St. Michael's Episcopal School

Summer Math

for rising 7th & 8th grade Algebra students

2017

Eighth Grade students should know the formulas for the perimeter and area of triangles and rectangles, the circumference and area of circles, the commutative, associative, and distributive properties, and order of operations. They should be proficient in working with integers, fractions and decimals.

To maintain skills through the summer, students are expected to complete the attached review problems, ***showing all work***. The summer skills packet will be collected on the first day of school and graded.

Students are also encouraged to use math throughout the summer. Suggested activities include:

*Play games with other people. Board games such as Monopoly, checkers and chess require logic and/or math skills. Set, 24, Sudoku, and many card games require logic and strategy.

*Worksheets, computer games, and word problems that require students to add, subtract, multiply, and divide without a calculator provide needed practice. Include operations with fractions and decimals.

*Real life situations often require math. Measuring and adjusting recipes, figuring a checkbook, determining a trip's costs and mileage are all opportunities to use math. Compare the costs of driving or flying for a vacation trip. Graph swim times or the price of gasoline each week. Determine tips, change and taxes on purchases.

Solve for x, showing all steps.

1. $0 = x + 4$

2. $\frac{1}{4}x = 8$

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

4. $\frac{3}{4}x = 12$

5. Evaluate the expression $\frac{2(x-3)}{4y+z}$ if $x = 1,\ y = -2,\ and\ z = 10.$

An algebra sentence occurs when two algebraic expressions are joined by a math verb. Some examples of math verbs are $\geq, \leq, \neq, =, <, >$. When two expressions are equal, the sentence is an equation.

6. The sum of twice a number and 24 is 72.

   a. Let x equal the number. Write the equation that describes this description.

   b. Find the number.

7. Write the equation to represent the diagram. Solve. p 3 7

8. Graph $2 \leq x$

9. A formula is an equation that states that a single variable is equal to an expression.

   Distance traveled *(d)* is related to rate *(r)* and time *(t)* using the formula $d = rt.$

   a. You travel for 3 hours at 65 mph. Distance equals _____.

   b. You travel for $(x + 2)$ hours at 50 mph. Distance equals _____.

10. Find a number between 2.44 and 2.45.

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1. A box contains 5 red chips, 4 green chips, and 3 white chips. A chip is drawn without looking from the box. Answer the following:

a. What is the total number of chips in the box?

b. P (red) _____ c. P (green) _____ d. P (black) _____

e. P(green or white) _____ f. P (red or white or green) _____

g. What us the probability that if two chips are selected without being replaced, that one will be green and the other white?

2. The perimeter (p) of a rectangle with length (l) and width (w) is given by $P = 2l + 2w$ or

$P = 2(l + w)$.

a. Find the perimeter of a rectangle with $l = 6\ units$ and $w = 4\ units$.

b. Find the perimeter of a rectangle with $l = x + 3\ units$ and $w = 5\ units$.

Evaluate the following:

3. $6 - 2(5 - 3)$ 4. $4 - 3(-2)^2$ 5. $\frac{(6-2)}{(8-6)}$ 6. $2 + 4 \div 2 \times 3$

7. An airplane travels 2,682 miles in 6 hours. Find its rate in miles per hour.

Solve for x, showing all work.

8. $x - 9 - 4x = 3$ 9. $2(x + 5) = 5$ 10. $7 - 3(x - 2) = 28$

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1. Evaluate $3(p - t)$ where $p = \frac{2}{3}$ and $t = \frac{5}{9}$.

2. Write the inequality to represent this diagram. P 7 8

3. Graph $y \geq -4$. P 7 9

4. Use the diagram:

p 10 9

a. Find the perimeter of the polygon formed by Chicago, Indianapolis, Cincinnati, Columbus, and Detroit.

b. At an average of 55 mph, how long will it take to travel the perimeter of the polygon if each city represents a vertex of the polygon?

Melanie wants to paint her bedroom walls. The dimensions of the room are 9 feet by 12 feet, and her ceiling is 8 feet high.

5. How many square feet does she need to paint?

6. If one gallon of paint can cover 350 square feet of surface, and if she needs to apply two coats of paint, how many

gallons of paint does she need to buy?

The area of a circle with radius r is given by $A = \pi r^2$.

7. Find the area of a circle with $r = 6\ units$. Round to tenths place.

8. A circle has an area of 28.26 units ^{2}. Find the radius.

9. Evaluate the following:

$3^2 =$ $5^2 =$ $8^2 =$ $9^2 =$

$10^2 =$ $12^2 =$ $15^2 =$ $20^2 =$

10. Paige can read 4 pages in 5 minutes. How many pages can she read in 1 ½ hours?

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William has the following scores on his third quarter math quizzes: 52, 85, 85, 90, 98

1. Find his mean score.

2. Find his median score.

3. A standard deck of cards has 52 cards. There are 13 of each suit (Ace through King in clubs, diamonds, hearts, spades) A card is chosen at random from the deck.

    a. What is the probability that it will be a heart?

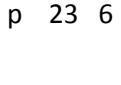
    a. What is the probability that it will be a Queen?

    b. What is the probability that it will be a red card?

    c. What is the probability that it will be the Queen of Hearts?

    d. What is the probability that it will be a Queen or a heart?

4. Using the triangle at the right:



    a. Write an expression for the perimeter.

    b. Find x if the perimeter is 75 units.

Evaluate each of the following when $a = -3,\ b = -2,\ and\ c = -6$

5. ab

6. c^2

7. $b - a$

8. $b + c$

9. $\frac{c}{a}$

10. Find a number between $\frac{11}{15}$ and $\frac{23}{30}$.

Page 5

Solve for x.

1. $.5x = 3.5$

2. $\frac{x}{7} = \frac{-7}{4}$

3. $\frac{2}{3}x + 38 = 90$

4. The area (*A)* of a rectangle with length (*l)* and width (*w)* is given by $A = lw.$ A rectangle has a length of 7 units and a width of 5 units. Find the area.

5. Which is a better buy, a 2-liter bottle bottle of Coke for $ 1.29 or a 12-pack (12 ounces per can) for $3? (Assume 1 liter = 33.8 ounces)

Simplify

6. $2 - 3^2 + 12 \div 2 \times 5$

7. $\frac{4 \times 6}{8-6}$

8. $(-5)^2$

9. -5^2

10. Josh mows lawns during the summer. Last summer he charged $15 per lawn. To help pay for his new lawn mower, he decided to raise his rates by 15%. How much should he charge for each lawn this year?

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1. The $\sqrt{42}$ is between what two whole numbers?

2. The perimeter of a rectangular lot is 174 meters. The length is twice the width.

   a. Write the equation that best describes this situation.

   b. Find the length and width.

These are the first three figures in a sequence: p 36 10

3. Draw the fourth figure.

4. Find the perimeter of each of the first 4 figures

   Figure 1 Perimeter

   Figure 2 Perimeter

   Figure 3 Perimeter

   Figure 4 Perimeter

5. Predict the perimeter of figure 5.

6. Two dice are tossed. List all the possible outcomes:

a. How many possible outcomes are there?

Find the probabilities:

b. P (5) c. P (5 or 6) d. P (sum is less than 4) e. P (13)

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Let $a = -2,\ b = \frac{3}{4}$, *and* $c = -3$. Evaluate the following:

1. c^2 2. $(-c-a)$ 3. $a^2 b$ 4. $\frac{b}{c}$ 5. $\frac{a}{b}$

6. The perimeter of an equilateral triangle is 8.7 inches. What is the length of one side?

In a right triangle, the legs are labeled *a* and *b* and the hypotenuse *c*. p 23 7

The Pythagorean Theorem states that $a^2 + b^2 = c^2$.

7. Find *c* in the right triangle on the right.

8. Emmy drove 380 miles and used 12.6 gallons of gas. To the nearest tenth, how many miles per gallon did her car get?

9. Can 6, 7, and 8 be the sides in a triangle?

10. Jack has quarter grades of 92, 85, and 91. What grade does he need to make for the last quarter to have a 90 final year average?

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Let $a = -\frac{1}{2}$, $b = 3$, $c = \frac{1}{3}$, $and\ d = -2$. Evaluate each of the following:

1. ab 2. ac 3. $c - d$ 4. $b - d$ 5. $d - c$

6. Circle the smallest and underline the largest.

7. Mrs. Chen wants to increase her circular garden by doubling the diameter of her existing garden. What effect will this have on the area? Your work will justify your answer.

8. Two dice are thrown. What is the probability that you will roll a "12"?

9. Plot Δ ABC where A = (-1, 3), B = (-1, 1) and C = (2,1) p 42 8

   a. Δ ABC is slid 2 units right and 4 units down.
      Write a rule for the image points.

   b. Plot and label the image of Δ A'B'C'

10. A ratio is the quotient of two quantities in the same units. There are 12 girls and 8 boys in 1st period Algebra class.

a. Find the ratio of girls to boys. b. Find the ratio of boys to total students

11. The formula for the volume V of a cone with height h and radius r is given by $V = \frac{1}{3}\Pi r^2 h$. Find the volume of a cone with $r = 3\ units\ and\ h = 5\ units$. Round your answer to the nearest whole number.

12. These are the first three figures in a sequence. P 47 7

This sequence is called triangle numbers.

a. Draw the fourth figure in this sequence.

b. How many * are in the bottom row of the sixth figure?

c. If the first three terms in the triangle number sequence are 1, 3, and 6, what is the sixth term?

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1. The area of a rectangle is 13.8 square feet. If the width is 2.3 feet, what is the length?

2. Can 6, 8, and 10 be the sides of a **right** triangle? PROVE your answer.

3. An angle measures $2x + 1$. Find the values of x which make this angle acute.

Scott has 4 tee shirts, 3 pairs of shorts, and 2 sweatshirts. No two are the same color.

4. How many different outfits can he make?

5. His favorite outfit is his red shirt, blue shorts, and gray sweatshirt. If he dresses in the dark, what is the probability that he will choose this outfit? Justify your answer.

The bowling scores of ten students at St. Michael's are listed below.

135, 152, 128, 132, 80, 90, 148, 110, 98, 177

6. Find the mean of the scores.

7. Find the median score.

8. Find the mode score.

9. Find the range.

10. The formula for the area (A) of a triangle with height *(h)* and base *(b)* is given by $A = \frac{1}{2} b h$. Find the area of a

triangle with h = 8 cm and b = 6 cm.

Page 10

1. Last year it took the eight members of the Ping Pong club 3.5 hours to wash 55 cars. This year their goal is to wash 70 cars. Assuming they can wash the same number of cars each hour, how many hours must they work?

Lucy counted the number of M & M's in a 3 ounce pack, finding 9 brown, 3 blue, 2 green, 2 red, 2 yellow and 1 orange.

2. Find the ratio of blue to brown.

3. Find the ratio of green to the total.

4. If a large pack has 90 M & M's, based on Lucy's data, how many greens would you expect?

5. The formula for the volume V of a cone with height h and radius r is given by $V = \frac{1}{3} \Pi r^2 h.$ Find the volume of a cone with r = 3 units and h = 5 units. Round your answer to the nearest whole number.

6. A car rental company charges $ 42 a day plus $ 0.26 for each mile driven. What is the cost to rent a car for 3 days if the renter drives 142 miles?

7. Mrs. Mikula found the same coat at *Macy's* and at *Dillard's.*

	Macy's	*Dillard's*
Original cost	$170	$180
First mark down	30%	40%
Second markdown	50%	50%

At which store should she buy her coat? Your work will justify the answer.

8. $A = P(l + r)^t$ calculates the amount (A) of money in an account when the principal (P) is invested at rate (r) for

time (t). Rate needs to be expressed as a decimal.

Suppose you invest $2000 at 5.5% annual interest. Calculate the amount you would have after the following number of years:

a. 2 years

b. 3 years

9. The perimeter of a rectangular lot is 168 meters. The length is three times the width.

a. Write the equation that describes this situation.

b. Find the length and width.

10. Find the area of the shaded region in the figure. $r = 7$ P 51 5