

EXAMPLE 1

Solving a Linear Equation Solve and check:

$$\begin{aligned}
 8x - 3(x - 4) &= 3(x - 4) + 6 \\
 8x - 3(x - 4) &= 3(x - 4) + 6 \\
 8x - 3x + 12 &= 3x - 12 + 6 \\
 5x + 12 &= 3x - 6 \\
 5x - 3x &= -6 - 12
 \end{aligned}$$

$$\begin{aligned}
 \frac{2x}{2} &= -\frac{18}{2} \\
 \boxed{x = -9} & \text{ solution}
 \end{aligned}$$

check

$$\begin{aligned}
 8x - 3(x - 4) &= (8)(-9) - 3(-9 - 4) = -72 + 39 \\
 3(x - 4) + 6 &= 3(-9 - 4) + 6 = \boxed{-33} = \boxed{-33} \\
 \boxed{x = -9} & \checkmark
 \end{aligned}$$

EXAMPLE 2Solving a Linear Equation Solve and check: $\frac{x+2}{2} - \frac{x}{3} = 5$

$$\cancel{6} \times \frac{x+2}{2} - \cancel{6} \times \frac{x}{3} = 5 \times 6$$

$$\begin{aligned}
 3(x+2) - 2x &= 30 \\
 3x + 6 - 2x &= 30
 \end{aligned}$$

$$3x - 2x = 30 - 6$$

$$\boxed{x = 24}$$

check

$$\begin{aligned}
 \frac{x+2}{2} - \frac{x}{3} &= \frac{24+2}{2} - \frac{24}{3} = \frac{26}{2} - 8 \\
 &= 13 - 8 = \boxed{5}
 \end{aligned}$$

$$\boxed{x = 24} \checkmark$$

EXAMPLE 3**Solving a Formula for a Particular Variable**

If you deposit a principal P in an account that earns simple interest at an annual rate r , then the amount A in the account after t years is given by $A = P + Prt$. Solve for

(A) r in terms of A , P , and t

$r = ??$

(B) P in terms of A , r , and t

$P = ??$

(A) $r = ?$

$$A = P + Prt$$

$$\frac{A - P}{Pt} = \frac{\cancel{Pr}t}{\cancel{Pr}t}$$

$$r = \frac{A - P}{Pt}$$

$$A = P + Prt$$

(B) $P = ?$

$$A = P + Prt$$

$$P[1 + rt] = A$$

$$P = \frac{A}{1 + rt}$$

Home Work:

Solve the equation for y

$$6 \times \frac{1}{2} (3x - y + 2) = (5x - y + \frac{1}{3}) \times 6$$

$$3(3x - y + 2) = 30x - 6y + 2$$

$$9x - 3y + 6 = 30x - 6y + 2$$

$$+6y - 3y = -9x - 6 + 30x + 2$$

$$3y = 21x - 4$$

$$y = 7x - \frac{4}{3}$$

Solve for X } $3y = 21x - 4$

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$$\frac{3y + 4}{21} = \frac{21x}{21}$$

$$x = \frac{3y + 4}{21}$$

EXAMPLE

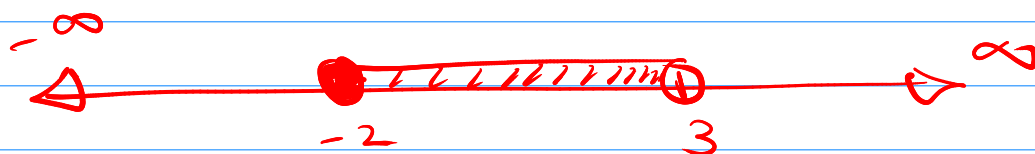
Interval and Inequality Notation, and Line Graphs

(A) Write $[-2, 3)$ as a double inequality and graph.

(B) Write $x \geq -5$ in interval notation and graph.

(A) $[-2, 3)$

$$-2 \leq x < 3$$



graph

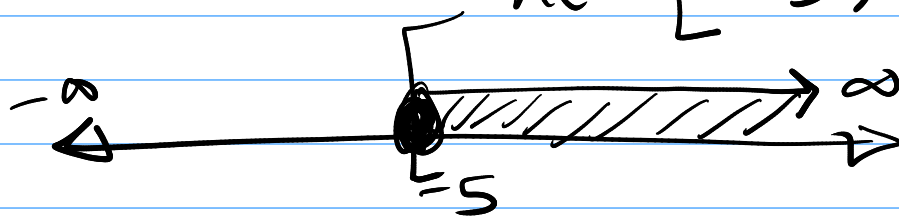


(B)

$$x \geq -5$$

$$x \in [-5, \infty)$$

interval notation



graph

EXAMPLE

Solving a Linear Inequality Solve and graph:

$$2(2x + 3) < 6(x - 2) + 10$$

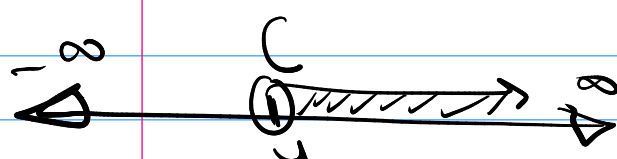
$$4x + 6 < \underline{6x} - \underline{12} + \underline{10}$$

$$\boxed{4x} + 6 < 6x \boxed{-2}$$

$$+2 + 6 < 6x - 4x$$

$$\frac{8}{2} < \frac{2x}{2}$$

$$4 < x$$

$$x \in (4, \infty)$$


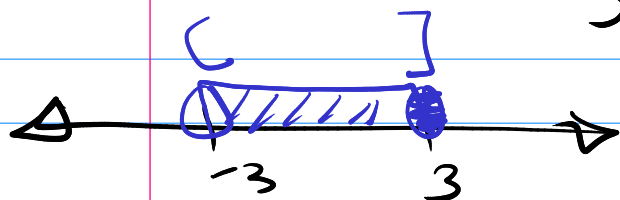
EXAMPLESolving a Double Inequality Solve and graph: $-3 < 2x + 3 \leq 9$

$$-3 < 2x \boxed{+3} \leq 9$$

$$-3 - 3 < 2x \leq 9 - 3$$

$$-\frac{6}{2} < \frac{2x}{2} \leq \frac{6}{2}$$

$$-3 < x \leq 3$$



$$x \in (-3, 3]$$

EXAMPLE

Solve and graph:

$$\left(-\frac{1}{7}\right) < \left(\frac{3}{7}x - 1\right) \leq 2$$

+1 +1 +1

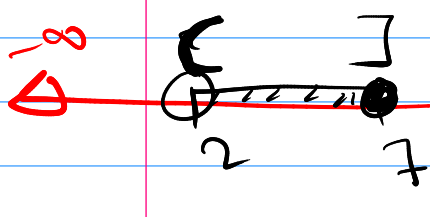
$$\cancel{7} \times -\frac{1}{\cancel{7}} < \cancel{7} \times \frac{3}{\cancel{7}} x - \cancel{7} \times 1 \leq 2 \times 7$$

$$-1 < 3x - 7 \leq 14$$

$$+7 - 1 < 3x \leq 14 + 7$$

$$\frac{6}{3} < \frac{3x}{3} \leq \frac{21}{3}$$

$$2 < x \leq 7$$

$$x \in (2, 7]$$


$$5 \times 3 \times 2 = 30$$

From Past Exams:

Solve and graph: $\cancel{30} \times \frac{1}{5} (x + 8) < \cancel{30} \times \frac{1}{2} (3x - 2) \leq \frac{7}{3} \times \cancel{30}$

$$\cancel{30} \times \frac{1}{5} (x + 8) < \cancel{30} \times \frac{1}{2} (3x - 2) \leq \frac{7}{3} \times \cancel{30}$$

$$6(x + 8) < 15(3x - 2) \leq 7 \times 10$$

$$6x + 48 < 45x - 30 \leq 70$$

$$\boxed{6x + 48 < 45x - 30}$$

$$48 + 30 < 45x - 6x$$

$$\frac{78}{39} < \frac{39x}{39}$$

$$\frac{78}{39} < x$$

$$x \in \left(\frac{78}{39}, \frac{100}{45} \right]$$

Solve and graph:

$$\frac{2x-1}{5} - \frac{1-x}{3} < 2x-1 \leq \frac{3x+5}{2}$$

$$\cancel{30}x \left(\frac{2x-1}{5} \right) - \cancel{30}x \frac{1-x}{3} < (2x-1) \times \cancel{30} \leq \frac{3x+5}{2} \times \cancel{30}$$

$$6(2x-1) - 10(1-x) < 30(2x-1) \leq 15(3x+5)$$

$$\underline{12x} - \underline{6} - \underline{10} + \underline{10x} < \underline{60x} - \underline{30} \leq \underline{45x} + \underline{75}$$

$$\boxed{22x - 16 < 60x - 30 < 45x + 75}$$

$$22x - 16 < 60x - 30$$

$$30 - 16 < 60x - 22x$$

$$14 < 38x$$

$$60x - 30 < 45x + 75$$

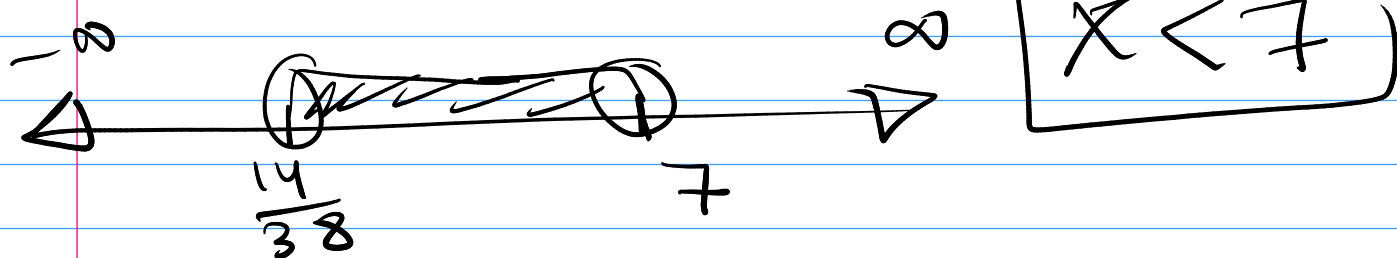
$$60x - 45x < 75 + 30$$

$$\boxed{15x < 105}$$

$$\boxed{x < \frac{105}{15}}$$

$$\frac{14}{38} < X$$

$$X < \frac{105}{15}$$



$$\frac{14}{38} < X < 7$$

$$X \in \left(\frac{14}{38}, 7 \right)$$