

Solving Review – Solve equations, literal equations, inequalities

Solve:

1.
$$\begin{array}{r} 4x + 7 = -17 \\ -7 \quad -7 \end{array} \quad \boxed{x = -6}$$

$$\frac{4x}{4} = \frac{-24}{4}$$

2.
$$\frac{3(2x - 6)}{3} = \frac{12}{3} \quad \boxed{x = 5}$$

$$\begin{array}{r} 2x - 6 = 4 \\ +6 \quad +6 \\ \hline 2x = 10 \\ \frac{2x}{2} = \frac{10}{2} \end{array}$$

3.
$$\begin{array}{r} 3x - 19 = 5x + 4 \\ -3x \quad -3x \end{array} \quad \boxed{x = \frac{-23}{2}}$$

$$\begin{array}{r} -19 = 2x + 4 \\ -4 \quad -4 \\ \hline -23 = 2x \\ \frac{-23}{2} = \frac{2x}{2} \end{array}$$

4.
$$3 \cdot \frac{2x - 5}{3} = -8 \cdot 3 \quad \boxed{x = \frac{-19}{2}}$$

$$\begin{array}{r} 2x - 5 = -24 \\ +5 \quad +5 \\ \hline 2x = -19 \\ \frac{2x}{2} = \frac{-19}{2} \end{array}$$

Solve for the variable.

5. $2 \cdot A = \frac{1}{2}bh$, for h

$$\frac{2A}{b} = \frac{bh}{b} \quad \boxed{h = \frac{2A}{b}}$$

6. $\frac{C}{2\pi} = \frac{2\pi r}{2\pi}$, for r

$$\boxed{r = \frac{C}{2\pi}}$$

7. $2 \cdot A = \frac{1}{2}h(b + c)$, for h

$$\frac{2A}{b+c} = \frac{h(b+c)}{b+c} \quad \boxed{h = \frac{2A}{b+c}}$$

8. $2 \cdot A = \frac{1}{2}h(b + c)$, for b

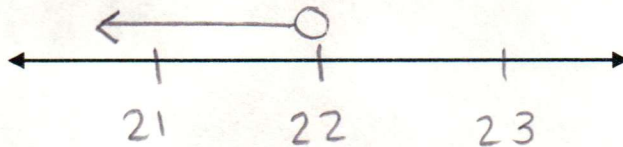
$$\frac{2A}{h} = \frac{h(b+c)}{h} \quad \frac{2A}{h} = \frac{b+c}{1} \quad \boxed{b = \frac{2A}{h} - c}$$

Solve and graph each inequality.

9. $x - 9 < 13$

$$\begin{array}{r} + 9 \\ \hline \end{array}$$

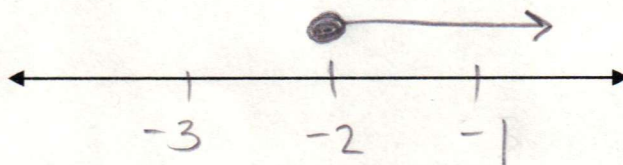
$$\boxed{x < 22}$$



10. $10 - x \leq 12$

$$\begin{array}{r} -10 \quad -10 \\ \hline -x \leq 2 \\ \frac{-x}{-1} \leq \frac{2}{-1} \\ \hline \end{array}$$

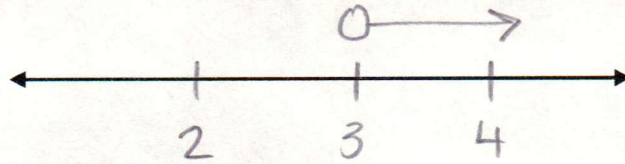
$$x \geq -2$$



Solve and graph each inequality.

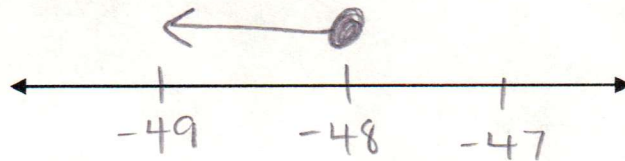
11. $6x - 8 > 10$
 $\quad +8 \quad +8$

$$\frac{6x}{6} > \frac{18}{6} \quad \boxed{x > 3}$$



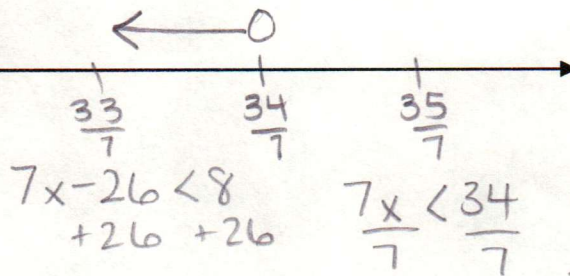
12. $2(x - 6) \geq 3(x + 12)$
 $2x - 12 \geq 3x + 36$
 $\quad -2x \quad -2x$

$$\begin{aligned} -12 &\geq x + 36 \\ -36 &\quad -36 \end{aligned}$$



$$-48 \geq x \quad \boxed{x \leq -48}$$

13. $4 + 5(x - 6) < 2(4 - x)$
 $4 + 5x - 30 < 8 - 2x$
 $5x - 26 < 8 - 2x$
 $\quad +2x \quad +2x$



$$\begin{aligned} 7x - 26 &< 8 \\ +26 &\quad +26 \end{aligned} \quad \frac{7x}{7} < \frac{34}{7} \quad \boxed{x < \frac{34}{7}}$$

14. Explain when you switch the inequality sign when solving inequalities.

When you multiply or divide by a negative number,

15. Oliver is raising money for his club. He has already raised \$40 by washing his neighbor's cars. He is now selling candy bars for \$1.50 each (they are big!). How many candy bars does Oliver need to sell, if he needs to raise at least \$150?

$b = \#$ of candy bars

$$\begin{aligned} 1.5b + 40 &\geq 150 \\ -40 &\quad -40 \end{aligned}$$

$$\frac{1.5b}{1.5} \geq \frac{110}{1.5}$$

$$b \geq 73\frac{1}{3}$$

Oliver needs to sell at least 74 candy bars

$$[74, \infty)$$

Solving Systems

Solve Systems of Equations

- Substitution
- Elimination
- Context with Graphing

Write Systems of Equations

- From a graph
- Context

Solve Systems of Inequalities

- Graphically
- Context with Graphing

Write a System of Inequalities

Solve each system using substitution or elimination.

1. $\begin{cases} y = 4x + 4 \\ 3x + 2y = 12 \end{cases} \left(\frac{4}{11}, \frac{60}{11} \right)$

$$3x + 2(4x + 4) = 12$$

$$3x + 8x + 8 = 12$$

$$11x + 8 = 12$$

$$\quad -8 \quad -8$$

$$\frac{11x}{11} = \frac{4}{11}$$

$$y = 4\left(\frac{4}{11}\right) + 4$$

$$y = \frac{60}{11}$$

3. $\begin{cases} 2x + y = 14 \\ 5x + 7y = -7 \end{cases}$

$$\left(\frac{35}{3}, -\frac{28}{3} \right)$$

$$\begin{array}{r} 14x + 7y = 98 \\ - \quad 5x + 7y = -7 \\ \hline \end{array}$$

$$\frac{9x}{9} = \frac{105}{9}$$

$$x = \frac{35}{3}$$

$$2\left(\frac{35}{3}\right) + y = 14$$

$$\frac{70}{3} + y = 14$$

$$y = -\frac{28}{3}$$

2. $\begin{cases} x + 3y = 9 \\ 2x - y = 4 \end{cases}$

$$\boxed{(3, 2)}$$

$$x = -3y + 9$$

$$2(-3y + 9) - y = 4$$

$$-6y + 18 - y = 4$$

$$-7y + 18 = 4$$

$$\quad -18 \quad -18$$

$$\frac{-7y}{-7} = \frac{-14}{-7}$$

$$y = 2$$

$$x + 3(2) = 9$$

$$x + 6 = 9$$

$$\quad -6 \quad -6$$

$$x = 3$$

4. $\begin{cases} 3y + x = 17 \\ x + y = 8 \end{cases}$

$$\boxed{\left(\frac{7}{2}, \frac{9}{2} \right)}$$

$$\begin{array}{r} x + 3y = 17 \\ - \quad x + y = 8 \\ \hline \end{array}$$

$$\frac{2y}{2} = \frac{9}{2}$$

$$y = \frac{9}{2}$$

$$x + \left(\frac{9}{2}\right) = 8$$

$$\quad -\frac{9}{2} \quad -\frac{9}{2}$$

$$x = \frac{7}{2}$$

5.
$$\begin{cases} 3x + 2y = -5 \\ x - y = 10 \end{cases}$$
 $(3, -7)$

$x = y + 10$
 $3(y + 10) + 2y = -5$
 $3y + 30 + 2y = -5$
 $5y + 30 = -5$
 $\begin{array}{r} -30 \quad -30 \\ 5y = -35 \\ \hline y = -7 \end{array}$

$x - (-7) = 10$
 $x + 7 = 10$
 $-7 - 7$
 $x = 3$

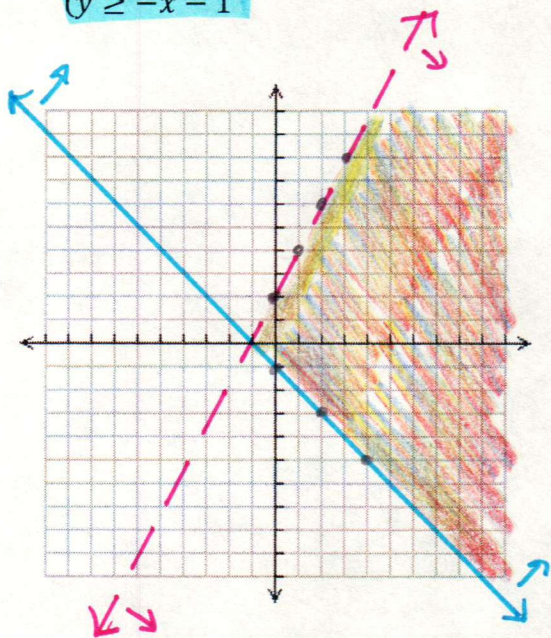
6.
$$\begin{cases} 10x - 2y = 14 \\ 15x - 3y = 21 \end{cases}$$

$$\begin{array}{r} 30x - 6y = 42 \\ - (30x - 6y = 42) \\ \hline 0 = 0 \end{array}$$

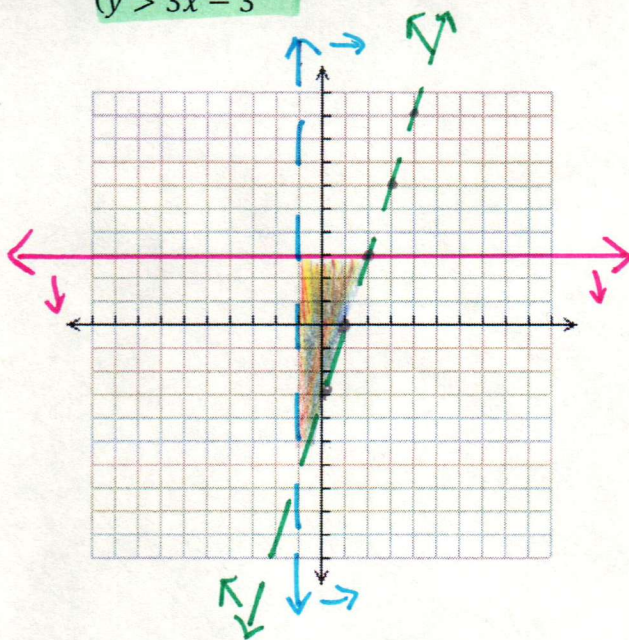
∞ solutions

Solve each system of inequalities.

7.
$$\begin{cases} y < 2x + 2 \\ y \geq -x - 1 \end{cases}$$



8.
$$\begin{cases} y \leq 3 \\ x > -1 \\ y > 3x - 3 \end{cases}$$



For each context problem:

- Write a system of equations
- Solve the system by graphing
- Verify your solution by solving algebraically (substitution or elimination)
- Answer the questions about the situation

9. A taxi company charges \$2.80 to pick you up and \$1.60 for each mile. Another taxi company charges \$3.20 to pick you up and \$1.50 for each mile. After how many miles will the charges be equal?

a. $C = \text{total cost}$
 $m = \# \text{ of miles}$

$$2.80 + 1.60m = C$$

$$3.20 + 1.50m = C$$

c.

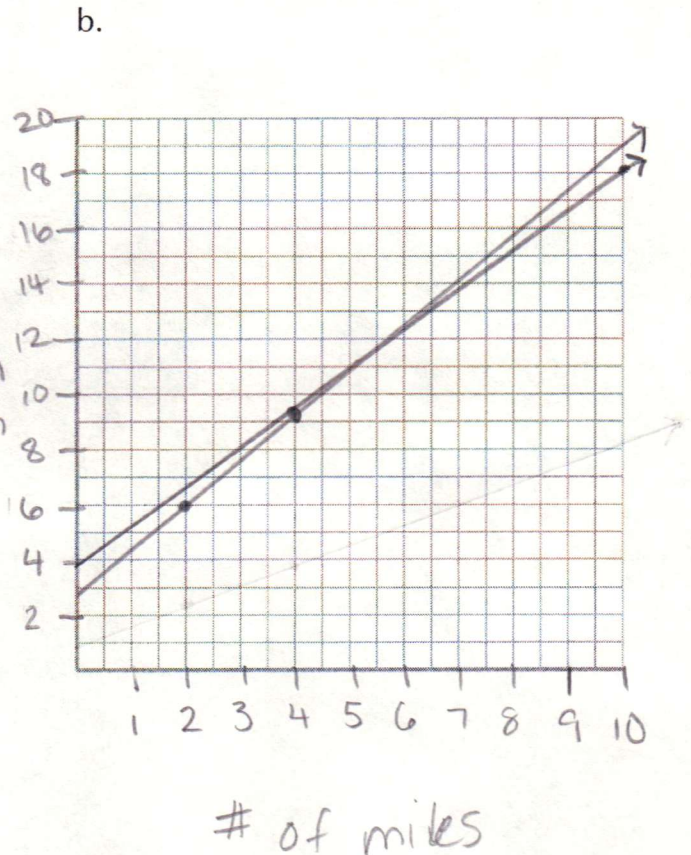
$$\begin{array}{r} 2.80 + 1.60m = 3.20 + 1.50m \\ -1.50m \qquad -1.50m \end{array}$$

$$\begin{array}{r} 2.80 + .1m = 3.20 \\ -2.80 \qquad -2.80 \end{array}$$

$$\frac{.1m}{.1} = \frac{.4}{.1}$$

$$m = 4$$

Cost in \$



- d. The two companies cost the same at 4 miles.

10. Carrie and Dave each rent the same size moving truck for one day. They pay a fee of x dollars for the truck and y dollars per mile they drive. Carrie drives 150 miles and pays \$215. Dave drives 120 miles and pays \$176. Find the amount of the fee and the cost per mile.

a. $y + 150x = 215$
 $y + 120x = 176$

b.

c.

$$\begin{array}{r} y + 150x = 215 \\ - (y + 120x = 176) \\ \hline \end{array}$$

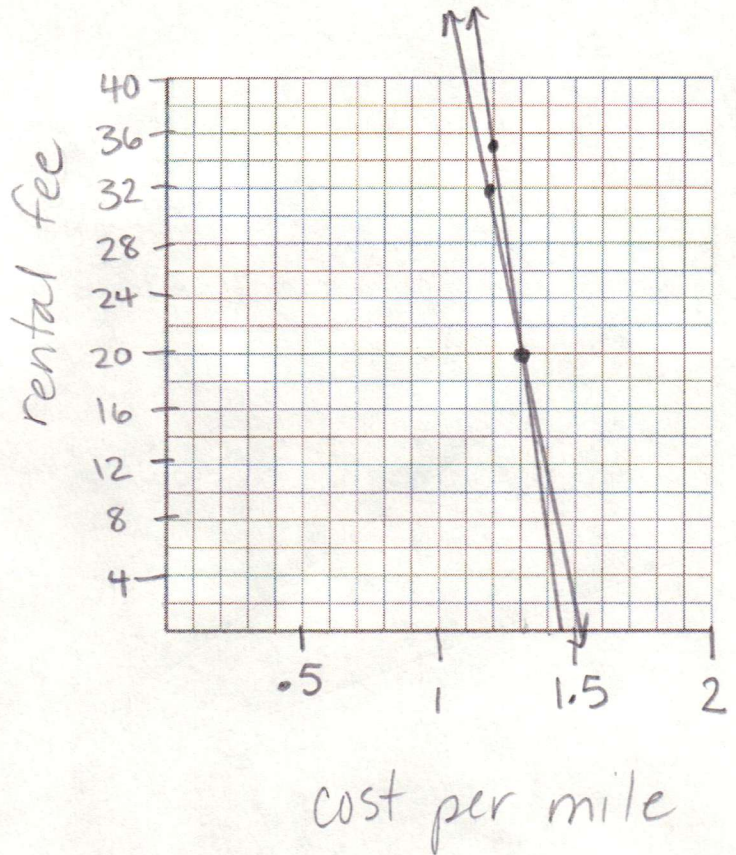
$$\frac{30x}{30} = \frac{39}{30}$$

$$x = 1.3$$

$$y + 150(1.3) = 215$$

$$\begin{array}{r} y + 195 = 215 \\ -195 \quad -195 \\ \hline \end{array}$$

$$y = 20$$



- d. The moving company charges a \$20 fee and \$1.30 per mile

For each context problem:

- Write a system of inequalities
- Find the limits for each inequality
- Graph the system.
- Find 3 realistic solutions to the system

11. Ethan makes \$10 per hour mowing lawns and \$12 per hour raking leaves. He cannot work more than 15 hours per week. He wants to make at least \$120 per week.

- a. $m = \#$ of hours mowing
 $r = \#$ of hours raking

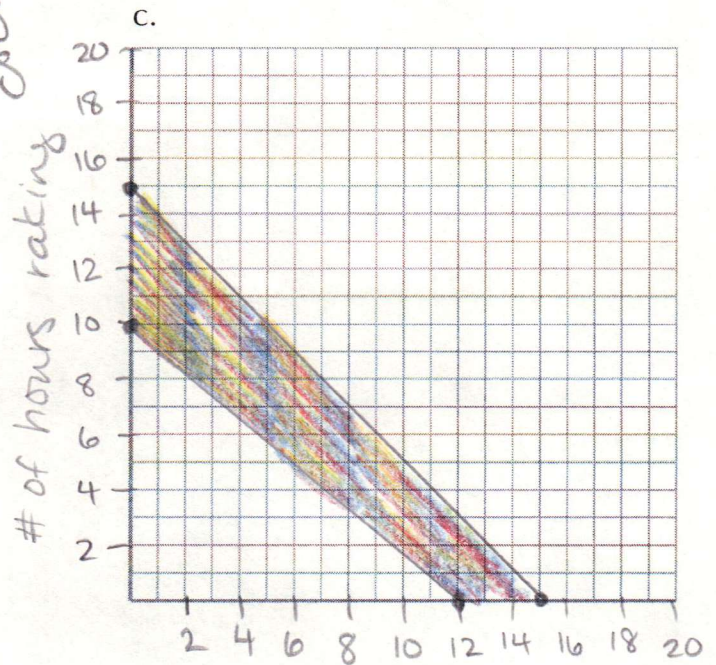
$$m + r \leq 15$$

$$10m + 12r \geq 120$$

b.

$$m: [0, 15], [12, \infty)$$

$$r: [0, 15], [10, \infty)$$



of hours
mowing

d.

any point in the shaded region

6 hours mowing + 7 hours raking

12. You are selling pizzas to raise money for a field trip. Cheese pizza cost \$7 and pepperoni pizza cost \$9. You must sell at least 2 of each kind of pizza, and you want to sell at least \$180 worth of pizza.

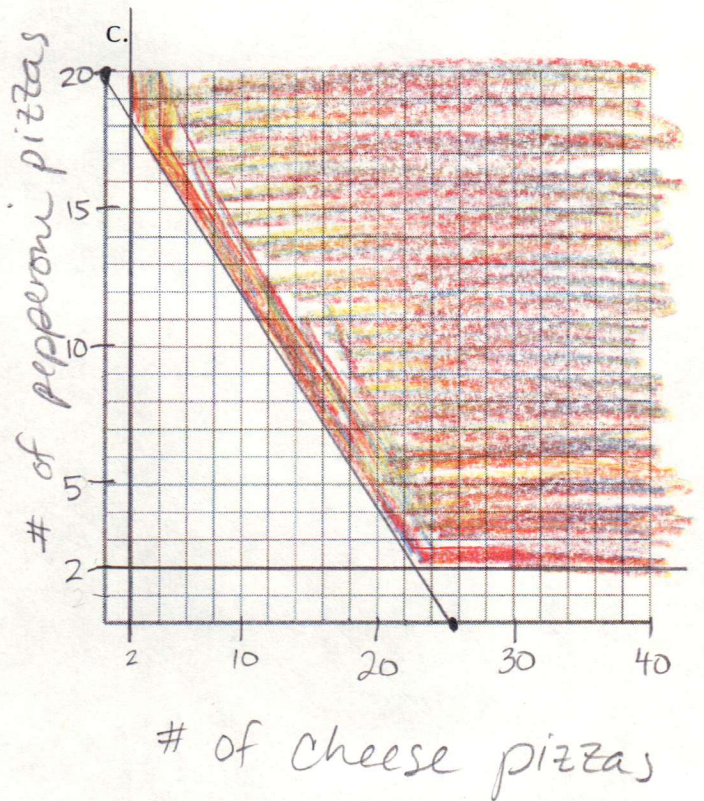
a. $C = \#$ of cheese pizza
 $P = \#$ of pepperoni

$$7C + 9P \geq 180$$

b. $C \geq 2$
 $P \geq 2$

$C: [25.7, \infty), [2, \infty)$

$P: [20, \infty), [2, \infty)$



d.

any point in the shaded region

10 cheese + 20 pepperoni