

These 11 skills are review from 6<sup>th</sup> and 7<sup>th</sup> grade that will prepare you for the start of Algebra 1.

8<sup>th</sup> grade Algebra 1 is taken for high school credit. This means it is one of the first grades on your high school transcript and is factored into your high school GPA.

A calculator is permitted for this packet, but is not necessary for these types of problems. If you need help, Khan Academy has some great resources and videos that can be found at the following links (the links are case sensitive):

Skills #1-3 <https://goo.gl/U2rCGg>

Skill #4-6 <https://goo.gl/SL7HFK>

Skills #7-10 <https://goo.gl/6vvTTx>

You must show ALL work for these exercises.

This packet will be turned in to Miss Rymer at the start of the year.

Assignments completed by Friday, August 24 = Full credit

Assignments completed by Friday, September 7 = Half credit

Assignments turned in after Friday, September 7 will receive no credit.

Skill #1

**Using the Distributive Property**

Simplify.

**Example**

$$8(y-4)$$

$$8y - 32$$

$$-4(a-3)$$

$$-4a + 12$$

1.  $7(x-7)$
2.  $-5(y-4)$
3.  $3(x-2y)$
4.  $-4(x-2y+3)$
5.  $6(3x-4y+8z)$
6.  $2.1(-1.2x+2.3y-1.1)$
7.  $-8(3x+2y-6)$
8.  $3(4a-5b+7)$
9.  $\frac{2}{3}(6x-9y)$
10.  $\frac{-5}{6}(x-\frac{1}{2}y+12)$

## Collecting Like Terms

Skill #2

Collect the like terms.

Remember: you can only combine terms with the same variable  
\* the operator follows the number  
ex:  $4x - 5 + 2 = 4x - 3$

**Example:**

add/subtract like terms

$$\begin{aligned} & \boxed{4x} + \boxed{5y} - \boxed{6x} - \boxed{2y} \\ & -2x - 3y \end{aligned}$$

$$\begin{aligned} & \boxed{3a} - 7 + \boxed{12a} \\ & 15a - 7 \end{aligned}$$

1.  $5y - y$

2.  $x - 4x$

3.  $3a + 2a$

4.  $m - 0.5m$

5.  $11x + 3y - 5x$

6.  $6y + 3z - 3y$

7.  $13a - 13b - 13c + 15a$

8.  $6p + 2p - 18$

9.  $\frac{2}{5}y + \frac{3}{5}x + \frac{1}{5}y - \frac{2}{5}x$

10.  $17a + 18b - 20b + a$

## Simplifying Algebraic Expressions

Skill #3

Simplify each algebraic expression.

**Example:**

add imaginary 1 and distribute

$$\begin{aligned} & 4a - 3 - (2a - 5) \\ & \boxed{4a} - \boxed{3} - \boxed{-2a} + \boxed{5} \\ & 2a + 2 \end{aligned}$$

Distribute first  
Combine like terms

1.  $6y - (3y + 10)$

2.  $2x - (2x + 5)$

3.  $4b - (6b - 8)$

4.  $12m - (6m - 5)$

5.  $2y + 8y - (6y + 12)$

6.  $5x + 6x - (3x + 5)$

7.  $3y - 4x - 2(4x - 5y)$

8.  $6a - 3b + 2(b + 5a)$

9.  $-(5a - 3x) - (3x - 5a)$

10.  $(-6x + y) - (3y - 5x)$

## Solving Equations Using Addition and Subtraction

Skill #4

Solve each equation.

**Example:**

$$\begin{array}{r} y + 57 = 119 \\ -57 \quad -57 \\ \hline y = 62 \end{array}$$

1.  $x + 2.6 = 9.8$

2.  $m - 37 = 312$

3.  $a - 12 = 101$

4.  $x + 89 = 376$

5.  $c + 2.04 = 3.68$

6.  $y - 1,064 = 3,882$

7.  $a + \frac{2}{7} = \frac{6}{7}$

8.  $p - \frac{4}{15} = \frac{3}{5}$

9.  $6.44 = x + 1.78$

10.  $23 = y - 261$

## Solving Equations Using Multiplication and Division

Skill #5

Solve each equation.

**Example:**

$$\begin{array}{r} 9m = 108 \\ \div 9 \quad \div 9 \\ \hline m = 12 \end{array}$$

1.  $26m = 182$

2.  $102 = 17c$

3.  $\frac{x}{0.11} = 6$

4.  $\frac{m}{6} = 62$

5.  $3p = 183$

6.  $5.44 = 0.34a$

7.  $59 = \frac{x}{4}$

8.  $\frac{r}{0.2} = 4.8$

9.  $23y = 115$

10.  $9m = 3.6$

# Solving Two-Step Equations

Skill #6

Solve each equation.

## Example:

Step 1: get rid of constant  
(# without the variable)  
by using inverse operations  
(+ or -)

$$\begin{array}{r} -3x + 5 = 26 \\ -5 \quad -5 \\ \hline \end{array}$$

$$-3x = 21$$

$$x = -7$$

$$\begin{array}{r} 4 + 5h = 19 \\ -4 \quad -4 \\ \hline \end{array}$$

$$5h = 15$$

$$h = 3$$

Step 2: Isolate the variable  
( $\div$  or  $\cdot$ )

1.  $7y + 9 = 72$

2.  $4x - 6 = 38$

3.  $7a + 2 = -47$

4.  $5m + 4 = -51$

5.  $-3x + 9 = -24$

6.  $-6y - 18 = -84$

7.  $-4x + 83 = -1$

8.  $4 - 8m = 20$

9.  $9y - 8 = -80$

10.  $-18 - 3y = -57$

# Solving Inequalities Using Addition and Subtraction

Skill #7

Solve each inequality.

## Example:

$$\begin{array}{r} f + 10 > 2 \\ -10 \quad -10 \\ \hline f > -8 \end{array}$$

$$\begin{array}{r} y - 6 \leq -10 \\ +6 \quad +6 \\ \hline \end{array}$$

$$y \leq -4$$

← combine like terms

$$3m + 8m < 22$$

$$\frac{11m}{11} < \frac{22}{11}$$

$$m < 2$$

1.  $x + 5 > 12$

2.  $y + 9 \leq -12$

3.  $a + 30 < 11$

4.  $m - 9 \geq -9$

5.  $x - 15 > -16$

6.  $b - 2.5 \leq 6.7$

7.  $m + \frac{1}{3} < \frac{4}{9}$

8.  $c - \frac{1}{4} \geq \frac{1}{4}$

9.  $\frac{2}{3} + x < \frac{4}{9}$

10.  $5m - 4m < 21$

## Solving Inequalities Using Multiplication and Division

Solve each inequality.

### Example:

When multiplying or dividing by a negative number, remember to reverse the inequality symbol.

$$-4x < 20$$

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

$$x > -5$$

$$5m > -3$$

$$\frac{5m}{5} > \frac{-3}{5}$$

$$m > \frac{-3}{5}$$

1.  $6x \geq -24$

2.  $-4m < 32$

3.  $-5y \leq -25$

4.  $20p > -400$

5.  $-x < \frac{1}{2}$

6.  $-3y \geq \frac{3}{8}$

7.  $9x \leq -6.3$

8.  $27 < -10n + n$

## Solving Multistep Inequalities

Solve each inequality.

\* Just like 2 step equations

\* Don't forget to flip the inequality if you  $\div$  or  $\cdot$  by a negative

### Example:

$$5x + 9 \leq 24$$

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

$$x \leq 3$$

$$\frac{x}{-2} + 5 > 11$$

$$\frac{x}{-2} > 6 - 5$$

$$-2 \cdot \frac{x}{-2} > 6 \cdot -2$$

$$x < -12$$

$$14 \geq 12 - y$$

$$-12 \geq -12 - y$$

$$\frac{-2}{-1} \geq \frac{-y}{-1}$$

$$2 \leq y$$

1.  $6 + 8x \leq 46$

2.  $-3x - 5 > 13$

3.  $6 - 5y \geq 21$

4.  $-7x + 4 < 39$

5.  $\frac{d}{3} + 4 < 6$

6.  $\frac{c}{5} + 13 \geq 17$

7.  $10 \leq 7 - m$

8.  $10 - a > 2$

9.  $2g - 13 \geq 3$

10.  $\frac{b}{2} - 9 \leq 11$

# Graphing Inequalities on a Number Line

Skill #10

# Evaluating Algebraic Expressions

Skill #11

Solve and graph the solution on a number line.

Evaluate each expression.  
Follow PEMDAS

Parentthesis  
Exponents  
Multiplication/Division (left to right)  
Addition/Subtraction (left to right)

**Example:**

$$x - 6 \leq -7$$

$$x \leq -1$$



For  $\leq$  or  $\geq$  use a solid circle. For  $<$  or  $>$  use an open circle.

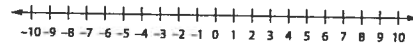
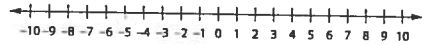
**Example:**

$$(10 - x)^2 \text{ if } x = 2$$

$$(10 - 2)^2 = 8^2 = 64$$

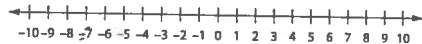
1.  $y + 5 > 14$

2.  $6x \leq 30$



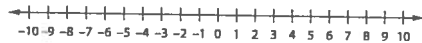
3.  $-3y < 21$

4.  $m - 5 \geq 2$



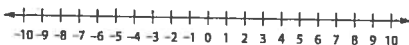
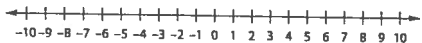
5.  $2a - 5 > 7$

6.  $-3b + 4 < 16$



7.  $-9c - 12 \leq 42$

8.  $7m + 4 \geq 25$



1.  $(3y)^2 - 5$  if  $y = 3$

2.  $5(x + 10)$  if  $x = 5$

3.  $m + 6m^2$  if  $m = 4$

4.  $(c - 5)^3$  if  $c = 6$

5.  $(n + 6)(n - 2)$  if  $n = 12$

6.  $\frac{c + 10}{2c}$  if  $c = 10$

7.  $\frac{y^2 + 2}{3y}$  if  $y = 4$

8.  $x^0 + 2x^1$  if  $x = 20$

9.  $\frac{(5x) + 5}{5x}$  if  $x = 1$

10.  $\frac{3a^2 + a}{a}$  if  $a = 4$