Warm Up   1/31/19
*COPY DOWN THE PROBLEMS

1. The sum of Avery and Becca's ages is 58 years. Avery is two more than 3 times the age of Becca. Find their ages.

x = Becca's age (14)

$2+3x$ = Avery's age

$2+3(14) = (44)$

$x+2+3x=58$

$4x+2=58$

$-2-2$

$4x=56$

$\frac{4x}{4}=\frac{56}{4}$

$x=14$

2. Five times the sum of a number and 16 is 65. Find the number.

$5(x+16)=65$

$5x+80=65$

$-80-80$

$\frac{5x}{5}=\frac{-15}{5}$

$x=-3$

3. Solve: $(3)\ \dfrac{x-15}{-3}=4\ (-3)$

$x-15=-12$
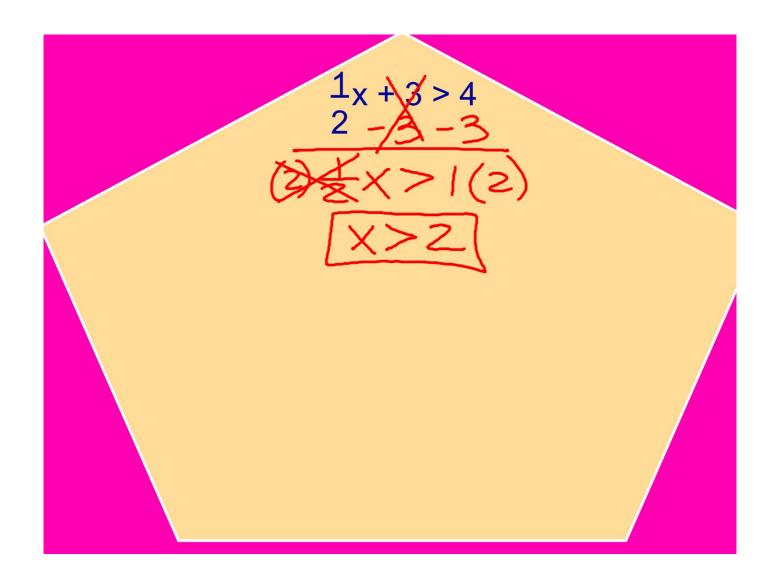
$+15+15$

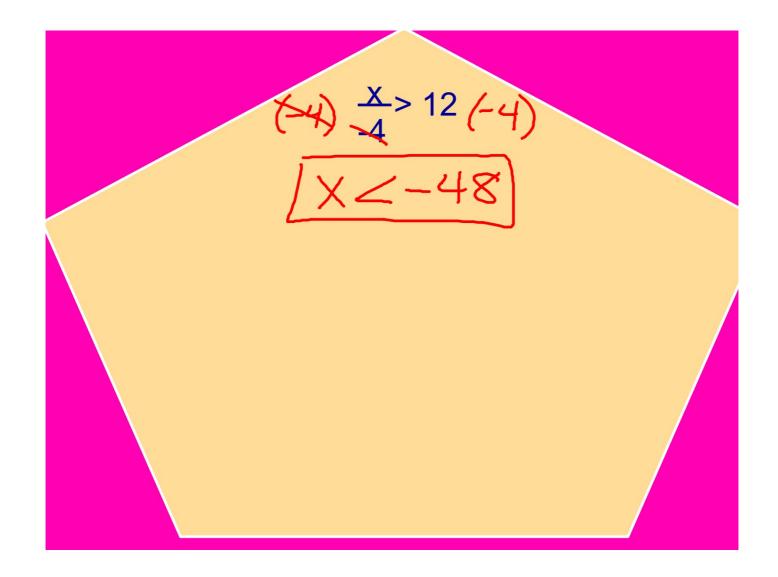$x=3$

Solving Inequalities

Solving Multi-Step Inequalities

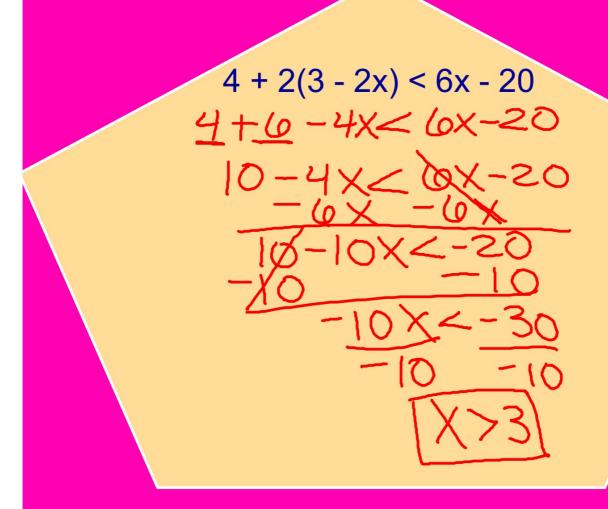**Follow the same steps as solving multi-step equations**

*Special Rule: *When multiplying or dividing by a NEGATIVE, flip the inequality symbol.*

3x + 5 < 2x − 6

$$-2x \qquad -2x$$

$$x + 5 < -6$$

$$-5 \qquad -5$$

$$\boxed{x < -11}$$

$$-12$$
$$-15$$

$$\frac{1}{2}x + 3 > 4$$

$$-3 \quad -3$$

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

$$\boxed{x > 2}$$

$$(-4) \frac{x}{-4} > 12 (-4)$$

$$\boxed{x < -48}$$

$$4 + 2(3 - 2x) < 6x - 20$$

$$4 + 6 - 4x < 6x - 20$$

$$10 - 4x < 6x - 20$$
$$\underline{ -6x \quad -6x}$$
$$10 - 10x < -20$$
$$\underline{-10 \qquad\qquad -10}$$
$$\underline{-10x < -30}$$
$$-10 \qquad -10$$

$$\boxed{x > 3}$$

$(4) \dfrac{3}{4}x - 8 \ge \dfrac{1}{2}x + 2 \; (4)$ with (4) (4)

$$3x - 32 \ge 2x + 8$$
$$-2x \qquad -2x$$
$$\overline{}$$
$$x - 32 \ge 8$$
$$+32 \quad +32$$
$$\overline{}$$
$$\boxed{x \ge 40}$$

$15 - (-4x + 10) > 11$

$\boxed{15} + 4x \ \boxed{-10} > 11$

$\cancel{5} + 4x > 11$

$-\cancel{5} \qquad\qquad -5$

$4x > 6$

$\overline{4} \qquad \overline{4}$

$\boxed{x > \dfrac{3}{2}}$

Inequality Word Problems

Words for each inequality symbol

< (less than)	= (equal)	> (greater than)
is less than	is / are / will be /only	more than
is under	is the same as	above
is below	that is equal to	over
shorter / smaller than	exactly	greater / larger than
fewer than	half (= .5* or ½ *)	exceeds / increased
is lower than		longer than
beneath		is higher than
a better deal		

≤ (less than or equal to)	≠ (not equal to)	≥ (greater than or equal to)
at most	is not equal to	at least
maximum	is not the same as	minimum
bottom	is different / differs from	top
is no more than		is no less than

Translate the verbal sentences into an algebraic inequality.

1) x is at most 50
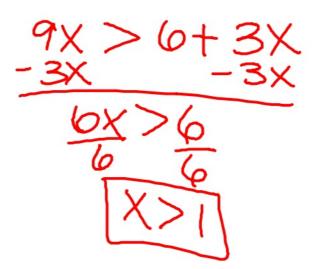
$$x \leq 50$$

2) The sum of 5x and 2x is at least 70

$$7x \geq 70$$

Check Understanding

3) The maximum value of 4x – 6 is 54.

$$4x - 6 \leq 54$$

4) 6 less than a number is greater than 4

$$x - 6 > 4$$

Write an inequality and solve the problem algebraically.

1) The product of nine and x is greater than six more than the product of three and x.

$$9x > 6 + 3x$$
$$-3x \qquad -3x$$
$$\overline{}$$
$$\frac{6x}{6} > \frac{6}{6}$$
$$\boxed{x > 1}$$

2) Joan needed $100 to buy a graphing calculator for her math class. Her neighbor will pay her $5 per hour to babysit and her father gave her $10 for cleaning her room. What is the minimum amount of hours she will need to babysit in order for her to buy her calculator?

$$x = hours$$

$$5x + 10 \geq 100 \qquad x \geq 18$$
$$-10 \qquad -10$$
$$\frac{5x}{5} \geq \frac{90}{5}$$

At least 18 hrs.

3) The dance committee hired a DJ for the fall dance. The DJ charges $125 per hour plus $55 for an assistant. The committee wants to keep the total cost under $600. What is the maximum amount of hours the DJ will play at the dance?

$$x = hours$$

$$125x + 55 \leq 600$$
$$-55 \qquad -55 \qquad x \leq 4$$
$$\frac{125x}{125} \leq \frac{545}{125}$$

At most 4 hrs.