

4.4 Solving, Writing and Graphing Two-Step Inequalities p.148

- * Simplify each side of the inequality first (d.p. or c.t.)
- * add or subtract the constant on the same side as the variable
- * multiply or divide to isolate the variable
[remember to flip/reverse the inequality symbol if \times or \div by a negative]

Examples

$$\begin{aligned} 1.) \quad & 2(k-5) < 6 \\ & 2k - 10 < 6 \\ & \quad +10 \quad +10 \\ & 2k < 16 \\ & \boxed{k < 8} \end{aligned}$$

$$\begin{aligned} 2.) \quad & 5x - 4 \geq -14 \\ & \quad +4 \quad +4 \\ & 5x \geq -10 \\ & \boxed{x \geq -2} \end{aligned}$$

$$\begin{aligned} 3.) \quad & 4 - 3d \leq -9 \\ & \quad -4 \quad \quad -4 \\ & \quad \quad -3d \leq -13 \\ & \quad \quad \quad -3 \quad \quad -3 \\ & \quad \quad \quad \boxed{d \geq \frac{13}{3}} \end{aligned}$$

$$\begin{aligned} 4.) \quad & -6y - 7 > -5 \\ & \quad +7 \quad +7 \\ & \quad \quad -6y > 2 \\ & \quad \quad \quad -6 \quad \quad -6 \\ & \quad \quad \quad \boxed{y < -\frac{1}{3}} \end{aligned}$$

$$\begin{aligned} 5.) \quad & -3 \leq 0.5(8+y) \\ & -3 \leq 4 + 0.5y \\ & \quad -4 \quad \quad -4 \\ & \quad \quad -7 \leq 0.5y \\ & \quad \quad \quad 0.5 \quad \quad 0.5 \\ & \quad \quad \quad -\frac{70}{5} \leq y \\ & \quad \quad \quad \boxed{-14 \leq y} \end{aligned}$$

$$\begin{aligned} 6.) \quad & 20 \geq -3.2(c-4.3) \\ & 20 \geq -3.2c + 13.76 \\ & \quad -13.76 \quad \quad -13.76 \\ & \quad \quad 6.24 \geq -3.2c \\ & \quad \quad \quad -3.2 \quad \quad -3.2 \\ & \quad \quad \quad \boxed{-1.95 \leq c} \end{aligned}$$

$$7) \quad 9x - 4x + 4 \geq 36 - 12$$

$$5x + 4 \geq 24$$

$$\begin{array}{r} -4 \\ \hline 5x \geq 20 \end{array}$$

$$\frac{5x}{5} \geq \frac{20}{5}$$

$$\boxed{x \geq 4}$$

$$8) \quad 3.6 - 0.24n < 1.2$$

$$\begin{array}{r} -3.6 \\ \hline -0.24n < -2.4 \end{array}$$

$$\begin{array}{r} -3.6 \\ \hline -0.24 \\ \hline -0.24 \end{array}$$

$$\begin{array}{r} 10. \\ 24 \overline{) 240} \\ \underline{24} \\ 0 \\ \hline \end{array}$$

$$\boxed{n > 10}$$

$$9) \quad -\frac{1}{4} \leq 4k + \frac{7}{4}$$

$$\begin{array}{r} -\frac{7}{4} \\ \hline -\frac{8}{4} \leq 4k \end{array}$$

$$-\frac{8}{4} \leq 4k$$

$$\frac{-2}{4} \leq \frac{4k}{4}$$

$$\boxed{-\frac{1}{2} \leq k}$$

$$10) \quad -5(m-2) > 30$$

$$-5m + 10 > 30$$

$$\begin{array}{r} -10 \\ \hline -5m > 20 \end{array}$$

$$-5m > 20$$

$$\boxed{m < -4}$$

$$11) \quad 12x - 5x - 4 \geq 60 - 8$$

$$7x - 4 \geq 52$$

$$\begin{array}{r} +4 \\ \hline 7x \geq 56 \end{array}$$

$$7x \geq 56$$

$$\begin{array}{r} \div 7 \\ \hline x \geq 8 \end{array}$$

$$\boxed{x \geq 8}$$