Problem Solving • Customary and Metric Conversions

Essential Question: How can you use the strategy make a table to help you solve problems about customary and metric conversions?

Unlock the Problem

Aaron is making fruit punch for a family reunion. He needs to make 120 cups of punch. If he wants to store the fruit punch in gallon containers, how many gallon containers will Aaron need?

Use the graphic organizer below to help you solve the problem.

Conversion Table

<table>
<thead>
<tr>
<th>gal</th>
<th>qt</th>
<th>pt</th>
<th>c</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>1/4</td>
<td>1</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>1/8</td>
<td>1/2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>1/16</td>
<td>1/4</td>
<td>1/2</td>
<td>1</td>
</tr>
</tbody>
</table>

Read the Problem

What do I need to find?
I need to find ______________
______________
______________
______________

What information do I need to use?
I need to use ______________
______________
______________
______________

How will I use the information?
I will make a table to show the relationship between the number of _________ and the number of _________.

Solve the Problem

There are _____ cups in 1 gallon. So, each cup is _____ of a gallon.

Complete the table below.

<table>
<thead>
<tr>
<th>c</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>120</th>
</tr>
</thead>
<tbody>
<tr>
<td>gal</td>
<td>1/16</td>
<td>1/8</td>
<td>3/16</td>
<td>1/4</td>
<td>1</td>
</tr>
</tbody>
</table>

Multiply by ______.

So, Aaron needs ______ gallon containers to store the punch.

- **Use Reasoning** Will all of the gallon containers Aaron uses be filled to capacity? Explain.
Try Another Problem

Sharon is working on a project for art class. She needs to cut strips of wood that are each 1 decimeter long to complete the project. If Sharon has 7 strips of wood that are each 1 meter long, how many 1-decimeter strips can she cut?

Conversion Table

<table>
<thead>
<tr>
<th>m</th>
<th>dm</th>
<th>cm</th>
<th>mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>10</td>
<td>100</td>
</tr>
<tr>
<td>1 dm</td>
<td>1/10</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>1 cm</td>
<td>1/100</td>
<td>1/10</td>
<td>1</td>
</tr>
<tr>
<td>1 mm</td>
<td>1/1,000</td>
<td>1/100</td>
<td>1/10</td>
</tr>
</tbody>
</table>

Read the Problem

What do I need to find?  
What information do I need to use?  
How will I use the information?

Solve the Problem

So, Sharon can cut ______ 1-decimeter lengths to complete her project.

Look for a Pattern  What relationship did the table you made show?

Math Talk

Use Diagrams  How could you use a diagram to solve this problem?
1. Edgardo has a drink cooler that holds 10 gallons of water. He is filling the cooler with a 1-quart container. How many times will he have to fill the quart container to fill the cooler?

**First**, make a table to show the relationship between gallons and quarts. You can use a conversion table to find how many quarts are in a gallon.

<table>
<thead>
<tr>
<th>gal</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>qt</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Then, look for a rule to help you complete your table.

number of gallons × ____ = number of quarts

Finally, use the table to solve the problem.

Edgardo will need to fill the quart container ____ times.

2. **Think Smarter** What if Edgardo fills the cooler with only 32 quarts of water. How can you use your table to find how many gallons that is?

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

3. How would the number of times Edgardo uses a container to fill the 10-gallon cooler change if he uses a 1-cup container? Explain.

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________
4. **THINK SMARTER** Maria put trim around a banner that is the shape of a triangle. Each side is 22 inches long. Maria has \( \frac{1}{2} \) foot of trim left. What was the length of the trim when she started? Write your answer in yards.

5. Dan owns 9 DVDs. His brother Mark has 3 more DVDs than Dan has. Their sister, Marsha, has more DVDs than either of her brothers. Together, the three have 35 DVDs. How many DVDs does Marsha have?

6. **GO DEEPER** Kevin is making a picture frame. He has a piece of trim that is 4 feet long. How many 14-inch-long pieces can Kevin cut from the trim? How much of a foot will he have left over?

7. **Mathematical Practice** Reason Quantitatively Explain how you could find the number of cups in five gallons of water.

8. Carla uses \( 2\frac{3}{4} \) cups of whole wheat flour and \( 1\frac{3}{8} \) cups of rye flour in her bread recipe. How many cups does she use in all?

9. **THINK SMARTER** A large pot holds 12 gallons of soup. Jared has 1-pint containers of chicken broth. Complete the table to help you find the number of 1-pint containers of chicken broth Jared will need to fill the pot.

<table>
<thead>
<tr>
<th>gallon</th>
<th>2</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>pint</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Jared will need _____ 1-pint containers to fill the pot.
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Solve each problem by making a table.

1. Thomas is making soup. His soup pot holds 8 quarts of soup. How many 1-cup servings of soup will Thomas make?

<table>
<thead>
<tr>
<th>Number of Quarts</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Cups</td>
<td>4</td>
<td>8</td>
<td>12</td>
<td>16</td>
<td>32</td>
</tr>
</tbody>
</table>

   32 1-cup servings

2. Paulina works out with a 2.5-kilogram mass. What is the mass of the 2.5-kilogram mass in grams?

3. Alex lives 500 yards from the park. How many inches does Alex live from the park?

4. A flatbed truck is loaded with 7,000 pounds of bricks. How many tons of bricks are on the truck?

5. WRITE Math Explain how you could use the conversion table on page 618 to convert 700 centimeters to meters.
Lesson Check (5.MD.A.1)

1. At the hairdresser, Jenny had 27 centimeters cut off her hair. How many decimeters of hair did Jenny have cut off?

2. Marcus needs 108 inches of wood to make a frame. How many feet of wood does Marcus need for the frame?

Spiral Review (5.NF.B.7c, 5.MD.A.1, 5.G.A.1)

3. Tara lives 35,000 meters from her grandparents. How many kilometers does Tara live from her grandparents?

4. Dane’s puppy weighed 8 ounces when it was born. Now the puppy weighs 18 times as much as it did when it was born. How many pounds does Dane’s puppy weigh now?

5. A carpenter is cutting dowels from a piece of wood that is 10 inches long. How many \(\frac{1}{2}\)-inch dowels can the carpenter cut?

6. What ordered pair describes the location of point \(X\)?