

Solving Multi-Step Inequalities Assignment

Solve each inequality.

1. $2x + 7 > -15$

2. $-6 \leq 8a - 14$

3. $7 \geq \frac{9}{4}y + 1$

4. $-8 + 7x < 20$

5. $-3a - 0.2 \geq 0.7$

6. $-3 - \frac{y}{6} < 4$

7. $8x + 7 < 23$

8. $-2a + 10 \geq 15$

9. $\frac{2}{3}y + 5 \geq 11$

10. $4x + 12 \leq 3(2x + 3)$

11. $-3x + 5 < 4(3x - 10)$

12. $-3x + 7 > 2(4x + 6)$

13. $-5(4x + 6) < 7x - 12$

14. $13x + 16 \leq 25 + 10x$

15. $\frac{4x + 9}{3} < 11$

16. $19x + 15 \leq 24 + 10x$

17. $\frac{3x - 4}{5} \geq 7$

18. $31x - 14 \geq 13x + 67$

19. $\frac{4a + 6}{5} \geq 3a$

Write, solve and graph each inequality.

20. One third of a number decreased by five is at least three.



21. Two thirds of a number plus eight is greater than twelve.



Solving Multi-Step Inequalities Assignment**ANSWER**

Solve each inequality.

1. $2x + 7 > -15$

$$\begin{aligned}
 2x + 7 - 7 &> -15 - 7 \\
 2x &> -22 \\
 \frac{2x}{2} &> \frac{-22}{2} \\
 x &> -11
 \end{aligned}$$

2. $-6 \leq 8a - 14$

$$\begin{aligned}
 -6 + 14 &\leq 8a - 14 + 14 \\
 8 &\leq 8a \\
 \frac{8}{8} &\leq \frac{8a}{8} \\
 1 &\leq a
 \end{aligned}$$

3. $7 \geq \frac{9}{4}y + 1$

$$\begin{aligned}
 7 - 1 &\geq \frac{9}{4}y - 1 + 1 \\
 6 &\geq \frac{9}{4}y \\
 6 \left(\frac{4}{9}\right) &\geq \left(\frac{9}{4}y\right) \left(\frac{4}{9}\right) \\
 \frac{8}{3} &\geq y
 \end{aligned}$$

4. $-8 + 7x < 20$

$$\begin{aligned}
 -8 + 8 + 7x &< 20 + 8 \\
 7x &< 28 \\
 \frac{7x}{7} &< \frac{28}{7} \\
 x &< 4
 \end{aligned}$$

5. $-3a - 0.2 \geq 0.7$

$$\begin{aligned}
 -3a - 0.2 + 0.2 &\geq 0.7 + 0.2 \\
 -3a &\geq 0.9 \\
 \frac{-3a}{-3} &\leq \frac{0.9}{-3} \\
 a &\leq -0.3
 \end{aligned}$$

6. $-3 - \frac{y}{6} < 4$

$$\begin{aligned}
 -3 + 3 - \frac{y}{6} &< 4 + 3 \\
 -\frac{y}{6} &< 7 \\
 (-6) \left(-\frac{y}{6}\right) &> 7(-6) \\
 y &> -42
 \end{aligned}$$

7. $8x + 7 < 23$

$$\begin{aligned}
 8x + 7 - 7 &< 23 - 7 \\
 8x &< 16 \\
 \frac{8x}{8} &< \frac{16}{8} \\
 x &< 2
 \end{aligned}$$

8. $-2a + 10 \geq 15$

$$\begin{aligned}
 -2a + 10 - 10 &\geq 15 - 10 \\
 -2a &\geq 5 \\
 \frac{-2a}{-2} &\leq \frac{5}{-2} \\
 a &\leq -\frac{5}{2}
 \end{aligned}$$

9. $\frac{2}{3}y + 5 \geq 11$

$$\begin{aligned}
 \frac{2}{3}y + 5 - 5 &\geq 11 - 5 \\
 \frac{2}{3}y &\geq 6 \\
 \left(\frac{3}{2}\right) \left(\frac{2}{3}y\right) &\geq 6 \left(\frac{3}{2}\right) \\
 y &\geq 9
 \end{aligned}$$

10. $4x + 12 \leq 3(2x + 3)$

$$\begin{aligned}
 4x + 12 &\leq 6x + 9 \\
 4x + 12 - 9 &\leq 6x + 9 - 9 \\
 4x + 3 &\leq 6x \\
 4x - 4x + 3 &\leq 6x - 4x \\
 3 &\leq 2x \\
 \frac{3}{2} &\leq \frac{2x}{2} \\
 \frac{3}{2} &\leq x
 \end{aligned}$$

11. $-3x + 5 < 4(3x - 10)$

$$\begin{aligned}
 -3x + 5 &< 12x - 40 \\
 -3x + 3x + 5 &< 12x + 3x - 40 \\
 5 + 40 &< 15x - 40 + 40 \\
 45 &< 15x \\
 \frac{45}{15} &< \frac{15x}{15} \\
 3 &< x
 \end{aligned}$$

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12. $-3x + 7 > 2(4x + 6)$

$$\begin{aligned}
 -3x + 7 &> 8x + 12 \\
 -3x + 3x + 7 &> 8x + 3x + 12 \\
 7 - 12 &> 11x + 12 - 12 \\
 -5 &> 11x \\
 -\frac{5}{11} &> \frac{11x}{11} \\
 -\frac{5}{11} &> x
 \end{aligned}$$

13. $-5(4x + 6) < 7x - 12$

$$\begin{aligned}
 -20x - 30 &< 7x - 12 \\
 -20x + 20x - 30 &< 7x + 20x - 12 \\
 -30 &< 27x - 12 \\
 -30 + 12 &< 27x - 12 + 12 \\
 -18 &< 27x \\
 -\frac{18}{27} &< \frac{27x}{27} \\
 -\frac{2}{3} &< x
 \end{aligned}$$

14. $13x + 16 \leq 25 + 10x$

$$\begin{aligned}
 13x - 10x + 16 &\leq 25 + 10x - 10x \\
 3x + 16 &\leq 25 \\
 3x + 16 - 16 &\leq 25 - 16 \\
 3x &\leq 9 \\
 \frac{3x}{3} &\leq \frac{9}{3} \\
 x &\leq 3
 \end{aligned}$$

15. $\frac{4x + 9}{3} < 11$

$$\begin{aligned}
 \frac{4x + 9}{3} (3) &< 11(3) \\
 4x + 9 &< 33 \\
 4x + 9 - 9 &< 33 - 9 \\
 4x &< 24 \\
 \frac{4x}{4} &< \frac{24}{4} \\
 x &< 6
 \end{aligned}$$

16. $19x + 15 \leq 24 + 10x$

$$\begin{aligned}
 19x - 10x + 15 &\leq 24 + 10x - 10x \\
 9x + 15 &\leq 24 \\
 9x + 15 - 15 &\leq 24 - 15 \\
 9x &\leq 9 \\
 \frac{9x}{9} &\leq \frac{9}{9} \\
 x &\leq 1
 \end{aligned}$$

17. $\frac{3x - 4}{5} \geq 7$

$$\begin{aligned}
 \frac{3x - 4}{5} (5) &\geq 7(5) \\
 3x - 4 &\geq 35 \\
 3x - 4 + 4 &\geq 35 + 4 \\
 3x &\geq 39 \\
 \frac{3x}{3} &\geq \frac{39}{3} \\
 x &\geq 13
 \end{aligned}$$

18. $31x - 14 \geq 13x + 67$

$$\begin{aligned}
 31x - 13x - 14 &\geq 13x - 13x + 67 \\
 18x - 14 &\geq 67 \\
 18x - 14 + 14 &\geq 67 + 14 \\
 18x &\geq 81 \\
 \frac{18x}{18} &\geq \frac{81}{18} \\
 x &\geq \frac{9}{2}
 \end{aligned}$$

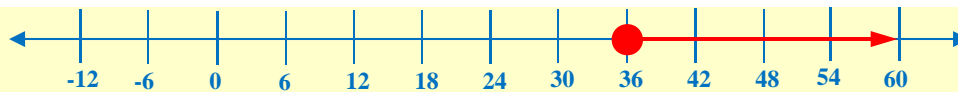
19. $\frac{4a + 6}{5} \geq 3a$

$$\begin{aligned}
 \frac{4a + 6}{5} (5) &\geq 3a(5) \\
 4a + 6 &\geq 15a \\
 4a - 4a + 6 &\geq 15a - 4a \\
 6 &\geq 11a \\
 \frac{6}{11} &\geq \frac{11a}{11} \\
 \frac{6}{11} &\geq a
 \end{aligned}$$

Solving Multi-Step Inequalities Assignment

Write, solve and graph each inequality.

20. One third of a number decreased by five is at least three.



$$\frac{1}{3}x - 5 \geq 3$$

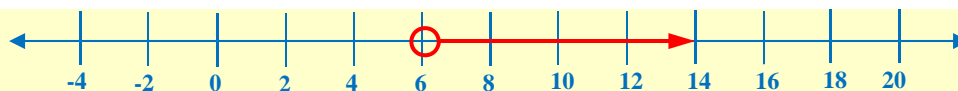
$$\frac{1}{3}x - 5 + 5 \geq 3 + 5$$

$$\frac{1}{3}x \geq 8$$

$$(3)\left(\frac{1}{3}x\right) \geq 8(3)$$

$$x \geq 24$$

21. Two thirds of a number plus eight is greater than twelve.



$$\frac{2}{3}x + 8 > 12$$

$$\frac{2}{3}x > 4$$

$$\frac{2}{3}x + 8 - 8 > 12 - 8$$

$$\left(\frac{3}{2}\right)\left(\frac{2}{3}x\right) > 4\left(\frac{3}{2}\right)$$

$$x > 6$$