May 2013

Dear Future Algebra Students,

Next year will be an exciting and challenging year as you take high school credit Pre-AP Algebra I. We spend very little time reviewing concepts from 7th and 8th grade math, and you are already expected to be proficient in many skills before taking algebra. Some of the important skills you need to have when you enter Algebra I include: order of operations, integer operations, decimal operations, fraction operations, probability and statistics, geometry, and measurement concepts.

To help you strengthen and keep your math skills strong over the summer, I would like you to complete a summer packet. The concepts in this packet will be on your first quiz on the second day of school. If you feel you need extra practice beyond that provided in this packet there are several resources available online or in the public library.

You will need to go to the SMS website, find Mrs. Nelson-Archer in the faculty list, click on resources, and click on Algebra Summer Packet to print the packet. If you are not able to print the packet, let your current math teacher know. If you lose any portion during the summer, you can return to the website to reprint it.

No calculators may be used in completing this packet, unless otherwise stated. In order to do well on your first algebra quiz, it is suggested that you complete the packet once within the first few weeks of summer break. It would also be wise to go back and complete selected problems a second time to review as the new school year approaches. Bring the completed packet to school with you next year.

I also recommend that you begin looking for a graphing calculator during the summer. You will need a graphing calculator to complete homework and classwork next year. There are calculators available to use in class, but they are not available for check-out. I strongly suggest you purchase a TI-84+ or TI-84+ Silver Edition. The calculator is for your home use only.

I hope you have an enjoyable summer and I look forward to meeting you next year.

Sincerely,

Michelle Nelson-Archer
SMS Math Department Head

Objective: Using the order of operations.

Order of Operations:

1. Perform any operations inside grouping symbols (parentheses.)
2. Simplify any term with exponents.
3. Multiply and divide in order **from left to right**.
4. Add and subtract in order **from left to right**.

Many students use PEMDAS to help them remember the order to perform operations.

Parentheses
Exponents
Multiply and
Divide
Add and
Subtract.

Simplify the following expressions.

_____ 1) $15 - 7 \cdot 3$

_____ 2) $7 * 8 - 5 + 6 \div 3$

_____ 3) $(3 - 7)4 - 12$

_____ 4) $12 \div 4 + 2 \cdot (-7) - 18 \div (-3)$

_____ 5) $4^2 - 2^4$

_____ 6) $6(5 + 12 \div 6)^2$

_____ 7) $\left(\frac{3}{4} + \frac{2}{3}\right) \cdot \frac{1}{2}$

_____ 8) $\frac{1}{6} + \left(\frac{2}{3}\right)^2$

_____ 9) $(49 - 10) \div (52/4)$

_____ 10) $-5 * 3^3$

_____ 11) $\frac{3}{4} \div \frac{2}{3} - \frac{3}{8}$

_____ 12) $\frac{7}{10} - \frac{4}{5} \div \left(\frac{2}{3} + \frac{2}{5}\right)$

_____ 13) $-6.2 + 0.72 \div 0.9$

_____ 14) $35 - 3(6 - 2)^3$

_____ 15) $28 \div 4 + 3$

_____ 16) $(7 + 2)(-3) + 9$

_____ 17) $18 \div (-15 \div 5)$

Objective: Adding and subtracting with integers.

Review the following addition and subtraction rules.

- To add two numbers with the same sign, *add* their absolute values. The sum has the same sign as the numbers.
- To add two numbers with different signs, find the *difference* of their absolute values. The sum has the same sign as the number with the greater absolute value.
- Rewrite subtraction problems as addition problems by adding the opposite of the second value. To subtract a number, add its opposite. (Some students may be familiar with "add a line, change the sign.")

_____ 1) $7+(-2)$

_____ 2) $7+(-11)$

_____ 3) $(-15)+(-15)$

_____ 4) $36+12+(-14)$

_____ 5) $-8+15+(-24)+17$

_____ 6) $(-26)+(-44)+14+36$

_____ 7) $(-56)+24+43+(-17)$

_____ 8) $19-31$

_____ 9) $-24-0$

_____10) $14-(-10)$

_____ 11) $-6-(-3)$

_____ 12) $(-8)-(-7)$

_____ 13) $(-57)-(-43)$

_____ 14) $65-(-335)$

_____ 15) $-175-(-305)$

_____ 16) $(-99)+(-77)+(-1)$

_____ 17) $(-3)+14+(-7)$

_____ 18) $8-56+12-4$

_____ 19) $8+(-10)-(-7)$

_____ 20) $13-18+10-9$

_____ 21) $-23-(-7)+5$

_____ 22) $13+(-38)-(-42)-17$

_____ 23) $-32+(-7)-(-40)+6$

_____ 24) $4+(-20)-18-(-13)$

Objective: Multiplying and dividing integers.

Review the following multiplication and division rules:

- The product or quotient of two positive numbers is positive.
- The product or quotient of two negative numbers is positive.
- The product or quotient of a negative number and a positive number is negative.

_____ 1) $-33*6$

_____ 2) $(-14)(-6)$

_____ 3) $-39*61$

_____ 4) $(-5)(-11)$

_____ 5) $-15*0$

_____ 6) $(-15)(15)$

_____ 7) $(3)(-5)(2)$

_____ 8) $5*(-3)(-8)$

_____ 9) $(-11)(-5)(-3)$

_____10) $(-9)(-4)(-5)$

_____ 11) $(3)(-2)(6)(-4)$

_____ 12) $(-4)(6)(-5)(-6)$

_____ 13) $(-7)(-2)(-5)(-3)$

_____ 14) $54\div(-6)$

_____ 15) $-84\div3$

_____ 16) $-42\div(-6)$

_____ 17) $-169\div(-13)$

_____ 18) $121\div(-11)$

_____ 19) $\frac{247}{-13}$

_____ 20) $\frac{-60}{-15}$

_____ 21) $\frac{-56}{-4}$

_____ 22) $42\div(-54)$

_____ 23) $\frac{-1080}{40}$

_____ 24) $\frac{0}{-22}$

Objective: Decimal Operations.

Review the rules for adding, subtracting, multiplying, and dividing integers. The same rules apply when adding, subtracting, multiplying, and dividing decimals. Remember to "line up the decimals" when adding and subtracting.

_____ 1) $-0.5+0.8$

_____ 2) $0.5-4$

_____ 3) $0.27-3.06$

_____ 4) $1.91-(-3.08)$

_____ 5) $(-17.9)+(-3.9)$

_____ 6) $-1+0.4$

_____ 7) $(-0.4)(47)$

_____ 8) $-9(0.06)$

_____ 9) $(0.5)(-0.9)$

_____10) $(7.3)(-0.5)$

_____ 11) $(-0.1)(96)$

_____ 12) $-1.2\div 0.4$

_____ 13) $0.36\div(-4)$

_____ 14) $0.12\div(-0.4)$

_____ 15) $-0.36\div(-0.9)$

_____ 16) $(0.3)(-84)$

_____ 17) $-0.8\overline{)33.2}$

_____ 18) $-0.3\overline{)-4.05}$

_____ 19) $3\overline{)-1.4}$

_____ 20) $8\overline{)96}$

_____ 21) $\dfrac{-3.2}{-10}$

Objective: Fraction operations.

Review the rules for adding, subtracting, multiplying, and dividing integers. The same rules apply when adding, subtracting, multiplying, and dividing fractions.

- Find common denominators and equivalent fractions when adding and subtracting.
- Multiply the numerators and multiply the denominators when multiplying fractions. If either of the multipliers are mixed numbers, change them to improper fractions.
- To divide fractions: Find the reciprocal of the *second* fraction (divisor) and then multiply by the first fraction (dividend).
- Always simplify the answers.

For example:

$$\frac{14}{15} \div \frac{7}{5} =$$

$$\frac{14}{15} \bullet \frac{5}{7} = \frac{2}{3}$$

_____ 1) $\frac{1}{5} + \left(-\frac{4}{5}\right)$

_____ 2) $-\frac{5}{6} + \left(-\frac{5}{6}\right)$

_____ 3) $\frac{1}{3} - \frac{2}{3}$

_____ 4) $\frac{3}{10} - \frac{1}{6}$

_____ 5) $2\frac{1}{2} + \left(-7\frac{1}{2}\right)$

_____ 6) $-5\frac{2}{7} + \left(-4\frac{3}{14}\right)$

_____ 7) $-13\frac{5}{9} - \left(-7\frac{2}{3}\right)$

_____ 8) $5\frac{1}{2} - \left(-2\frac{2}{3}\right)$

_____ 9) $9\frac{2}{5} - 11\frac{1}{2}$

_____ 10) $36\left(-\frac{5}{9}\right)$

_____ 11) $\left(-\frac{8}{15}\right)\left(\frac{27}{20}\right)\left(-\frac{5}{6}\right)$

_____ 12) $-12 \div \frac{2}{7}$

_____ 13) $\frac{4}{5} \div \left(-\frac{1}{20}\right)$

_____ 14) $\left(-3\frac{1}{2}\right)\left(1\frac{3}{5}\right)$

_____ 15) $-\frac{1}{6}\left(-4\frac{4}{7}\right)$

_____ 16) $\left(4\frac{7}{8}\right)\left(-2\frac{2}{9}\right)$

_____ 17) $2\left(\frac{2}{3}\right) + 3\left(\frac{1}{3}\right)$

_____ 18) $\frac{3}{4}$ (illegible)

Objective: Probability

You can collect data through observations or experiments and use the data to state the **experimental probability** as a ratio of favorable outcomes to the total number of trials.

$$P(\text{event}) = \frac{\text{favorable outcomes}}{\text{number of trials}}$$

Theoretical probability is the ratio of the number of ways the event can occur to the total number of possibilities in the sample space.

$$P(\text{event}) = \frac{\text{favorable outcomes}}{\text{\# of possible outcomes}}$$

Two events are **independent** when the outcome of the second is not affected by the outcome of the first. Examples of independent events: flipping coins; spinning spinners; choosing an item from a bag and *replacing* it before choosing another item.
If A and B are independent events, $P(\text{A and B}) = P(\text{A}) \times P(\text{B})$.

Two events are **dependent** when the outcome of the second is affected by the outcome of the first. Examples of dependent events: choosing an item from a bag and *not replacing* it before choosing a second item from the same bag; selecting a candy, eating it, and selecting another candy.
If A and B are dependent events, $P(\text{A, then B}) = P(\text{A}) \times P(\text{B after A})$.

Suppose you have a drawer of socks containing 15 red, 5 white, 25 green, 20 black, 25 purple, and 10 blue socks. You draw a sock, record its color, and put it back. You do this 100 times with these results: 12 red, 9 white, 27 green, 17 black, 22 purple, and 13 blue. Write each probability as a fraction in simplest form.

	1. P(red)	2. P(white)	3. P(green)	4. P(black)	5. P(purple)	6. P(blue)
Experimental probability						
Theoretical probability						

For problems 7 – 16, suppose you take out a sock, put it on your foot, then take out another sock.

_____ 7) Suppose you take out a sock, put it on your foot, and take out another sock. Are these events independent or dependent?

_____ 8) What is the probability of drawing a red and then a blue sock?

Express each probability as a fraction in simplest form.

_____ 9) P(two purple socks)

_____ 10) P(red, then white)

_____ 11) P(green, then orange)

_____ 12) P(red, then green)

Express each probability as a percent. Round to the nearest tenth, if necessary.

_____ 13) P(two purple socks)

_____ 14) P(red, then white)

_____ 15) P(green, then orange)

_____ 16) P(red, then green)

Objective: Statistics

The mean, median, and mode are measures of central tendency.

- To calculate the mean of a set of data, find the average.
- To find the median of a set of data, order the data and find the middle number.
- The mode is the data that occurs most often. It is possible to have no mode or more than one mode.

The range is the *difference* between the highest and lowest values in the data set.

Find the mean, median, mode, and range for the set of data: 3, 8, 2, 9, 10, 4, 6, 12, 15

_____ 1) mean

_____ 2) median

_____ 3) mode

_____ 4) range

The chart shows the ages of the people (under the age of 16) at the ice skating rink one evening. Find the mean, median, mode, and range for the ages of the people there.

Age (years)	Number of people
3	2
5	5
8	10
9	8
10	15
11	7
12	35
13	22
14	26
15	20

_____ 5) mean (you may use a calculator for this but explain what you did to get your answer.)

_____ 6) median

_____ 7) mode

_____ 8) range

Which measure of central tendency would you use to find:

_____ 9) the middle-most salary of teachers working in Fort Bend ISD?

_____ 10) the radio station your friends like the best?

_____ 11) your favorite baseball player's batting average?

Objective: Geometry and Measurement
A formula chart can be found at the following link on pages 9 and 10.
http://www.tea.state.tx.us/student.assessment/taks/booklets/math/8_Math_Info_Booklet_tagged.pdf
Sketch the net of each 3-D figure.

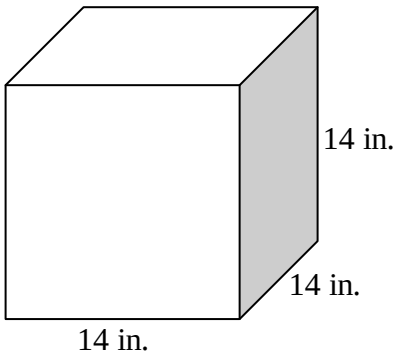
1) Cube

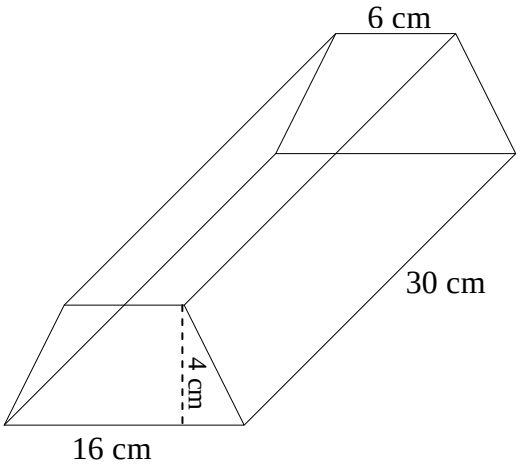
2) square pyramid

3) cylinder

4) triangular prism

Find the surface area and volume for each figure. ***You may use a calculator to calculate #7.***





_____ 5) surface area

_____ 6) volume

_____ 7) surface area

_____ 8) volume

_____ 9) What is the volume of a cylinder with radius of 7 feet and height of 42 feet? (Use $\pi = \frac{22}{7}$)

_____ 10) Find the surface area of a cone with d = 8 feet and l = 14 feet. (Use π = 3.14)

_____ 11) Find the volume of a square pyramid. The edge of the square is 1.5 cm, and the height of the pyramid is 4 cm.

12) Explain the difference between total surface area and lateral surface area.

Objective: Dimensional Changes.

Two space (3D) figures are **similar space figures** if they have the same shape and if all of their corresponding dimensions are proportional.

Surface Area and Volume of Similar Solids:
If the ratio of corresponding dimensions of two similar solid figures is a **:** b, then

- the ratios of their surface areas is a^2 **:** b^2
- the ratios of their volumes is a^3 **:** b^3

The patterns above can save you time in computing surface area and volume.

The surface area and volume of a prism are given. Find the surface area and volume of a prism with (a) double, (b) triple, and (c) half the dimensions of the given prism.

1a) _____ 1) S. A. = 23 ft^2
1b) _____ V = 12 ft^3
1c) _____

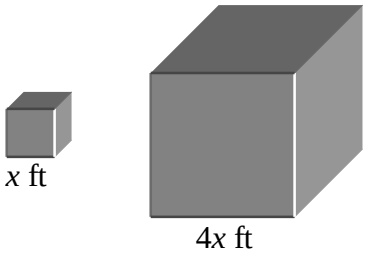
2a) _____ 2) S. A. = 61.7 m^2
2b) _____ V = 28.2 m^3
2c) _____

3. Two similar cylindrical vases have diameters of 6 in. and 8 in.
   3a) _____ What is the ratio of their surface areas?
   3b) _____ What is the ratio of their volumes?

_____ 4) A regulation-size table tennis ball has a circumference of 4 ½ inches. The volume of a regulation-size baseball is 8 times that of a table tennis ball. What is the circumference of a baseball?

_____ 5) A sculptor made a smaller version of his next art piece. The real piece will be 10 times larger than the model. How much will the sculpture weigh if the model weighs 42 lb? *(Hint: Weight is proportional to volume.)*

_____ 6) The dimensions of two cubes are shown below. The volume of the smaller cube is 64 cubic feet. Find the volume of the larger cube.



_____ Find the length of each edge of a cube that has a volume twice that of the cube shown. Give your answer to the nearest tenth of a centimeter. You may use a calculator.