

Math Challenge #15

First Name: _____ Last Name: _____ Grade: _____

Teacher: _____ Parent's email: _____

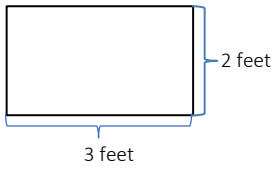
Shapes, Perimeters and Areas

Welcome to the Math Challenge #15. This is the last Math Challenge for 2020-2021 school year. To continue sharpening your problem solving skills during the summer, consider taking [Summer Math Competition Classes](#).

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.	<p>Each sticky note will cover 1 square of the figure. How many sticky notes will cover the whole figure?</p> <div style="display: flex; align-items: center; justify-content: center; gap: 20px;"> </div>	9
2.	<p>If you fold a piece of paper as shown in the picture, you get 2 sections of rectangles. If you fold it one more time, how many sections of rectangle would you get?</p> <div style="display: flex; align-items: center; justify-content: center; gap: 20px;"> </div>	4
3.	<p>If two triangles make up one square as shown, find how many squares make up each of these shapes?</p> <div style="display: flex; align-items: center; justify-content: center; gap: 20px;"> <div style="text-align: center;"> = </div> <div style="text-align: center;"> <p>SHAPE A</p> </div> <div style="text-align: center;"> <p>SHAPE B</p> </div> </div>	<p><i>A = 9 [squares]</i> <i>B = 8 [squares]</i></p>
4.	<p>To find the area of a rectangle, we can multiply the length times the width. To find the area of a rectangle with length of 3 feet and width of 2 feet, we can multiply 3 feet \times 2 feet = 6 square feet.</p> <p>What is the area of this rectangle if we double its length and its width?</p> <p><i>The new dimension would be 6 feet by 4 feet; therefore, the area is $6 \times 4 = 24$ square feet.</i></p> <div style="display: flex; align-items: center; justify-content: center; gap: 20px;"> </div>	24 [square feet]
5.	<p>A square paper with 8 inches long on its sides is cut into two identical pieces as in picture. What is the new perimeter of one of the smaller pieces of paper?</p> <p><i>The new piece of paper measures 8 inches by 4 inches. The perimeter must be $8 + 4 + 8 + 4 = 24$ inches.</i></p> <div style="display: flex; align-items: center; justify-content: center; gap: 20px;"> </div>	24 [inches]

6. What is the perimeter of this rectangle if we double its length and its width?
 The new dimension would be 6 feet by 4 feet; therefore, the perimeter is $6+4+6+4 = 20$ feet.

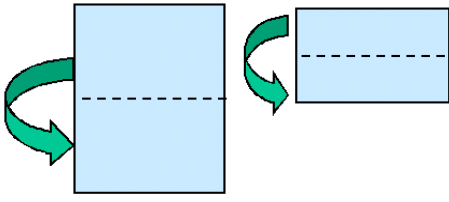


20 [feet]

7. A rectangle that is 12 inches long and 3 inches wide is enlarged. If its length is doubled and its width is tripled, what is the new area of the rectangle?
 The new dimension would be $12 \times 2 = 24$ inches by $3 \times 3 = 9$ inches; therefore, the area is $24 \times 9 = 216$ square inches.

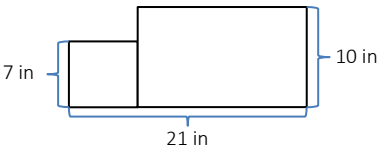
216 [square inches or in²]

8. As you learned from question #2, with one fold, you make 2 sections. With 2 folds, you create 4 sections. How many folds must you do to create 64 sections?



6

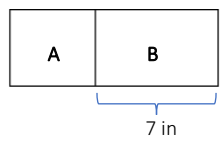
9. Find the area of the figure below which is made up of a square and a rectangle.



Length of the rectangle: $21 - 7 = 14$ inches
 Area: $(7 \times 7) + (14 \times 10) = 49 + 140 = 189$ in²

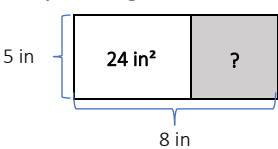
189 in²

10. The figure on the right is made up of a square A and a rectangle B. Perimeter of the square A is 20 inches. Find the area of the whole figure.
 Since A is a square, the side must be $20 \text{ inches} \div 4 = 5$ inches. The length of the figure is 7 inches + 5 inches = 12 inches, and the width is 5 inches. Therefore, the area is $12 \times 5 = 60$ in²



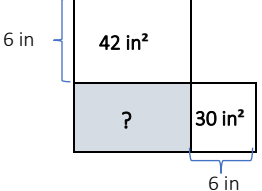
60 in²

11. Study the figure below: What is the area of the shaded figure?
 The area of the whole shape is $5 \times 8 = 40$ in². By subtracting the area that we know, we'll get the area of the square. $40 - 24 = 16$ in²



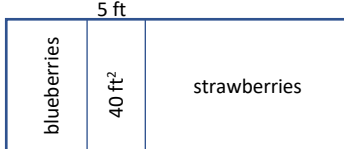
16 in²

12. Study the figure below: What is the area of the shaded figure?
 The sides of the shaded rectangle are 7 inches and 5 inches. Thus, the area is $7 \times 5 = 35$ square inches

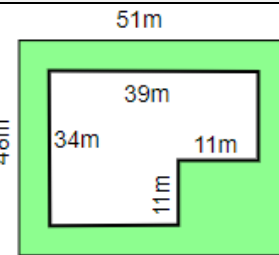
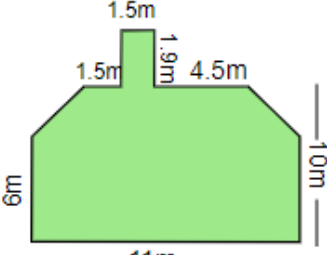
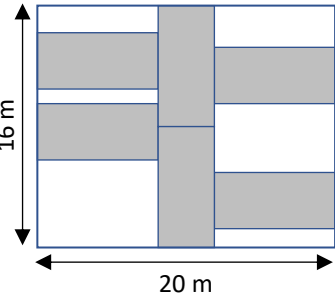
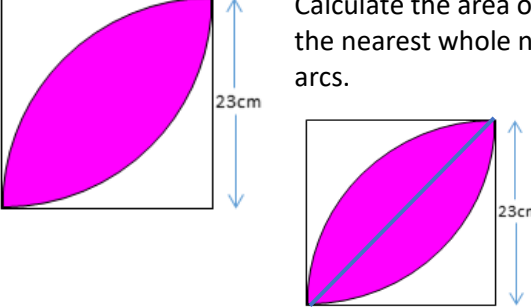
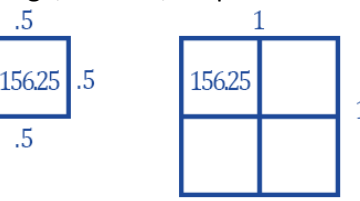


35 in²

13. Mrs. Rosenblum grows blueberries and strawberries. This season, she has changed the rectangular blueberry bed to a square by lengthening one of its sides by 5 feet. Because of this change, the area of the strawberry bed was reduced by 40 square feet. What was the area of the blueberry bed before the change? Hint: Draw it out.
 The sides of the small rectangle that is 40 ft² are 5 ft and 8 ft. The new side of the blueberry bed is 8 by 8 ft. Which means previously it was 8 ft by 3 ft. Thus, the area of the blueberry bed before change was $8 \times 3 = 24$ ft²



24 ft²

14.	<p>The figure below made up of rectangles. Find the area of the shaded (green) figure.</p> <p>Area of shaded figure = Area of rectangle – Area of the white figure. $= (51 \times 48) - [(28 \times 34) + (11 \times 23)]$ $= 2448 - (952 + 253) = 1243 \text{ m}^2$</p>		1243 m ²
15.	<p>The figure below made up of quadrilaterals and triangles. Find the area of the figure.</p> <p>Area of the figure = $(1.5 \times 1.9) + \left(\frac{11+7.5}{2} \times 4\right) + (11 \times 6)$ $= 2.85 + 37 + 66$ $= 105.85$</p>		105.85 m ²
16.	<p>The sides of the large rectangle are 20 m and 16 m. All six shaded rectangles are the same shape and have the same area. What is the total area of all the shaded regions, in square meters?</p> <p>Find the dimension of the small rectangle. The length: $16/2 = 8 \text{ m}$. The width: $20 - 8 - 8 = 4 \text{ m}$. The total area of all the shaded regions: $6 \times (8 \times 4) = 192 \text{ m}^2$.</p>		192 m ²
17.	<p>Calculate the area of the shaded region and round your answer to the nearest whole number. Hint: It is bound by two quarter-circle arcs.</p> <p>The area of half of the pink leaf is $\frac{23^2\pi}{4} - \frac{1}{2}23^2 = \frac{603.06}{4}$. You have two parts of the leaf. Thus the answer is $\frac{603.06}{2} = 301.53 \approx 302 \text{ cm}^2$</p>		302 cm ²
18.	<p>Two miles of fence will enclose a square of 156.25 acres. How large, in acres, a square pasture will 4 miles of fence enclose?</p> <p>Draw it out. A square pasture will be $156.25 \times 4 = 625$ acres.</p>		625 [acres]

Solution is available on May 21, 2021 at www.mathinaction.org