

## **2023 Summer Math Assignments**

### ***Rising Geometry Students***

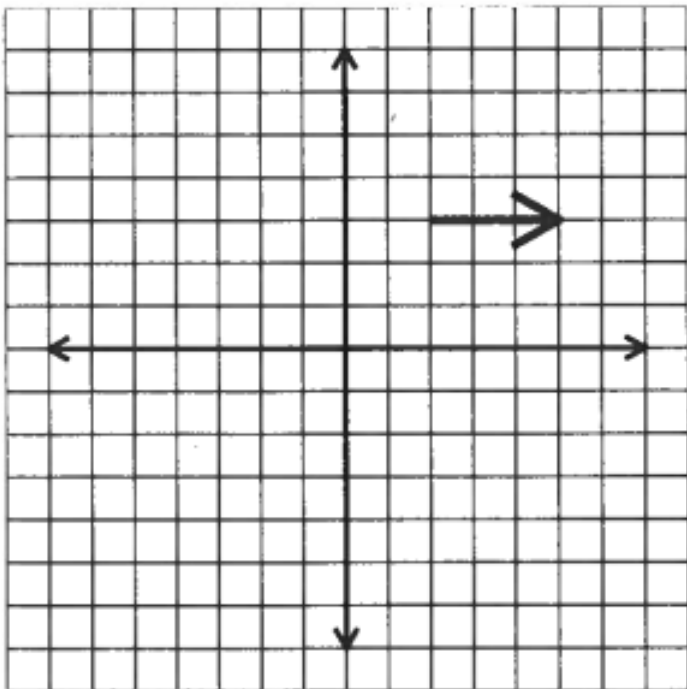
While the summer break is a good time to take a much-needed rest from academic work, because of the cumulative nature of math, it is also important to continue to practice some basic mathematical skills so that you do not lose any of the useful problem-solving and sense-making skills you have been developing in your math education.

The worksheets below involve mathematics that you have seen in previous courses. While the difficulty of these exercises vary, it should take you, on average, about 10 - 15 minutes to complete a page. Feel free to ask for help from a knowledgeable person when necessary.

You can either print these pages and then complete your work on the pages themselves, or view the pages digitally and complete your work on separate sheets of paper. **Many of the exercises below require that you write an explanation in a complete sentence or that you show your mathematical calculations.** We, the math teachers at St. Michael's, will collect your completed work during the first week of school.

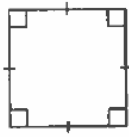
A. **Turning It Around.** Follow the directions step by step. Give the coordinates of the arrow upon completion of **each step** below.

1. Rotate the figure 90 degrees counterclockwise around the point (2, 3).
2. Translate this arrow (the resulting arrow from Step 1) 5 units to the left.
3. Next, reflect this arrow (the resulting arrow from Step 2) over the x-axis.
4. Reflect this arrow (the resulting arrow from Step 3) over the y-axis.
5. Translate this arrow (the resulting arrow from Step 4) up 1 unit.
6. Rotate this arrow (the resulting arrow from Step 5) 90 degrees counterclockwise about the origin.



**B. A Quadrilateral By Any Other Name.** Write all the applicable names of the quadrilaterals below. Use the names from the Answer Bank. Answers from the bank will be used more than once.

1.



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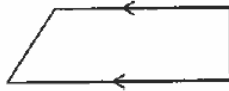
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2.



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3.



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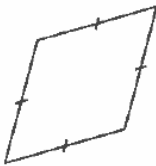
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4.



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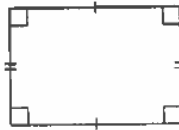
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5.



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6.



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**Answer Bank**

quadrilateral   square   rhombus   parallelogram   rectangle   trapezoid

C. **Different and Yet the Same.** All of the angles and figures in each row have a common characteristic. **Identify and explain** these characteristics.

1.  $70^\circ$   $20^\circ$

$28^\circ$   $62^\circ$

$45^\circ$   $45^\circ$

2.  $15^\circ$

$85^\circ$

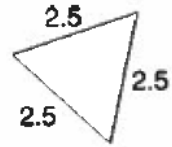
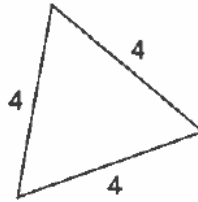
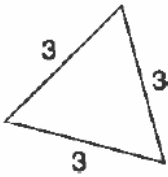
$29^\circ$

3.  $15^\circ$   $75^\circ$   $90^\circ$

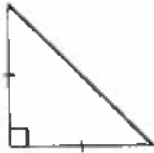
$28^\circ$   $65^\circ$   $87^\circ$

$126^\circ$   $31^\circ$   $23^\circ$

4.



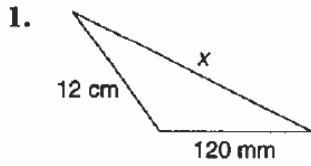
5.



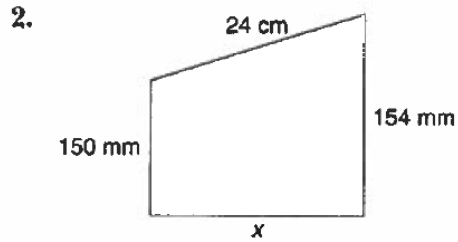
6.



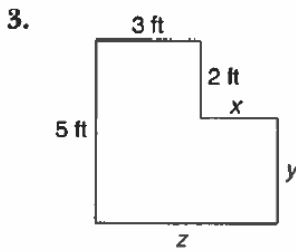
D. **Finding the Way Around.** Given the perimeters of the figures below, find the missing length(s). Use 3.14 for  $\pi$ . **Show your calculations.**



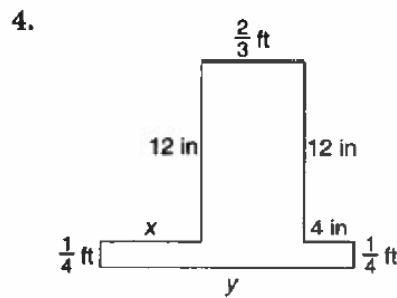
Perimeter = 42 cm  
Length: \_\_\_\_\_



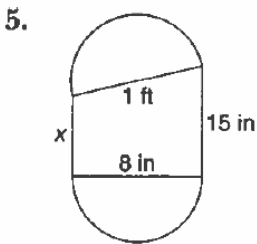
Perimeter = 75.4 cm  
Length: \_\_\_\_\_



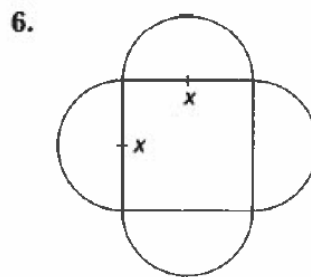
Perimeter = 20 ft.  
Lengths: \_\_\_\_\_  
\_\_\_\_\_



Perimeter = 66 in.  
Lengths: \_\_\_\_\_  
\_\_\_\_\_



Perimeter = 50.4 in.  
Length: \_\_\_\_\_



Perimeter = 157 cm  
Length: \_\_\_\_\_

E. **Sketching It Out.** Making a drawing or diagram is a great strategy for solving some types of problems. Use this strategy to answer the questions below. Note: all of the sides of the squares and rectangles are whole numbers. **Show your calculations.**

1. A square has a perimeter of 20 inches. What is the area?
2. A rectangle has an area of 36 square inches. What are its five possible perimeters?
3. A rectangle and a square have the same area. The perimeter of the rectangle is four more than the perimeter of the square. What are the dimensions of the rectangle and square?
4. A certain rectangle can be divided into three congruent squares. Each square has an area of 25 square inches. What is the perimeter of the rectangle?
5. Four congruent squares are arranged such that they form one large square. The area of this large square is 100 square units. What is the perimeter of the small squares?
6. Two congruent rectangles are arranged so that they form a square. The perimeter of each rectangle is 36 inches. What is the area and perimeter of the large square?

**F. Drawing Geometric Figures.** Visualizing and drawing geometric figures is quite a skill. Using another sheet of paper, try your hand at creating these shapes. It's best if you use a ruler when trying to draw straight lines.

1. Draw a square and a rectangle that have the same area but different perimeters.
2. Draw a right triangle and an acute triangle that have the same area but different perimeters.
3. Draw a scalene triangle and a right triangle that have the same area but different perimeters.
4. Draw two rectangles that have the same perimeter but different areas.
5. Draw a parallelogram and a rectangle that have the same area but different perimeters.
6. Draw two congruent triangles whose combined area is the same as the area of a square.
7. Divide a square into two congruent rectangles.
8. Divide a square into two congruent irregular figures.
9. Draw a trapezoid that can be divided into three congruent triangles.
10. Draw a rhombus that can be divided into two congruent triangles.

G. **Doubletalk.** Solve each system of equations. Then find the solution for each system in the Answer Bank. Each answer is used twice. **Show your work.**

1.  $x + y = 6$   
 $x - y = 2$

2.  $x + y = 10$   
 $x - y = -4$

3.  $x + y = 0$   
 $x - y = -6$

4.  $-7x + y = 1$   
 $3 - 3y = 7x$

5.  $x - y = 1$   
 $y = 2x - 3$

6.  $2x - y = -7$   
 $x + 7 = y$

7.  $x + y = 4$   
 $3x - 2y = -13$

8.  $-5x + 3y = -31$   
 $-2x - 5y = 0$

9.  $-3x + 4y = -6$   
 $5x - 6y = 8$

10.  $5x + 3y = 17$   
 $2x - 9y = 17$

**Answer Bank**

1   -3   2   0   -1   3   7   5   4   -2