

Math Challenge #12

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

Measurements

Measurement is a skill most kids are eager to learn since it's easy to see the real-life applications. Generally, younger students are introduced to the idea by comparing sizes, then trying out some non-standard measurement. Then, it's time to get to know all kinds of measuring devices and units. In this math challenge, students will work on problems involving measurements.

An acronym below is commonly used to remember the types of metric units for metric conversion.

King Henry Doesn't Usually Drink Chocolate Milk

- Kilo (unit×1000)
- Hecto (unit×100)
- Deka (unit×10)
- Unit (1)
- Deci (unit×0.1)
- Centi (unit×0.01)
- Milli (unit×0.001)

METRIC CONVERSION CHART
Length/Capacity/Weight(Mass)

To convert to a smaller unit, multiply by moving the decimal point to the right.

Largest unit	↔ × 10	↔ × 10	↔ × 10	↔ × 10	↔ × 10	Smallest unit
King	Henry	Doesn't	Usually	Drink	Chocolate	Milk
Kilo	Hecto	Deka	UNIT Meter Liter Gram	Deci	Centi	Milli
↔ ÷ 10	↔ ÷ 10	↔ ÷ 10	↔ ÷ 10	↔ ÷ 10	↔ ÷ 10	↔ ÷ 10

Meter: length/distance
Liter: capacity
Gram: weight(mass)

To convert to a larger unit, divide by moving the decimal point to the left.

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.

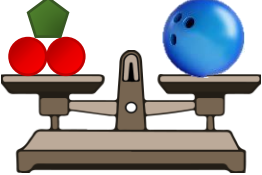
Answer

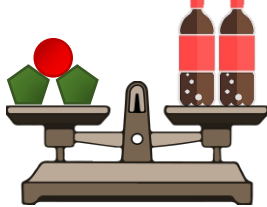
1.	<p>There are four shapes in the figure below. Each shape has different sizes.</p> <table style="width: 100%; text-align: center; border-collapse: collapse;"> <tr> <td style="border: none;">Column 1</td> <td style="border: none;">Column 2</td> <td style="border: none;">Column 3</td> <td style="border: none;">Column 4</td> </tr> <tr> <td style="border: 1px solid black;"> <table border="1" style="width: 100%; height: 100%; border-collapse: collapse;"> <tr> <td style="border: none; text-align: right; padding-right: 5px;">Row 1</td> <td style="text-align: center;"></td> <td style="text-align: center;"></td> <td style="text-align: center;"></td> <td style="text-align: center;"></td> </tr> <tr> <td style="border: none; text-align: right; padding-right: 5px;">Row 2</td> <td style="text-align: center;"></td> <td style="text-align: center;"></td> <td style="text-align: center;"></td> <td style="text-align: center;"></td> </tr> <tr> <td style="border: none; text-align: right; padding-right: 5px;">Row 3</td> <td style="text-align: center;"></td> <td style="text-align: center;"></td> <td style="text-align: center;"></td> <td style="text-align: center;"></td> </tr> <tr> <td style="border: none; text-align: right; padding-right: 5px;">Row 4</td> <td style="text-align: center;"></td> <td style="text-align: center;"></td> <td style="text-align: center;"></td> <td style="text-align: center;"></td> </tr> </table> </td> <td style="border: 1px solid black;"> <table border="1" style="width: 100%; height: 100%; border-collapse: collapse;"> <tr> <td style="border: none; text-align: right; padding-right: 5px;">a.</td> <td style="padding: 5px;">In which row and column is the smallest square?</td> </tr> <tr> <td style="border: none; text-align: right; padding-right: 5px;">b.</td> <td style="padding: 5px;">In which row and column is the second largest circle?</td> </tr> <tr> <td style="border: none; text-align: right; padding-right: 5px;">c.</td> <td style="padding: 5px;">In which row and column is the largest triangle?</td> </tr> </table> </td> </tr> </table>	Column 1	Column 2	Column 3	Column 4	<table border="1" style="width: 100%; height: 100%; border-collapse: collapse;"> <tr> <td style="border: none; text-align: right; padding-right: 5px;">Row 1</td> <td style="text-align: center;"></td> <td style="text-align: center;"></td> <td style="text-align: center;"></td> <td style="text-align: center;"></td> </tr> <tr> <td style="border: none; text-align: right; padding-right: 5px;">Row 2</td> <td style="text-align: center;"></td> <td style="text-align: center;"></td> <td style="text-align: center;"></td> <td style="text-align: center;"></td> </tr> <tr> <td style="border: none; text-align: right; padding-right: 5px;">Row 3</td> <td style="text-align: center;"></td> <td style="text-align: center;"></td> <td style="text-align: center;"></td> <td style="text-align: center;"></td> </tr> <tr> <td style="border: none; text-align: right; padding-right: 5px;">Row 4</td> <td style="text-align: center;"></td> <td style="text-align: center;"></td> <td style="text-align: center;"></td> <td style="text-align: center;"></td> </tr> </table>	Row 1					Row 2					Row 3					Row 4					<table border="1" style="width: 100%; height: 100%; border-collapse: collapse;"> <tr> <td style="border: none; text-align: right; padding-right: 5px;">a.</td> <td style="padding: 5px;">In which row and column is the smallest square?</td> </tr> <tr> <td style="border: none; text-align: right; padding-right: 5px;">b.</td> <td style="padding: 5px;">In which row and column is the second largest circle?</td> </tr> <tr> <td style="border: none; text-align: right; padding-right: 5px;">c.</td> <td style="padding: 5px;">In which row and column is the largest triangle?</td> </tr> </table>	a.	In which row and column is the smallest square?	b.	In which row and column is the second largest circle?	c.	In which row and column is the largest triangle?	
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2. Kayla's houseplant grew 4 inches since last month. If her houseplant was 9 inches tall last month, how tall is it now?

3. Find the weight of the bowling ball and the two soda bottles on the scales by adding the weights of each figure.

● = 2 pounds ▲ = 3 pounds


a.  The weight of the bowling ball is ___ pounds. *a.*

b.  The weight of the two soda bottles is ___ pounds. *b.*



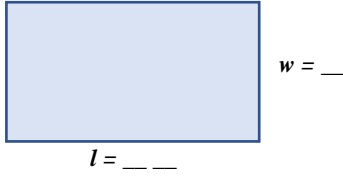


4. Olga cut a one-foot long ribbon into 2 pieces equally. She then took one of the pieces and cut it into 3 pieces of equal length. How many inches long is one of the shortest pieces?
1 foot = 12 inches.

5. Four ounces of popcorn are put into each bag. What is the greatest number of full bags can be made from 30 ounces of popcorn?

6. One watermelon weighs 7 pounds 12 ounces. A second watermelon weighs 10 pounds 4 ounces. A third watermelon weighs 2 pounds 9 ounces more than the second watermelon. What is the total weight of all three watermelons (in pounds and ounces)?
1 pound = 16 ounces

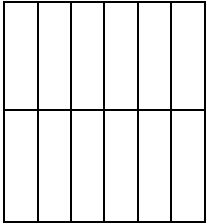


7. Paula's time for swimming in the Ironman Triathlon was 1 hour 25 minutes. Her time for biking was 5 hours longer than her swimming time. She ran for 4 hours 50 minutes. Assuming she took no breaks in between each event, how long did it take her to complete all three parts of the race?
1 hour = 60 minutes


8. What is the greatest area you can make with a rectangle that has a perimeter of 24 cm?	
9. Anita left home to visit Ben at his house. After traveling 7.5 km, she thought to herself, "I'm three fifths of the way there!" How much farther does Anita have to travel to get to Ben's house?	
10. Nala and Ralph live in different towns. Both towns are 9 kilometers away from the nearest market. Nala rides her bike at a speed of 6 kilometers per hour and Ralph rides his bike at 4 kilometers an hour. When should they each leave their homes to meet at exactly noon at the market?	<p><i>Nala:</i></p> <p><i>Ralph:</i></p>
11.  The mass of an empty jar is 470 grams. Lucy placed 6 identical marbles in the jar. The total mass of the jar and marbles is now 1.1 kilograms. If Lucy removed two of the marbles, what is the combined mass of the jar and marbles now in grams? 1 kg = 1000 g 	
12. Find the largest possible area for the rectangle below if the length of it has two digits and the width has one digit. Each digit is <u>different</u> . 	
13. Bob is making cakes. Each cake requires $1\frac{1}{3}$ cup of cake mix and 1 egg. If he has 7 eggs and 10 cups of cake mix, how many cups of cake mix will be left when he has made all the cakes he can? 	
14.  Seventy-five percent of the metal in a nickel is copper. A nickel weighs 5 grams. How many milligrams of copper would be left over after the maximum number of nickels have been made with one kilogram of copper?	

15. Lorna walks 18 inches with each step. Her nephew, Jay, walks 14 inches with each step. If Lorna walks one mile and Jay takes the same number of steps as Lorna, how far behind will the Jay be when Lorna completes the mile? Express your answer in feet and inches.

16. The figure below is a square that has been subdivided into twelve congruent rectangles. The perimeter of each of those twelve small rectangles is 48 cm. What is the area of the square?



17. Professor Johnson boasted that his catch had been the best one made by any member of the fishing club. "How big was your fish?" one club member asked. The professor paused a moment and then answered, "I remember the head measured nine inches. The tail was as long as the head plus half the body, and the body was as long as the head plus the tail." How long was the fish in feet?



18. The perimeter of a triangle is 76 centimeters. The second side is twice as long as the first side. The third side is 4 centimeters shorter than the second side. What is the ratio of the length of the second side to the length of the third side?

Solution is available on March 31, 2023
www.mathinaction.org