

Bell Ringer

Solve. $6x + 8 = 2x + 36$

Solve. $\frac{2}{3}x - 4 = 12$

Solving Inequalities Notes

Goal: Isolate the variable just like with an equation.

Steps:

- Follow the same steps as when solving equations with ONE exception
 - **when multiplying or dividing BY a negative, switch the inequality symbol.**
- Solutions are graphed on a number line
 - Open circle for $>$ and $<$; closed circle for \geq and \leq
 - Shade in the direction that represent the solutions

Note: a negative answer does not mean you need to switch the symbol.

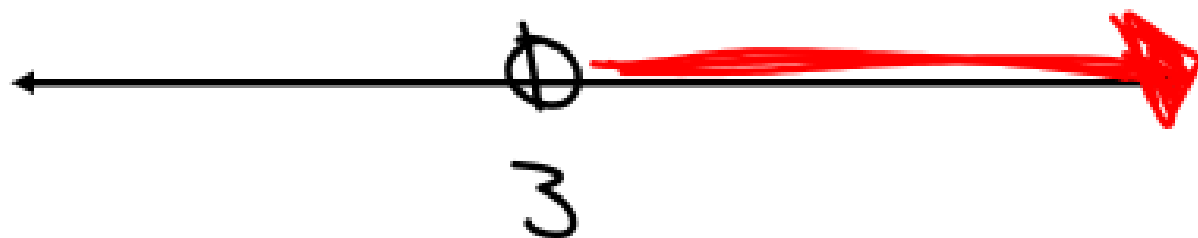
Solve the inequality and graph the solution.

1. $5x - 3 > 12$

$$+3 \quad +3$$

$$\frac{5x}{5} > \frac{15}{5}$$

$$x > 3$$

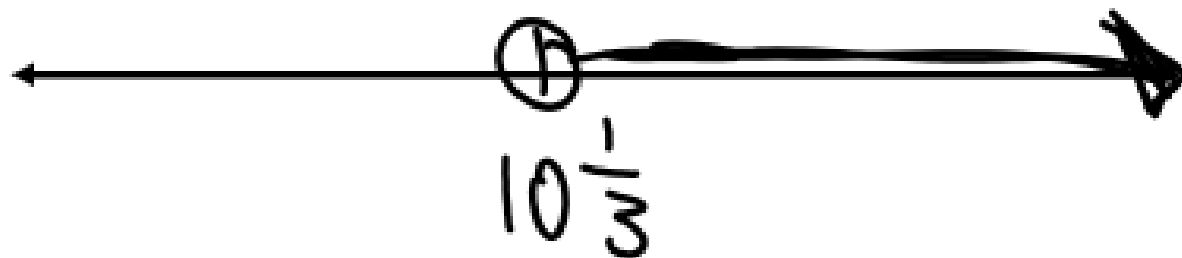


$$2. 13 - 3n < -18$$

$$\quad -13 \quad -13$$

$$\frac{-3n}{-3} < \frac{-31}{-3}$$

$$n > \frac{31}{3} \text{ or } 10\frac{1}{3}$$



$$3. -x + 1 \leq 3x + 21$$

method A

$$-x + 1 \leq 3x + 21$$

$+x$

$+x$

$$1 \leq 4x + 21$$

-21

-21

$$-20 \leq 4x$$

$\div 4$

$\div 4$

$$-5 \leq x$$

method B

$$-x + 1 \leq 3x + 21$$

$-3x$

$$-4x + 1 \leq 21$$

-1

-1

$$\frac{-4x}{-4} \leq \frac{20}{-4}$$

x

\geq

-5



$$4. \ 2 > \frac{7}{3}m + 6$$

$$\frac{7}{3}m - 2 \quad \frac{7}{3}m - 2$$

$$\frac{7}{3}m > 4$$

$$\frac{-7m > 12}{-7 \quad -7}$$

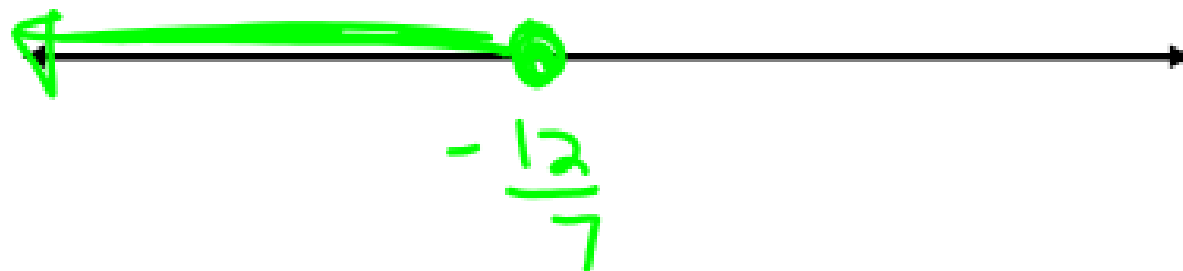
$$m < -\frac{12}{7} = -1\frac{5}{7}$$

rewrite so the variable is on the left

$$\frac{7}{3}m + 6 < 2$$

$$\frac{3}{7} \cdot \frac{7}{3}m < -4 \cdot \frac{3}{7}$$

$$m < -\frac{12}{7} \text{ or } -1\frac{5}{7}$$



For story problems: (1) identify the variable and (2) look for key words that tell you which inequality sign to use.

5. You have to earn ^{\geq} at least 6000 points to advance. So far, you've earned 4200 points. If you have 4 tries left, how many points do you need to average on each try in order to advance?

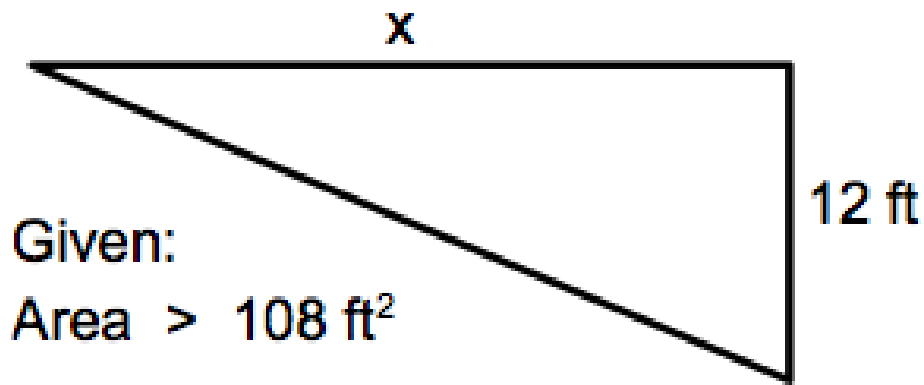
p = points per try needed to advance

$$4200 + 4p \geq 6000$$

$$4p \geq 1800$$

$$p \geq 450 \text{ points}$$

7. Write an inequality for x .



Area of \triangle
 $\frac{1}{2}bh$

$$\frac{1}{2}bh > 108$$

$$\frac{1}{2}(x)(12) > 108$$

$$\frac{6x}{6} > \frac{108}{6}$$

$$x > 18$$