Chapters 5 and 6 – Algebra Study Card

Vocabulary:
Equation – a mathematical sentence that contains an equal sign
Term – the product of a coefficient, a variable, and an exponent
Inequality- a mathematical sentence that contains >, <, ≥, or ≤

Evaluating Algebraic Expressions
Substitute the appropriate values and use order of operations to simplify

Evaluate the following when a = 5, b = -3, and c = 8

$a + b$	$9b$	$4a - 3c$	$ab + c$	$\frac{bc}{4}$	$4a^2 - 2b^3$
$5+-3$	$9(-3)$	$4(5)-3(8)$	$5(-3)+8$	$\frac{8(-3)}{4}$	$4(5)^2-2(-3)^3$
②	⑳⑦	$20-24$	$-15+8$	$\frac{-24}{4}$	$4(25)-2(-27)$
		④	⑦	⑥	$100--54$
					⑮④

Solving One Step Equations	**Solving Two Step Equations**
To solve a one step equation us the inverse operation	Steps: 1. Add or Subtract (opposite) 2. Multiply or Divide (opposite)

Solving One Step Equations

Ex: $c - 4 = -9$

$c-4=-9$
$\underline{+4 \quad +4}$
$\boxed{c=-5}$

$\frac{m}{-6} = -7$

$(\times) \frac{m}{-6} = -7(-6)$
$\boxed{m=42}$

Solving Two Step Equations

Ex: $4r - 7 = -55$

$4r-7=-55$
$\underline{+7 \quad +7}$
$\frac{4r}{4}=\frac{-48}{4}$
$\boxed{r=-12}$

$\frac{e}{5} + 12 = 9$

$\frac{e}{5}+12=9$
$\underline{-12 \quad -12}$
$(5)\frac{e}{5}=-3(5)$
$\boxed{e=-15}$

Solving Equations with Combining Like Terms (CLT)

Combining Like Terms (CLT)
Terms are like if:
1. They have the same variable(s)
2. The variable(s) have the same exponent(s)
Be sure to use grouping symbols and take the signs in front of the coefficients

Ex: $4e + 6e$

$10e$

$-6r + 11r$

$5r$

$6a - 7b + 5b - 11a$

$6a-7b+5b-11a$
$-5a-2b$

Solving with Like Terms:

Ex: $5c - 9 + 7c = 135$ $-4c + 14 - 5c = 77$

$$5c - 9 + 7c = 135$$
$$12c - 9 = 135$$
$$+9 \qquad +9$$
$$12c = 144$$
$$\overline{12} \quad \overline{12}$$
$$c = 12$$

$$-4c + 14 - 5c = 77$$
$$-9c + 14 = 77$$
$$-14 \quad -14$$
$$-9c = 63$$
$$\overline{-9} \quad \overline{-9}$$
$$c = -7$$

Solving Equations with Variables on Both Sides (VBS)
Remember to move the smaller coefficient to the larger coefficient whenever possible

Ex: $5r = 2r - 27$ $7y - 12 = -3y + 68$

$$5r = 2r - 27$$
$$-2r \quad -2r$$
$$3r = -27$$
$$\overline{3} \quad \overline{3}$$
$$r = -9$$

$$7y - 12 = -3y + 68$$
$$+3y \qquad +3y$$
$$10y - 12 = 68$$
$$+12 \quad +12$$
$$10y = 80$$
$$\overline{10} \quad \overline{10}$$
$$y = 8$$

Solving Equations with the Distributive Property

Distributive Property
Distribute → Multiply , use the Distributive Property to eliminate ( )

Ex: $6(y - 5)$ $-2(x - 7)$ $9(a + 2) - 5a - 15$

$$6(y - 5)$$
$$6y - 30$$

$$-2(x - 7)$$
$$-2x + 14$$

$$9(a + 2) - 5a - 15$$
$$9a + 18 - 5a - 15$$
$$4a + 3$$

Solving with Distributive Property

Ex: $4(r - 5) = 12$ $\qquad\qquad$ $-3(d - 11) = -18$

$$4(r-5)=12$$
$$4r-20=12$$
$$\underline{+20\ |\ +20}$$
$$\frac{4r=32}{4\ \ \ 4}$$
$$\boxed{r=8}$$

$$-3(d-11)=-18$$
$$-3d+33=-18$$
$$\underline{-33\ |\ -33}$$
$$\frac{-3d=-51}{-3\ \ \ -3}$$
$$\boxed{d=17}$$

Solving Equations – All Types
Checklist:
1. Use the Distributive Property to eliminate parentheses. (Distribute ( ) → Multiply)
2. Combine like terms (CLT) on both sides of the equation. (Combine → Add)
3. Get the variable on one side of the equation
4. Add or Subtract (opposite)
5. Multiply or Divide (opposite)

Ex: $7(x - 3) = -5x + 39$ $\qquad\qquad$ $-4y + 12 + 13y = 6(y - 5)$

$$7(x-3)=-5x+39$$
$$7x-21=-5x+39$$
$$\underline{+5x\ \ \ \ \ \ +5x}$$
$$12x-21=39$$
$$\underline{+21\ |\ +21}$$
$$\frac{12x=60}{12\ \ \ 12}$$
$$\boxed{x=5}$$

$$-4y+12+13y=6(y-5)$$
$$-4y+12+13y=6y-30$$
$$9y+12\ \ \ \ =6y-30$$
$$\underline{-6y\ \ \ \ \ \ \ \ \ -6y}$$
$$3y+12\ =-30$$
$$\underline{-12\ \ \ \ \ -12}$$
$$\frac{3y=-42}{3\ \ \ \ 3}$$
$$\boxed{y=-14}$$

Solving Equations-Word Problems

When solving a word problem algebraically don't forget to include a Let statement

Ex: The Richardson family is looking to rent a tent for their child's graduation party this spring. Syracuse Tents and Events charges a fee of $50 per hour plus a delivery fee of $79.99. Century Party Rentals has a fee of $65 per hour with a delivery fee of $42.49. How many hours would the family need to rent the tent for the cost of the companies to be equal?
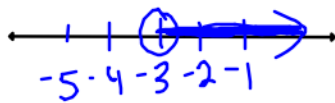
$$\text{Let } h = \text{the \# of hours}$$

$$50h + 79.99 = 65h + 42.49$$
$$-50h \qquad\qquad -50h$$

$$79.99 = 15h + 42.49$$
$$-42.49 \qquad\qquad -42.49$$

$$\frac{37.50}{15} = \frac{15h}{15}$$

$$\boxed{2.5 = h}$$

Graphing Inequalities

> and < → Open circle (not part of solution)
≥ and ≤ → Closed circle (part of solution)
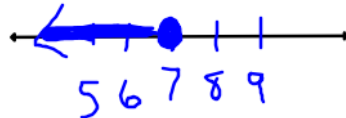
Ex: $x > -3$ $x \le 7$ $-4 < x \le 5$
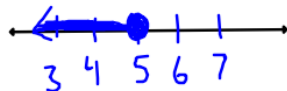
Solving Inequalities

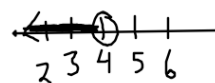Remember: When you multiply or divide by a negative you must flip the inequality symbol

Ex: $-6x - 13 \ge -43$ $-4z - 13 > z - 33$

$$-6x - 13 \ge -43$$
$$+13 \qquad +13$$
Flip symbol
$$-6x \ge -30$$
$$\frac{-6x}{-6} \quad \frac{-30}{-6}$$
$$x \le 5$$

$$-4z - 13 > z - 33$$
$$+4z \qquad +4z$$
$$-13 > 5z - 33$$
$$+33 \qquad +33$$
$$\frac{20}{5} > \frac{5z}{5}$$
$$4 > z$$

Solving Inequalities – Word Problems
Remember to include a let statement

Tony is a delivery man for Trappers Pizza Pub. He earns a salary of $10.65 plus any tips he receives from a delivery. What is the least number of hours Tony can work on Saturday if he makes $40 in tips and wants to make at least $100?

Let h = the # of hours

$$10.65h + 40 \geq 100$$
$$ -40 \quad -40$$
$$\frac{10.65h}{10.65} \geq \frac{60}{10.65}$$
$$h \geq 5.633\ldots$$

$$\boxed{6 \text{ hours}}$$