5.3.9: Convert between Cups, Pints, Quarts and Gallons

Identification of Equivalent Customary Units of Capacity

Junior is planning a hiking trip. According to the survival guide book he has been reading, the average person needs 1 gallon of water to drink per day. If he plans on taking a 3 day hike, how many fluid ounces of water will Junior need?

In this concept, you will learn about customary units of capacity.

Identifying Equal Customary Units of Capacity

Capacity is the volume or the amount of liquid an item can hold. There are several customary units of capacity.

Here are the common units of capacity from smallest to largest.

1. Fluid ounces (fl oz)
2. Cups
3. Pints
4. Quarts
5. Gallons

You may have to figure out how many cups are in a pint or how many quarts are in a gallon. These types of conversions are often necessary when doing an activity involving liquids, like cooking. To convert different units of capacity, you need
to know how much of one unit is equal to another unit. Here is a table that shows equivalent customary units of capacity.

Figure 5.3.9.2

To use the table, match up one of the red numbers with the units you are changing to. For example, the basic relationship between cups and fluid ounces is 1 cup = 8 fl oz. Between quarts and pints, the basic relationship is 1 qt = 2 pt. Between gallons and pints: 1 gal = 8 pt.

Use the information in the table to convert customary units of capacity.

36 fluid ounces = _____ cups

First, figure out if you need to multiply or divide. Check the units. Divide when converting a smaller unit to a larger unit, fluid ounces to cups.

Then, check the table for the unit equivalence.

8 fl oz = 1 cup

Finally, divide the number of ounces by 8.

36 ÷ 8 = 4(1/2)

The answer is 32 fluid ounces is equal to 4(1/2) cups.

Here is another conversion problem.

4 quarts = _____ ounces

First, figure out if you need to multiply or divide. Check the units. Multiply when converting a larger unit to a smaller unit, quarts to ounces.

Then, check the table for the unit equivalence.

32 fl oz = 1 qt

Finally, multiply the number of quarts by 32.

32 × 4 = 128
The answer is 4 quarts is equal to 128 fluid ounces.

**Examples**

Example 5.3.9.1

Earlier, you were given a problem about Junior planning a hiking trip.

Junior wants to know how many fluid ounces of water he needs for a 3 day hike if average person needs 1 gallon of water per day. Convert 3 gallons to fluid ounces to find how many fluid ounces of water Junior should take.

**Solution**

3 gallons = _____ fluid ounces

First, check if you will multiply or divide. A gallon is a larger unit than a fluid ounce. Multiply when converting a larger unit to a smaller unit.

Then, find the unit equivalence.

1 gallon = 128 fluid ounces

Next, multiply the number of gallons by the unit equivalence.

\[ 3 \times 128 = 384 \]

3 gallons = 384 fluid ounces

Junior will need 384 fluid ounces for a 3 day hike.

Example 5.3.9.2

Use the table to find equivalent customary units of capacity.

Marcus has a 5 gallon jug of water. How many fluid ounces is that?

**Solution**

First, check if you will multiply or divide. The problem is converting gallons to ounces. Multiply when converting a larger unit to a smaller unit.

5 gallons = _____ fl oz

Then, check the table for the unit equivalence.

1 gallon = 128 fl oz

Finally, multiply the number of gallons by 128.
5 \times 128 = 640

The answer is 5 gallons is equal to 640 fluid ounces.

Example 5.3.9.3

Convert the following unit of capacity: 5 quarts = ____ pints.

Solution

First, check if you will multiply or divide. Multiply when converting a larger unit to a smaller unit.

Then, find the unit equivalence.

1 quart = 2 pints

Finally, multiply the number of quarts by 2.

\[ 5 \times 2 = 10 \]

The answer is 5 quarts is equal to 10 pints.

Example 5.3.9.4

Convert the following unit of capacity: 6.5 gallons = ____ quarts.

Solution

First, check if you will multiply or divide. Multiply when converting a larger unit to a smaller unit.

Then, find the unit equivalence.

1 gallon = 4 quarts

Finally, multiply the number of gallons by 4.

\[ 6.5 \times 4 = 26 \]

The answer is 6.5 gallons is equal to 26 quarts.

Example 5.3.9.5

Convert the following unit of capacity: 20 fl oz = ____ cups.

Solution

First, check if you will multiply or divide. Divide when converting a smaller unit to a larger unit.

Then, find the unit equivalence.
8 fl oz = 1 cup

Finally, divide the number of fluid ounces by 8.

\[ 20 \div 8 = 248 = 212 \]

The answer is 20 fluid ounces is equal to 212 cups.

**Review**

Convert the following units of capacity.

1. 3 cups = ____ fl oz
2. 32 fl oz = ____ cups
3. 4 cups = ____ pints
4. 8 pints = ____ cups
5. 2 quarts = ____ pints
6. 8 gallons = ____ quarts
7. 24 quarts = ____ gallons
8. 2 quarts = ____ gallons
9. 1 gallon = ____ pints
10. 16 fl oz = ____ pints
11. 2 gallons = ____ fl oz
12. 10 gallons = ____ fl oz
13. 384 fl oz = ____ gallons
14. 384 fl oz = ____ pints
15. 384 fl oz = ____ cups

**Review (Answers)**

To see the Review answers, open this PDF file and look for section 7.14.

**Vocabulary**

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cup</td>
<td>A cup is a small customary unit for measuring liquid capacity. One cup is equal to eight ounces or about 0.25 liters.</td>
</tr>
<tr>
<td>Customary System</td>
<td>The customary system is the measurement system commonly used in the United States, including: feet, inches, pounds, cups, gallons, etc.</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
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<tr>
<td>Fluid Ounce</td>
<td>A fluid ounce is a customary unit for measuring liquid capacity. Soft drinks are measured in fluid ounces.</td>
</tr>
<tr>
<td>Gallon</td>
<td>A gallon is a unit of liquid capacity. One gallon is equivalent to four quarts.</td>
</tr>
<tr>
<td>Pint</td>
<td>A pint is a unit of liquid capacity. One pint is equivalent to two cups.</td>
</tr>
<tr>
<td>Quart</td>
<td>A quart is a unit of capacity that is equivalent to two pints.</td>
</tr>
</tbody>
</table>

**Additional Resources**

**Video:**

Media, iframe, embed and object tags are not supported inside of a PDF.

**PLIX Interactive:** [Comparing Standard Units of Volume](https://k12.libretexts.org/Bookshelves/Science_and_Technology/Measurement/05%3A_Capacity_and_Volume/5.03%3A_Comparing_Standard_Units_of_Volume)

**Practice:** [Convert between Cups, Pints, Quarts and Gallons](https://k12.libretexts.org/Bookshelves/Science_and_Technology/Measurement/05%3A_Capacity_and_Volume/5.03%3A_Convert_between_Cups__Pints__Quarts_and_Gallons)

**Real World Application:** [Super Soup](https://k12.libretexts.org/Bookshelves/Science_and_Technology/Measurement/05%3A_Capacity_and_Volume/5.03%3A_Super_Soup)