

Solving Inequalities

1. $7m + 9 \leq 6(m + 3)$

$$\begin{array}{r} 7m + 9 \leq 6m + 18 \\ -6m \quad -6m \\ \hline m + 9 \leq 18 \\ -9 \quad -9 \\ \hline m \leq 9 \end{array}$$



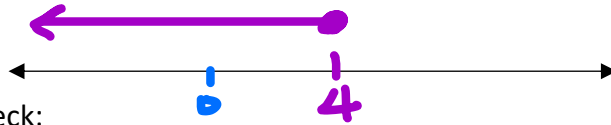
Check:

$$\begin{array}{l} 7m + 9 \leq 6(m + 3) \\ 7(0) + 9 \leq 6(0 + 3) \\ 9 \leq 18 \quad \text{True!} \end{array}$$

Zero is a solution ✓

2. $3(2x + 4) \geq 7x + 8$

$$\begin{array}{r} 6x + 12 \geq 7x + 8 \\ -7x \quad -7x \\ \hline -x + 12 \geq 8 \\ -12 \quad -12 \\ \hline -x \geq -4 \\ \frac{-x}{-1} \geq \frac{-4}{-1} \\ x \leq 4 \end{array}$$



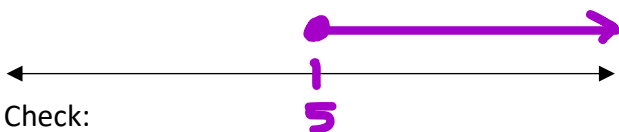
Check:

$$\begin{array}{l} 3(2(0) + 4) \geq 7(0) + 8 \\ 12 \geq 8 \end{array}$$

True Zero is a solution ✓

3. $2(k + 4) \leq 3(2k - 4)$

$$\begin{array}{r} 2k + 8 \leq 6k - 12 \\ -6k \quad -6k \\ \hline -4k + 8 \leq -12 \\ -8 \quad -8 \\ \hline -4k \leq -20 \\ \frac{-4k}{-4} \leq \frac{-20}{-4} \\ k \geq 5 \end{array}$$



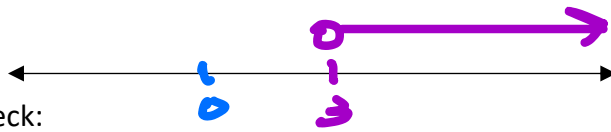
Check:

$$\begin{array}{l} 2(0 + 4) \leq 3(2(0) - 4) \\ 8 \leq -12 \\ \text{False} \end{array}$$

Zero is NOT a solution ✓

4. $5x + (-3) > 2(3 + x)$

$$\begin{array}{r} 5x - 3 > 6 + 2x \\ -2x \quad -2x \\ \hline 3x - 3 > 6 \\ +3 \quad +3 \\ \hline 3x > 9 \\ \frac{3x}{3} > \frac{9}{3} \\ x > 3 \end{array}$$



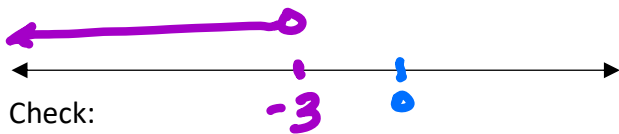
Check:

$$\begin{array}{l} 5(0) - 3 > 2(3 + 0) \\ -3 > 6 \\ \text{False} \end{array}$$

Zero is NOT a solution ✓

$$5. \quad 5c + 2 < 2c + (-7)$$

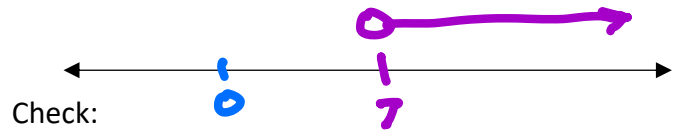
$$\begin{array}{r} -2c \quad -2c \\ \hline 3c + 2 < -7 \\ -2 \quad -2 \\ \hline 3c < -9 \\ \frac{3c}{3} < \frac{-9}{3} \\ c < -3 \end{array}$$



$$\begin{array}{l} 5(0) + 2 < 2(0) - 7 \\ 2 < -7 \\ \text{False} \end{array} \quad \text{Zero is NOT a solution} \checkmark$$

$$6. \quad 5x - 20 > 2x + 1$$

$$\begin{array}{r} +20 \quad +20 \\ \hline 5x > 2x + 21 \\ -2x \quad -2x \\ \hline 3x > 21 \\ \frac{3x}{3} > \frac{21}{3} \\ x > 7 \end{array}$$

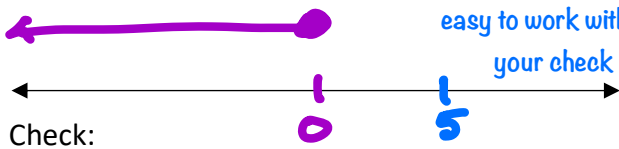


$$\begin{array}{l} 5(0) - 20 > 2(0) + 1 \\ -20 > 1 \\ \text{False} \end{array} \quad \text{Zero is NOT a solution} \checkmark$$

$$7. \quad 3(s - 4) \geq 4s - 12$$

$$\begin{array}{r} 3s - 12 \geq 4s - 12 \\ -4s \quad -4s \\ \hline -s - 12 \geq -12 \\ +12 \quad +12 \\ \hline (-1) -s \geq 0 (-1) \\ s \leq 0 \end{array}$$

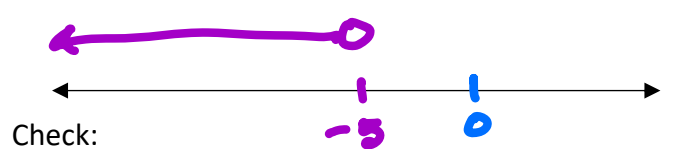
Since 0 is our boundary we cannot use it to test if our arrow is graphed correctly. Choose another number that is easy to work with for your check



$$\begin{array}{l} 3(5 - 4) \geq 4(5) - 12 \\ 3(1) \geq 20 - 12 \\ 3 \geq 8 \\ \text{False} \end{array} \quad \text{5 is NOT a solution} \checkmark$$

$$8. \quad -9 - e > 3e + 11$$

$$\begin{array}{r} +9 \quad +9 \\ \hline -e > 3e + 20 \\ -3e \quad -3e \\ \hline -4e > 20 \\ \frac{-4e}{-4} > \frac{20}{-4} \\ e < -5 \end{array}$$



$$\begin{array}{l} -9 - (0) > 3(0) + 11 \\ -9 > 11 \\ \text{False} \end{array} \quad \text{Zero is NOT a solution} \checkmark$$

