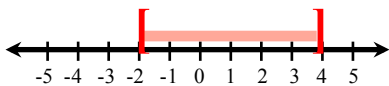
23. $-6 < 2x < 4$
 $\frac{-6}{2} < \frac{2x}{2} < \frac{4}{2}$
 $-3 < x < 2$



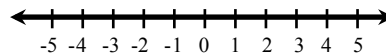
24. $-3 < 3x < 9$



25. $-3 \leq 2x + 1 \leq 9$
 $\frac{-1}{2} \leq \frac{2x + 1}{2} \leq \frac{9}{2}$
 $-4 \leq 2x \leq 8$
 $\frac{-4}{2} \leq \frac{2x}{2} \leq \frac{8}{2}$
 $-2 \leq x \leq 4$



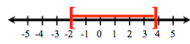
26. $-5 < 2x + 3 \leq 7$



Answers: 23.



25.



Write and solve an inequality that represents each problem.

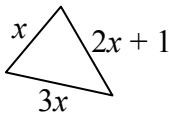
27. The sum of six and three times a number is greater than fifteen.

$$\begin{aligned}6 + 3x &> 15 \\ \underline{-6} \quad \underline{-6} & \\ 3x &> 9 \\ \frac{3x}{3} &> \frac{9}{3} \\ x &> 3\end{aligned}$$

The number is greater than 3.

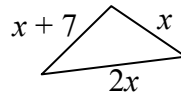
28. The sum of five and twice a number is greater than negative eleven.

29. The perimeter of the triangle below must be greater than or equal to 55 inches. Find the solution set for x .



$$\begin{aligned}x + 3x + 2x + 1 &\geq 55 \\ 6x + 1 &\geq 55 \\ \underline{-1} \quad \underline{-1} & \\ 6x &\geq 54 \\ \frac{6x}{6} &\geq \frac{54}{6} \\ x &\geq 9\end{aligned}$$

30. The perimeter of the triangle below must be less than 25 inches. Find the solution set for x .



Answers: **27.** $x > 3$; **29.** $x \geq 9$