

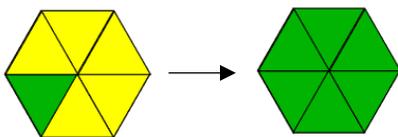
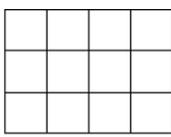
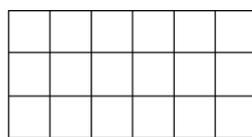
Math Challenge #12

First Name: _____	Last Name: _____	Grade: _____
Teacher: _____	Parent's email: _____	

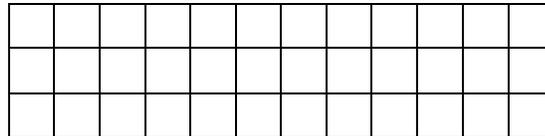
2D Shapes

Welcome to the Math Challenge #12. In this challenge, we will explore 2-dimensional shapes. A **2D shape** is a flat shape that has only two dimensions – length and width, with no thickness or depth, and that is the reason why it is called a two-dimensional shape. For example, a sheet of paper is two-dimensional in shape. It consists of a length and a width but does not have any depth or height. Some common **2D shapes** are squares, rectangles, triangles, circles, and hexagons.

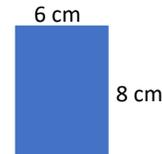
Kinder & First Grade: solve at least 3 problems.
Second & Third Grade: solve at least 7 problems.
Fourth Grade and above: solve at least 12 problems.

	<i>Answer</i>
1. If you subtract the number of sides on a triangle from the number of sides on a pentagon, you will get ____.	
2.  How many triangles would it take to cover the hexagon without overlapping? 	
3. James has a handful of these tiles (see picture below). How many of these tiles would it take to cover each grid below without overlapping? <div style="display: flex; justify-content: center; align-items: center; gap: 20px;">  <div style="text-align: center;"> <p>Grid A</p>  </div> <div style="text-align: center;"> <p>Grid B</p>  </div> </div>	<p><i>Grid A =</i></p> <p><i>Grid B =</i></p>
4. How many hexagons would it take to cover the shape below without overlapping? 	
5. How many triangles (of any size) are there in the figure? 	

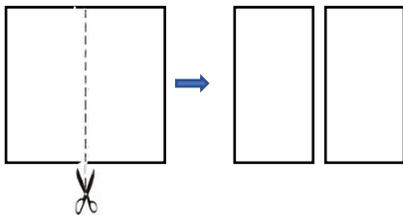
6. Sarah has a handful of these tiles (see picture below). How many of these tiles would it take to cover the grid completely below without overlapping?



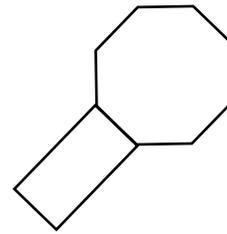
7. Perimeter is the distance around a 2-dimensional object. You find the perimeter of a shape by adding the lengths of the sides. Find the perimeter, in cm, of the rectangle.



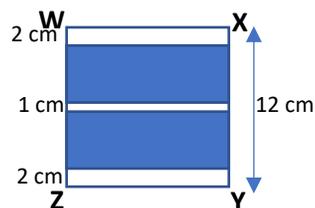
8. A piece of square paper with side length 32 cm was cut in half as in the picture. What is the perimeter of each new piece of paper?



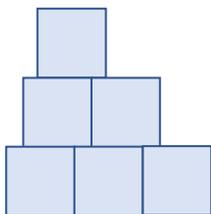
9. A rectangle and a regular octagon share a common side, the short side of the rectangle. If the length of the rectangle is twice its width and the perimeter of the rectangle is 36 cm, what is the perimeter of the octagon?



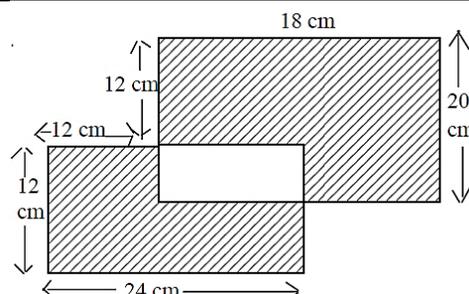
10. WXYZ is a square with side of 12 cm. Other lengths are shown in the picture below. Find the total area of the two shaded regions.



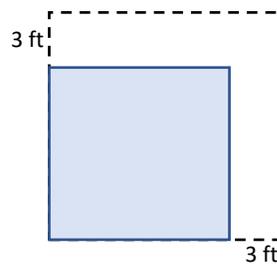
11. The figure below is made up of 6 identical squares. Each side of the square measures 6 inches. What is the perimeter of the figure?



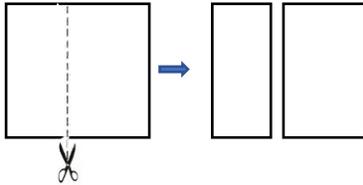
12. Find the area of the shaded region.



13. If two sides of a square field were increased by three feet, as shown in the diagram, the area of the field would increase by 129 square feet. Find the area of the original field, in square feet.



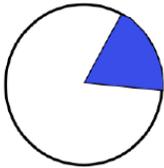
14. A 4 by 4 inch square piece of paper is cut into two pieces using one straight cut. The perimeters of the pieces are 12 and 14 inches. What is the length of the cut?



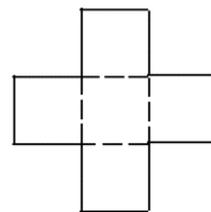
15. The radius of a circle with area of 64π is decreased to form a circle with area of 9π . By how much was the radius reduced?

16. A large square paper was cut in half. Then the results were cut again in half a few more times. If at the end of cutting, there were 64 identical small squares, and each square has a side of 3 inches long, what is the perimeter of the large square paper?

17. Chris, Eric, Kelsey and Ronnie baked a round cake. Then each of them took a sector of the cake; a sector of the cake is shaped like the shaded area in the picture below. Chris took one third, Eric took one fourth, Kelsey took one fifth, and Ronnie took one sixth of the whole cake. What is the angle in degrees of the remaining section?



18. A piece of posterboard is cut into the shape on the right consisting of five congruent squares with a total area of 180 square centimeters. If the shape is folded along the dotted lines to make an open box, what is its volume in cubic centimeters?



Solution is available on April 1, 2022, at www.mathinaction.org