

Two-Step Inequalities

Example 1: Solving and Graphing Inequalities

Solve and graph each of the inequalities.

I Do	We Do
$5 + 4b \leq 21$ $\begin{array}{r} -5 \\ 4b \leq 16 \\ \hline b \leq 4 \end{array}$	$-3x - 4 > 14$ $\begin{array}{r} +4 \\ -3x > 18 \\ \hline x < -6 \end{array}$
We Do	You Do
$5 < 7 - 2t$ $\begin{array}{r} -7 \\ -2 < -2t \\ \hline 1 > t \end{array}$	$-8 \geq 5n - 23$ $\begin{array}{r} +23 \\ 15 \geq 5n \\ \hline 3 \geq n \end{array}$
You Do	You Do
$\frac{1}{8} + 2d < \frac{3}{8}$ $\begin{array}{r} -\frac{1}{8} \\ 2d < \frac{1}{8} \div 2 \\ \hline d < \frac{1}{16} \end{array}$	$7.5 \geq \frac{y}{2} + 3.2$ $\begin{array}{r} -3.2 \\ 4.3 \geq \frac{y}{2} \cdot 2 \\ \hline 8.6 \geq y \end{array}$

Two-Step Inequalities

We Do	We Do
$3x + 4(6 - x) < 2$ $3x + 24 - 4x < 2$ $-x + 24 < 2$ $\begin{array}{r} -24 \\ -24 \end{array}$ $\frac{-x}{-1} < \frac{-22}{-1}$ $x > 22$	$5(-3 + d) \leq 3(3d - 2)$ $-15 + 5d \leq 9d - 6$ $\begin{array}{r} -5d \\ -5d \end{array}$ $-15 \leq 4d - 6$ $\begin{array}{r} +6 \\ +6 \end{array}$ $\frac{-9}{4} \leq d$
You Do	You Do
$4p + 2(p + 7) < 8$ $4p + 2p + 14 < 8$ $6p + 14 < 8$ $\begin{array}{r} -14 \\ -14 \end{array}$ $6p < -6$ $\frac{6p}{6} < \frac{-6}{6}$ $p < -1$	$15 \geq 5 - 2(4m + 7)$ $15 \geq 5 - 8m - 14$ $15 \geq -8m - 9$ $\begin{array}{r} +9 \\ +9 \end{array}$ $\frac{24 \geq -8m}{-8}$ $-3 \leq m$

Two-Step Inequalities

We Do	We Do
$3b + 12 > 27 - 2b$	$-6(x - 4) < 7(2x - 3)$

You Do	You Do
$\frac{1}{2}(4p+12) < 22$ $\begin{array}{r} 2p+6 < 22 \\ -6 \quad -6 \\ \hline 2p < 16 \\ \hline 2 \\ p < 8 \end{array}$	$\frac{3}{4}(16p+12) \geq 34$ $\begin{array}{r} 12p+9 \geq 34 \\ -9 \\ \hline 12p \geq 25 \\ \hline 12 \\ p \geq 2.08\bar{3} \\ \text{or} \\ p \geq 2\frac{1}{12} \end{array}$

$$\begin{array}{l} \frac{3}{4} \cdot 16 = 12 \\ \frac{3}{4} \cdot 12 = 9 \\ \frac{3}{4} \cdot 12 = 9 \\ \frac{25}{12} = 2\frac{1}{12} \end{array}$$

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Example 2: Solving Word Problems

Solve and graph each situation.

Jalen wants to purchase a new video game system that costs \$475. He has made \$350 working at a local café. If he makes \$12.50 per hour, how many more hours must he work to purchase the system.

$$\begin{array}{r}
 350 + 12.50h \geq 475 \\
 -350 \qquad \qquad -350 \\
 \hline
 12.5h \geq 125 \\
 \frac{12.5h}{12.5} \geq \frac{125}{12.5} \\
 \boxed{h \geq 10 \text{ hours}}
 \end{array}$$

Sam is opening her own business where she types papers for local businesses. She spends \$299 on a new computer. If she charges businesses \$12.99 per hour, how many hours will she have to work to make \$145.

$$\begin{array}{r}
 -299 + 12.99h \geq 145 \\
 +299 \qquad \qquad +299 \\
 \hline
 12.99h \geq 444 \\
 \frac{12.99h}{12.99} \\
 h \geq 34.180 \text{ hours}
 \end{array}$$

h = hours