Piedmont Classical High School

Summer Math Packet

Summer math packets are designed to brush up your math skills and prepare you to start the year with a firm foundation of appropriate knowledge and understanding. Summer math packets are optional and designed to contain material that should be review. If you don't understand or have forgotten something in the math packet, it is important that you get help and learn the concept so that you will be successful in your new math class. If you complete the packet, you will benefit from stronger skills, better understanding, and a 100% quiz grade.

Guidelines:

- You should complete the math packet for the class that you will be going into
- Math packets should reflect your own work
- You may get help with the material and concepts, but you must list people and resources who helped you on the accompanying form
- Completed Packets are due on August 19 at 4:00 pm and are to be turned into your math teacher.
- If you need help, you may use the following recommended resources or find some on your own
    - Last year's textbook (you may check one out if you don't have one)
    - Khan academy
    - Tutoring hours at the school (confirm times and dates on website)
        - August 1, 3 from 12:00- 2:00
        - August 8, 10,15 3:00-5:00
        - August 17,18 10:00-12:00
        - Other times by appointment

I will honor, through my words and actions, my school, my family, my country, and myself.

This packet reflects my own work and upholds the honor code.

Signed: _____

I received help from the following people:

_____

_____

ALGEBRA I

SUMMER MATH REVIEW

Welcome to Algebra I at PCHS! Here is your optional summer review packet. Be sure to show all work on a separate sheet of paper, read directions carefully, and do NOT use a calculator. Get help if you need it!

I. Prime Numbers

A. A prime number has only itself and 1 as factors. One (1) is not a prime number.

Examples: 2, 5, 29

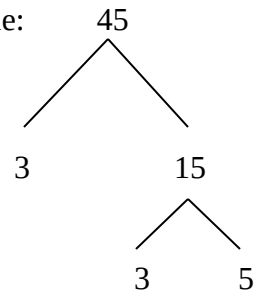
B. Factors (from the Latin for "to make") make numbers by multiplying.

Example: 2 X 3 = 6 2 and 3 are factors of six. They are also prime.

3 X 15 = 45 3 and 15 are factors of 45. But 15 is not prime.

C. A factor tree can break a composite number into prime factors.

Example:



The prime factors of 45 are 3 and 5. If all are listed: 3, 3, and 5.

D. Practice

Make a factor tree for each of the following numbers, then list all prime factors:

1. 25

2. 36

3. 108

4. 95

II. Greatest Common Factor and Least Common Multiple

A. The greatest common factor (GCF) of two or more number is the largest number that is a factor of both numbers.

Example: The GCF of 24 and 18 is 6. 6 X 3 = 18; 6 X 4 = 24

B. The least common multiple (LCM) is the smallest number of which both numbers are factors. These are often used as common denominators when combining fractions.

Example: The LCM of 24 and 18 is 72. 24 X 3 = 72; 18 X 4 = 72

C. Practice: Find the GCF and LCM of the following numbers:

1. 36 and 72

2. 30 and 100

3. 3 and 49

4. 5 and 40

III. Fractions are Your Friends

A. Parts of fractions:

1. The top part is the numerator (from the Latin), or the counter. It counts.

2. The bottom part is the denominator (Latin, of course), the namer.

B. Adding and Subtracting

1. To add or subtract, make sure the fractions have a common denominator, LCM, then add or subtract the numerators, leaving the denominators unchanged. Then simplify (reduce) the answer if you can.

2. Example:

$$\frac{1}{3} + \frac{2}{3} = \frac{3}{3} = 1$$

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3. Practice: (These fractions bars are slanted, horizontal ones are better.)

    1. 1/2 + 2/3

    2. 3/8 + 3/4

    3. 3/4 − 3/8

    4. 3/7 + (1/2 − 1/4)

C. Multiplying and Dividing

1. To multiply, just multiply the numerators, multiply the denominators, and then simplify your answer.

    Example: 2/3 X 3/4 = 6/12 = 1/2

2. To divide by a fraction, invert it (to make a reciprocal) and multiply. Simplify if possible.

    Example: 2/3 ÷ 3/4 = 2/3 X 4/3 = 8/9

3. Practice:

    1. 4/5 x 5/4

    2. 4/5 ÷ 5/4

    3. 8/13 x 2/3

    4. 8/13 ÷ 2/3

IV. Fractions, Decimals, and Percents - All of these are ways to denote parts of a whole.

A. From fraction to decimal

1. Divide numerator by denominator. (The fraction bar looks like a division sign for a good reason!)

2. Look for repeating patterns or a remainder of 0.

B. From decimal to percent and back

1. To change a decimal number to a percent, move decimal point two places to the right (in other words, multiply by 100), then add % sign.

   Ex: 1.245 = 124.5% .5 = 50%

2. To go the other way, move decimal point two spaces to the left and delete the % sign.

   Ex. 98% = .98 (read "98 hundredths")

3. Practice: Change to percent or decimal.

   1. 9.6%
   2. 0.0068
   3. 1.5
   4. 350%

4. Practice: Change to a fraction.

   1. 25%
   2. 20%
   3. 66.66... %
   4. 70 %

V. The Coordinate Plane - (x,y)

A. Axes: x-axis is horizontal, y axis is vertical.

B. Always list x coordinate first in an ordered pair.

C. On the x-axis, positive is to the right, negative to the left; on the y-axis, positive is up, negative is down.

D. Plot and <u>label</u> the following points on graph paper:

1. A(5,3)
2. B(-2,7)
3. C(3, -5)
4. D(0,0)
5. E(-5, -5)
6. F(7, -2)

VI. Integers and Absolute Value

A. Remember, on a number line, negative is left of 0, positive is right.

B. Remember, on a number line, the number to the right of another is larger.

C. Absolute value is always positive, because it is the distance from 0 on a number line.

Ex: $|2| = 2$ $|-2| = 2$ (Same distance from 0)

D. Practice:

List from smallest to greatest:

-2, 5, 0, |-6|, -8

VII. Working with Integers

A. Adding and subtracting

1. To add a positive integer, go to the right on the number line.

2. To add a negative integer, go to the left.

3. To subtract an integer, add its opposite.

Ex: $2 + 4 = 6$, $2 + (-4) = -4$, $2 - 4 = -2$, $2 - (-4) = 2 + 4 = 6$

4. Practice

1. $14 - 8$ 2. $6 + 25$ 3. $6 - 25$ 4. $6 - (-25)$

B. Multiplying and dividing

1. A positive times or divided by a positive is a positive.

2. A negative times or divided by a negative is a positive.

3. A positive times or divided by a negative is a negative.

Ex: $2 \times 5 = 10$, $2 \times -5 = -10$, $-2 \times -5 = 10$

$10 \div 5 = 5$, $-10 \div -5 = 2$, $10 \div -2 = -5$

4. Practice - multiply or divide

1. $108 \div 12$ 2. $98 \div -2$ 3. $-72 \div -18$

4. 9×8 5. -7×-12 6. -5×7

VIII. Tackling word problems

A. Turn word problems into number problems as soon as possible.

B. Follow the question word by word, following instructions.

C. If the problem is a "story", write down what you know, *then* decide what to do.

D. Always write an equation. Simple problems that you can work in your head can give you safe practice writing the equations.

Ex: One half of what number is 6? $1/2\ X = 6$

What is 3 times the sum of 6 and 3? $X = 3\ (6 + 3)$

Hamburgers cost $4.50 each. You have $25. How many hamburgers can you buy?

$25 = 4.50\ X$ In this case, your calculated answer, 5.555... seems to make no sense; nobody sells 5/9 of a hamburger. You can only buy 5 hamburgers and get 2.50 in change. Your correct final answer is 5; math always makes sense.

E. Practice

1. Twelve divided by what number is 4?

2. What number added to 16 makes 25?

3. What is 5 less than 38?

4. Joe had 14 M&M's. He gave 6 to Sally. How many does he have left?

IX. Simplifying expressions

A. To simplify expressions, follow order of operations (PEMDAS)

B. Use the distributive property when appropriate.

C. Add or subtract LIKE EXPRESSIONS ONLY.

Ex: $2z + 3(z - 5) - (-12) = 2z + 3z - 15 + 12 = 5z + 3$

D. Practice

1. $14d - 17 + 12d + 6$ 2. $2(f + 6) - 3(f - 2)$

X. Solving equations

A. The goal is to get the variable (or the chosen variable) ALONE on one side of the equal marks.

B. Use mathematical operations to rearrange the terms - do NOT even think "move it over!" Add, subtract, multiply, or divide terms and coefficients as needed.

C. Whatever you do to one side of the equation (sides are separated by the =), you must do to the other.

Ex: $25 = 7 + x$ Subtract 7 from both sides

$-7 \quad -7$

$18 = x$

Ex: $5(x + 3) = 1/2$ Multiply both sides by 2 to eliminate the fraction

$10(x + 3) = 1$ Distribute

$10x + 30 = 1$ Subtract 30

$10x = -29$ Divide by 10

$x = -2.9$ Also correct would be $\frac{-29}{10}$

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D. Practice

1. $m - 16 = 5$

2. $-g + 21 = 13$

3. $-5 + 3k = 10$

4. $(x + 5)/6 = 3$