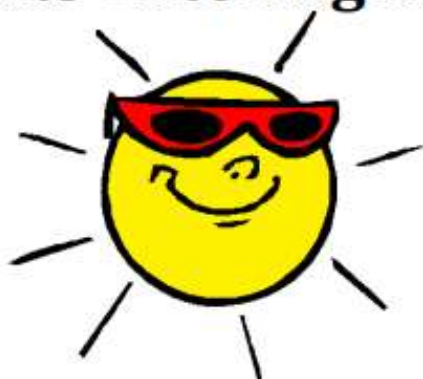


# Summer Math Packet

**Number Sense & Pre-Algebra Skills For  
Students Entering Algebra**



**No Calculators!!**

Within the first few days of your Algebra course you will be assessed on the prerequisite skills outlined in this packet. The packet will not be graded; however, you are responsible for the material. **The assessment will count as a full test grade in your first quarter average.**

CCHS Algebra 1 Students,

This Algebra 1 Summer Math Packet is designed to review skills learned in middle school math and Pre-Algebra that are essential to your success in Algebra 1. Bring this **completed** work on the **first** day of school. During the first two classes, you will be given the opportunity to ask questions about the topics listed in the prerequisite material.

Your task is to complete the problems with work shown. If there is a problem you do not remember or seems like new material, you must be resourceful and utilize online resources, a study group, or a knowledgeable adult. Remember, you will be taking an assessment the first week of school. Practice makes perfect so practice extra problems of a concept you may be struggling with. The concepts are listed on the next page. You can find extra problems using online resources such as Khan Academy.

Please purchase a three ring binder for class. You will need paper, graph paper, and plenty of pencils. It will be helpful for you to have both lined paper and graphing paper. The school will provide you with a TI 84+ calculator during class time. It may be helpful to have one at home but it is not required. A scientific calculator is sufficient.

The intention of the summer practice is not for you to spend your summer doing math. Enjoy the month of June. Pace out the work through the month of July. This will allow you to start school better prepared. If this work is too overwhelming or too difficult, you may want to discuss your course selection with your guidance counselor.

Sincerely,

Cross Creek High School Math Teachers

## **Topics Covered**

- 1.** Central Tendencies
- 2.** Greatest Common Factor/Least Common Multiple
- 3.** Fractions
- 4.** Order of Operations
- 5.** Working with Integers
- 6.** Evaluation Algebraic Expressions and Formulas
- 7.** Properties of Operations
- 8.** Solving Multi-Step Equations
- 9.** Solving Multi-Step Inequalities
- 10.** Linear Functions
- 11.** Polynomials

**Central Tendencies**  
(Mean, Median, Mode, and Range)

**Mean** is the sum of the values in a set of data divided by the number of values.

**Median** is the middle value of a set of data written in ascending order. If there are two middle values, the median is the mean of those values.

**Mode** is the most frequent value in a set of data.

**Range** is the difference between the greatest and least value in a set of data.

Exercises:

**Find the mean, median, mode, and range of each set of data.**

1. 108, 93, 426, 766, 518, 210
  
2. 21.5, 35.5, 49.5, 16.3, 35.5

## GCF & LCM

Example:

Find the Greatest Common Factor (GCF) and Least Common Multiple (LCM) of 24 and 32.

**GCF**

2	24	32
4	12	16
	3	4

Common Factors →

$GCF = 2 \times 4 = 8$

**LCM**

2	24	32
4	12	16
	3	4

$LCM = 2 \times 4 \times 3 \times 4 = 96$

Exercises:

**Find the GCF.**

1. 42, 60
2.  $24xy^2$ ,  $42xy$
3.  $27x^2y^2$ ,  $45x^2$
4. 11, 21

**Find the LCM**

5. 27, 18
6.  $15x$ ,  $18xy$
7.  $9x^2y$ ,  $15xy^2$
8. 64, 48

## Fractions

(Addition, Subtraction, Multiplication, and Division)

### Miscellaneous

Write the fractions in lowest terms.

1.  $\frac{8}{24}$

2.  $\frac{18}{24}$

3.  $\frac{15x^2y}{20xy}$

4.  $\frac{36abc^4}{45a^3bc^2}$

Solve for  $x$ .

5.  $\frac{16}{48} = \frac{x}{12}$

6.  $\frac{12}{42} = \frac{4}{x}$

7.  $\frac{20}{32} = \frac{x}{16}$

8.  $\frac{6}{9} = \frac{12}{x}$

Write as improper fractions.

9.  $2\frac{1}{3}$

10.  $-4\frac{6}{7}$

Write as mixed numbers.

11.  $-\frac{9}{4}$

12.  $\frac{38}{3}$

Addition and Subtraction

Find each sum or difference. Write your answer in simplest form.

13.  $-\frac{2}{3} + \frac{1}{4}$

14.  $3\frac{5}{9} + 2\frac{1}{6}$

15.  $\frac{3}{10} - \frac{4}{5}$

16.  $6\frac{7}{10} + (-1\frac{1}{5})$

17.  $5\frac{4}{11} - 2\frac{2}{3}$

18.  $2\frac{7}{12} - 9\frac{2}{3}$

Multiplication and Division

Find each product or quotient. Write your answer in simplest form.

19.  $-\frac{5}{6} \cdot \frac{6}{15}$

20.  $-\frac{3}{4} \div (-\frac{9}{16})$

21.  $2\frac{2}{5} \cdot (-3\frac{3}{4})$

22.  $-3\frac{3}{4} \div 4\frac{2}{3}$

23.  $\frac{2}{9} \cdot \frac{3}{16} \cdot \frac{3}{6}$

24.  $6\frac{3}{4} \div 4$



## Order of Operations

When several operations are indicated in a numerical expression, proceed in the following order: work within the parentheses, expand each power, multiply and divide (whichever comes first), and finally, add or subtract (whichever comes first).

**PEMDAS** (“**P**lease **E**xcuse **M**y **D**ear **A**unt **S**ally”) is an acronym that provides a good way to remember your order of operation.

**P:** Parentheses

**E:** Exponents

**MD:** Multiply or Divide, whichever comes first

**AS:** Add or Subtract, whichever comes first

*Simplify.*

1.  $2^4 - 3(3^2 - 8)$

2.  $(4^2 + 10)4 - 10(5^2 - 20)$

3.  $4^2 - 4(5^2 - 32 \div 8 \cdot 4)$

4.  $(8 \cdot 5 \div 10 + 2)(2^5 - 8^2 \div 2)$

5.  $5^2 - 3[6 + (-2)(20 + (-15))]$

6.  $[4^3 + (-10)(30 - 8 \cdot 5)]$

7.  $[15 - 3(4^2 - 10) + 25 \div 5 \cdot 15]$

8.  $\{10 - 5[20 - 2(3^2 + 1)]\}$

9.  $|-32| + 32$

10.  $\frac{48 - 24 \div 2^3}{3 + 2 \cdot 6}$



## Working with Integers

### Adding and Subtracting:

1<sup>st</sup>: Rewrite all subtraction as addition then...

- If the integers have the same signs, add their absolute values. The sum will have the same sign of the addends.
- If the integers have different signs, subtract their absolute values. The sum has the sign of the addend with the greater absolute value.

### Multiplying and Dividing:

- The product or quotient of two integers having the same sign is positive.
- The product or quotient of two integers having different signs is negative.

Find each sum, difference, product, or quotient.

1.  $-13 + 19$

2.  $37 + (-13)$

3.  $-18 + (-29)$

4.  $-27 - 93$

5.  $-46 - (-32)$

6.  $9 - 83$

7.  $-45 \div 9$

8.  $-84 \div -12$

9.  $\frac{132}{-11}$

10.  $8(-17)$

11.  $-24 \cdot -6$

12.  $-62(8)$

13. There is a  $6^\circ$  drop in temperature over the past hour. If it is  $55^\circ$  now, what was the temperature an hour ago?
14. It is  $-9^\circ$  now. The temperature will drop  $5^\circ$  in two hours. What will the temperature be in two hours?

## Evaluating Expressions and Formulas

To evaluate an expression, first replace the variable by a given value. Then simplify the resulting numerical expression.

Evaluate the expression when  $x = -2$  and  $y = 5$ .

1.  $x + y$

2.  $x^2 + y^3$

3.  $2x - y$

4.  $-2(y - 2x)$

5.  $\frac{3x-y}{11}$

6.  $\frac{x}{3-y}$

## Properties of Operations

**Commutative Property  
of Addition:**

$$a + b = b + a$$

**Commutative Property  
of Multiplication:**

$$a \times b = b \times a$$

**Associative Property  
of Addition:**

$$(a + b) + c = a + (b + c)$$

**Associative Property  
of Multiplication:**

$$(a \times b) \times c = a \times (b \times c)$$

**Identity Property of Addition:**

$$a + 0 = a$$

**Identity Property of Multiplication:**

$$a \times 1 = a$$

Name the property illustrated by each expression.

1.  $8 \times 12 = 12 \times 8$

2.  $3 \times (2 \times 5) = (3 \times 2) \times 5$

3.  $2 + 5 + 12 = 5 + 2 + 12$

4.  $xy + 0 = xy$

5.  $1x = x$

6.  $5 + 7 = 7 + 5$

7.  $3 + (4 + 5) = 3 + (5 + 4)$

8.  $3xy = 3xy(1)$

9.  $(4 + 8) + 5 = 4 + (8 + 5)$

10.  $5 \times 6 \times 8 = 8 \times 5 \times 6$

## Solving Multi-Step Equations

**Procedure:** To solve multi-step equations...

1. Fully simplify both sides of the equation
2. Get all variables to one side of the equation.
3. Use inverse operations to isolate the variable  
\*\*undo addition and subtraction first\*\*

Ex. 
$$\begin{array}{r} 2x + 3 = 7 \\ \cancel{3} \quad \cancel{-3} \\ \hline 2x = 4 \\ \frac{2x}{2} = \frac{4}{2} \\ \boxed{x = 2} \end{array}$$

Ex. 
$$\begin{array}{r} 2(x + 5) = 3x - 5 \\ 2x + 10 = 3x - 5 \\ \cancel{-2x} \quad \quad \quad \cancel{-2x} \\ \hline 10 = x - 5 \\ +5 \quad \quad \quad +5 \\ \hline \boxed{x = 15} \end{array}$$

### Exercises

**Solve and check each equation.**

1.  $-2x + 7 = 25$

2.  $3 - 8x = -141$

3.  $15 - 2(w + 5) = 11$

4.  $12 - 4r = 6r + 2$

5.  $-4(n + 5) = -32$

6.  $12 - 2x + 5 = -1$

7.  $3 - 2x = 15$

8.  $\frac{z}{2} - 7 = 12$

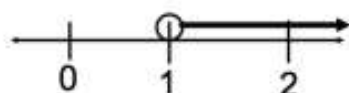
9.  $17 + 3x = 4x - 9$

10.  $-3(6f - 12) = 36 - 18f$

## Solving Multi-Step Inequalities


**Note:** Solve a multi-step inequality just like you would solve a multi-step equation. However, if you multiply or divide both sides of an inequality by a negative number, then the inequality sign reverses.

Ex.

$$\begin{array}{r} 2x + 5 > 7 \\ \underline{-5 \quad -5} \\ 2x > 2 \\ \underline{\div 2 \quad \div 2} \\ \boxed{x > 1} \end{array}$$


A number line with tick marks at 0, 1, and 2. An open circle is drawn at 1, and a thick line with an arrowhead points to the right from this circle, representing the solution set  $x > 1$ .

Ex.

$$\begin{array}{r} 10 \leq -2(x - 4) \\ 10 \leq -2x + 8 \\ \underline{-8 \quad -8} \\ 10 \leq -2x \\ \underline{-2 \quad -2} \\ \boxed{-5 \geq x \text{ or } x \leq -5} \end{array}$$


A number line with tick marks at -6, -5, and -4. A solid black dot is drawn at -5. A thick line with an arrowhead points to the left from this dot, and another thick line with an arrowhead points to the right from the same dot, representing the solution set  $-5 \geq x$  or  $x \leq -5$ .

### Exercises

Find and graph the solution set of each inequality.

1.  $3x + 8 > 17$

2.  $-6y + 3 > 9 - 7y$

3.  $2v + 7 \geq 11$

4.  $7 > 3 + \frac{b}{3}$

5.  $\frac{c-2}{3} \leq 4$

6.  $4b + 4 < 4(5 - 3b)$

7.  $2z - 5 < -21 - 2z$

8.  $8b - 10 \geq 6(3 - a)$

9.  $3x - 5 > 6x + 13$

1.  $7(y + 5) - 10 \leq 2y$



## Linear Functions

### Exercises

**Tell whether each ordered pair is a solution of the equation.**

1.  $3x + y = -11, (-4, 1)$

2.  $2x - y = 4, (3, -2)$

**Find the intercepts of the equations graph.**

3.  $3x - 4y = -12$

4.  $y = -2x - 8$

**Find the slope through the given points.**

5.  $(4, 7), (-3, 6)$

6.  $(-5, 7), (-5, -14)$

**Identify the slope and y-intercept of the line with the given equation.**

7.  $y = 2x - 12$

8.  $2x - 3y = -6$

**Write an equation of the line that is parallel to the given line and passes through the given point.**

9.  $y = -2x - 6, (0, -4)$

10.  $-2x + 3y = 12, (3, 2)$

**Graph the equation using any method.**

11.  $y = 2x - 3$

12.  $-2x - 3y = 12$

## Polynomials

### Examples

A polynomial is in **Standard Form** if it is simplified and the terms are arranged so the degree of each term increases (or stays the same) from left to right.

#### Find the difference:

$$(6x^2 - 5x + 2) - (-3x^2 - 8x + 3)$$

First: Turn the expression into an addition problem by distributing the negative to the second expression.

$$(6x^2 - 5x + 2) + (3x^2 + 8x - 3)$$

Then: Combine like terms

$$(6x^2 + 3x^2) + (-5x + 8x) + (2 + -3) = 9x^2 + 3x - 1$$

#### Find the product:

$$3x(2x^2 - 5) = 3x(2x^2) + 3x(-5) = 6x^3 - 15x$$

#### Find the quotient:

$$\frac{8r^4 + 4r^2 - 6r}{2r} = \frac{8r^4}{2r} + \frac{4r^2}{2r} + \frac{-6r}{2r} = 4r^3 + 2r - 3$$

#### Find the product using the F.O.I.L. method (F: first, O: outer, I: inner, L: last):

$$(2x - 3)(x + 5) = 2x(x) + 2x(5) - 3(x) - 3(5) = 2x^2 + 7x - 15$$

### Exercises

#### Write the expression in standard form.

1.  $13 - 4x + 3x^3$

2.  $4y^3 - 2(2y - 3) + y$

#### Find the sum or difference.

3.  $(3x^2 - 5x + 2) + (5x^2 + 9x - 5)$

4.  $(8y^2 + 2y - 6) - (3y^2 - 5y + 2)$

#### Find the product or quotient.

5.  $3x(x^2 - 5)$

6.  $(4z^3 - 5z + 2)6z$

7.  $\frac{8y^3 - 4y^2 + 6y}{2y}$

8.  $\frac{18z^6 - 9z^4 - 3z^2}{-3z^2}$

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

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