

5-3 Solving Multi-Step Inequalities

Exercises

Solve each inequality. Check your solution.

1. $2(t+3) \geq 16$

$t \geq 5$

2. $3(d-2) - 2d > 16$

$d > 22$

3. $4h - 8 < 2(h - 1)$

$h < 3$

6. $5r - 6 > 8r - 18$

$r < 4$

7. $\frac{-3x+6}{2} \leq 12$

$x \geq -6$

12. $\frac{4x-2}{5} \geq -4$

$x \geq -4\frac{1}{2}$

12. $2(-3m - 5) \geq -28$

$m \leq 3$

13. $-6(w + 1) < 2(w + 5)$

$w > -2$

14. $2(q - 3) + 6 \leq -10$

$q \leq -5$

Define a variable, write an inequality, and solve each problem. Check your solution.

13. Negative three times a number plus four is no more than the number minus eight.

$-3n + 4 \leq n - 8$

14. One fourth of a number decreased by three is at least two.

$\frac{1}{4}n - 3 \geq 2$

15. The sum of twelve and a number is no greater than the sum of twice the number and -8 .

$n + 12 \leq 2n + (-8)$

16. Twice the sum of a number and 4 is less than 12.

$2(n+4) < 12$

17. Three times the sum of a number and six is greater than four times the number decreased by two.

$3(n+6) > 4n - 2$

18. Twice the difference of a number and four is less than the sum of the number and five.

$2(n-4) < n+5$

Exercises – Your turn

Solve each inequality. Check your solution.

1. $2(t + 3) \geq 16$

$$\begin{aligned} 2t + 6 &\geq 16 \\ 2t &\geq 10 \\ t &\geq 5 \end{aligned}$$

2. $3(d - 2) - 2d > 16$

$$\begin{aligned} 3d - 6 - 2d &> 16 \\ d - 6 &> 16 \\ d &> 24 \end{aligned}$$

3. $4h - 8 < 2(h - 1)$

$$\begin{aligned} 4h - 8 &< 2h - 2 \\ 2h &< 6 \\ h &< 3 \end{aligned}$$

4. $6y + 10 > 8 - (y + 14)$

$$\begin{aligned} 6y + 10 &> -1y - 6 \\ 7y &> -16 \\ y &> -\frac{16}{7} \text{ or } -2\frac{2}{7} \end{aligned}$$

5. $4.6(x - 3.4) > 5.1x$

$$\begin{aligned} 4.6x - 15.64 &> 5.1x \\ -15.64 &> 0.5x \\ -31.28 &> x \text{ or} \\ x &< -31.28 \end{aligned}$$

6. $-5x - (2x + 3) \geq 1$

$$\begin{aligned} -5x - 2x - 3 &\geq 1 \\ -7x &\geq 4 \\ x &\leq -\frac{4}{7} \end{aligned}$$

7. $3(2y - 4) - 2(y + 1) > 10$

$$\begin{aligned} 6y - 12 - 2y - 2 &> 10 \\ 4y &> 24 \\ y &> 6 \end{aligned}$$

8. $8 - 2(b + 1) < 12 - 3b$

$$\begin{aligned} 8 - 2b - 2 &< 12 - 3b \\ -2b + 6 &< 12 - 3b \\ b &< 6 \end{aligned}$$

9. $-2(k - 1) > 8(1 + k)$

$$\begin{aligned} -2k + 2 &> 8 + 8k \\ -10k &> 6 \\ k &< -\frac{3}{5} \end{aligned}$$

12. $2(-3m - 5) \geq -28$

$$\begin{aligned} -6m - 10 &\geq -28 \\ -6m &\geq -18 \\ m &\leq 3 \end{aligned}$$

13. $-6(w + 1) < 2(w + 5)$

$$\begin{aligned} -6w - 6 &< 2w + 10 \\ -8w &< 16 \\ w &> -2 \end{aligned}$$

14. $2(q - 3) + 6 \leq -10$

$$\begin{aligned} 2q - 6 + 6 &\leq -10 \\ 2q &\leq -10 \\ q &\leq -5 \end{aligned}$$

Define a variable, write an inequality, and solve each problem. Check your solution.

15. Four more than the quotient of a number and three is at least nine. $\frac{n}{3} + 4 \geq 9$

16. The sum of a number and fourteen is less than or equal to three times the number. $n + 14 \leq 3n$

17. Negative three times a number increased by seven is less than negative eleven. $-13n + 7 < -11$

18. Five times a number decreased by eight is at most ten more than twice the number. $5n - 8 \geq 2n + 10$

19. Seven more than five sixths of a number is more than negative three. $\frac{5}{6}n + 7 > -3$

20. Four times the sum of a number and two increased by three is at least twenty-seven. $4(n + 2) + 3 \geq 27$