The Mill

When working with decimals and money in the Culinary Arts, you usually work out to a thousandth of a dollar. You only round off after all computations are completed. By figuring production costs and menu costs to the thousandths of a dollar, you receive more exact values. The thousandth of a dollar is called the mill. For example, $16.728 is a cost taken to the mill. Since a cent is one hundredth of a dollar, the mill is one-tenth of a cent. For example, 1672.8¢ is the same cost in terms of cents. Notice that .8 cents is less than one penny (one cent). .8 cents is 8 mills since .8¢ = $.008. When you convert an amount of cents into dollars, you need to divide by 100. (100 cents = 1 dollar or, using symbols, 100¢ = $1). When you go from a small unit to a larger unit, you divide.

Examples of converting from cents to dollars:

\[
\frac{1724.9¢}{100} = \frac{1724.9}{100} = \$17.249
\]

\[
\frac{63.5¢}{100} = \frac{63.5}{100} = \$0.635
\]

\[
\frac{453¢}{100} = \frac{453}{100} = \$4.53
\]

When you convert an amount of dollars into cents, you need to multiply by 100. When you go from a large unit to a smaller unit, you multiply.

Examples of converting from dollars to cents:

\[
$7.291 = 7.291 \times 100 = 729.1¢
\]

\[
$56.903 = 56.903 \times 100 = 5690.3¢
\]

\[
$6.19 = 6.19 \times 100 = 619¢
\]

When you do finally round off any monetary values, you round to the nearest cent (to the hundredth of a dollar).

Examples of rounding off:

\[
$7.291 \text{ becomes } $7.29
\]

\[
59.4¢ \text{ becomes } 59¢ = \$0.59
\]

\[
$72.043 \text{ becomes } $72.04
\]

\[
$17.245 \text{ becomes } $17.25
\]

The most frequently used equation by anyone who purchases or computes the cost of any purchase (food, clothes, books, etc.) is this one: the total cost of an item equals the number purchased times the cost per unit.

\[
\text{total cost} = (\text{amount purchased}) \times (\text{cost per unit})
\]

Example:

You purchase 6 T-shirts at $3 per package of two shirts, the total cost (before taxes). The cost per unit is $3 per 2 shirts, so \(\frac{3}{2}\) shirts. The amount purchased is 6 shirts.

\[
\text{total cost} = 6 \times \frac{3}{2} = \frac{18}{2} = \$9.00
\]

The total cost (before taxes) of the six shirts is $9.00.
Your restaurant purchases a 25-pound box of Hershey’s semi-sweet chocolate chips for $1.51 per pound. So the cost per unit is $1.51 per 1 pound.

\[ \text{total cost} = 25 \times \frac{1.51}{1} = 25 \times 1.51 = 37.75. \]

The total cost of 25 pounds of chocolate chips is $37.75.

\[ \text{AP, EP & AS} \]

A vitally important concept in Culinary Arts is the relationship between the amount or weight of food purchased and that food’s serving quantity. These amounts are rarely the same. For example, 1 pound of raw lentils weighs 3.1 pounds when cooked. A second example is when 16-ounces of pork tenderloins are trimmed, the yield is 14 ounces of useable meat. Cooking the tenderloins will cause more weight loss due to shrinkage, resulting about 13.4 ounces.

AP, or As Purchased amount, refers to the amount of food you buy.

In our second example, the original weight of our pork tenderloins was 16 ounces. So, the AP is 16 ounces.

EP, or Edible Portion amount, refers to the amount of food left after trimming, sorting for poor quality or spoilage, draining canned food, etc., but before cooking.

In our second example, the trimmed weight of our pork tenderloins was 14 ounces. So, the EP = 14 ounces.

AS, or As Served Amount (Amount Served), refers to the amount served to the customer. Some foods increase when cooked (rice, grains, pastas, cereals) while other items shrink.

In our second example, the serving weight of our pork tenderloins was 13.4 ounces. So, the AS = 13.4 ounces.

The units may not be ounces as in our example above, but any kind of unit. You may be looking as weight, package size or weight, volume, or even a simple count by the piece. It doesn’t matter what the units are as long as the units are the same so that you can compare the AP, EP and AS. The relationship between these values is used to determine quantity to purchase or price per portion. (Note: Sometimes only AP and EP or AP and AS, are used. It depends upon the food the kitchen, and/or the preference of the head chef/baker or the company.) Amount of waste (unused part of the food) is referred to as waste so we see that AP – EP = waste or AP – waste = EP.

The following two equations are very useful.

To find the number of servings in a certain quantity of food, you use the EP, edible portion. The EP is usually not as messy and is easier to measure than the AS. So always use the EP when talking about the amount of food being served. The number of servings is equal to the EP (total amount available) divided by the portion size. The units of the EP and the portion size must be the same.

\[
\text{number of servings} = \frac{\text{EP}}{\text{portion size}}
\]

You might want to know how much of an ingredient is needed. You would use this same formula and a little algebra. That is, multiply the number of servings by the portion size to get the total EP units.

\[
\text{EP} = (\text{number of servings}) \times (\text{portion size})
\]
To determine your cost per serving for an item, you use the AP price (as purchased price) and the EP units (edible portion units) for the ingredients. The cost per serving is equal to the total AP cost divided by the total EP units times the size of the portion.

\[
\text{cost per serving} = \frac{\text{AP cost} \times \text{portion size}}{\text{EP amount}}
\]

Sometimes you just want to find the cost per EP unit. This value is the first part of the cost per serving formula.

\[
\text{cost per unit} = \frac{\text{AP cost}}{\text{EP amount}}
\]

Example:
Suppose 7 pounds of pork loins cost $1.20 per pound. (This is 112 ounces of pork loins cost $1.20 per 16 ounces.) About 1.75 pounds (28 ounces) is lost in trimming. If a portion is 8 ounces, find the number of portions (servings) and the cost per portion.

\[
\begin{align*}
\text{AP} &= 112 \text{ ounces} \\
\text{cost} &= 7 \times \frac{1.20}{1} = 8.40 \quad \text{or cost} = 112 \times \frac{1.20}{16} = 8.40 \\
\text{EP} &= 112 - 28 = 84 \text{ ounces} \\
\text{number of servings} &= \frac{84}{8} = 10.5 \quad \text{There are 10 portions.}
\end{align*}
\]

(Note: ½ portion or 4 ounces is not enough for one portion and will be used in various other ways by the kitchen.)

\[
\text{cost per portion} = \frac{8.40}{112} \times 8 = .075 \times 8 = .60 \quad \text{The cost per portion is $0.60.}
\]

\[
\text{The cost per ounce is $0.075.}
\]

NOTE: Remember, the EP amount is used when talking about portion sizes, but the AP is used when discussing portion costs.

Homework Problems

1. The Gray Crane Restaurant has 18 pounds (288 ounces) of chicken salad. Today a luncheon party of 28 has preordered the chicken salad. If no special parties are planned, the restaurant generally serves 16 portions of chicken salad during lunchtime. Does the kitchen need to prepare more chicken salad if a portion is 7 ounces?

2. A 40-ounce box of frozen corn costs 6 cents per ounce.
   a. What is the total cost (in dollars) of the corn?
   b. How much does a 4-ounce serving cost?

3. Semper (white coating chocolate) comes in 11-pound bars. A bar costs $33.90.
   a. What is the cost per pound?
   b. Since 11 pounds is 176 ounces, what is the cost per ounce?

4. The ingredients for a strange and simple salad are given below. One portion is 3 cups of salad. You are to find the cost per portion using two different methods.
   a. Method One: Figure out the cost per serving of each ingredient. Add the results.
   b. Method Two: Figure out the total cost and the total units. Divide the total cost by the total units.
      (See list of ingredient on top of next page.)
Strange and Simple Salad

- Romaine lettuce 8 cups cost: 32 cups for $8.20
- Cucumbers 1 cup cost: 8 cups for $3.35
- Seedless red grapes 2 cups cost: 6 cups for $3.50

5. A 25-pound bag of black-eyed peas cost 40 cents per pound. What is the total cost?

6. A recipe calls for 4 cups of sliced, natural almonds. Suppose you purchase one case of three 2-pound bags for $26.20. Each 2-pound bag contains about 9.5 cups of almonds. What is the total cost for the almonds in the recipe?

7. The Gray Crane Restaurant purchases a 15-pound sirloin piece of beef for $3.05 per pound.
   a. What is the total cost?
   b. If the trim loss (waste) is 4.3 pounds, how many ½-pound sirloin steaks can you get from this cut of beef?
   c. What is the restaurant’s cost per ½ pound sirloin steak? (That is, what is the cost per serving?)

8. You buy a drawn (gutted) salmon that weighs 7 pounds (112 ounces) and cost $4.20 per pound (that is $4.20 per 16 ounces).
   a. What is the total cost of this salmon?
   b. Suppose you want to use this fish for steaks. The head, tail and fins are removed giving you about 12 ounces of waste. If you could cut the entire fish into 8-ounce steaks, how many portions would you get?
   c. What is the cost of each portion in part b?
   d. Suppose you decide to use the fish for salmon filets instead of steaks. Now the skin and bones are removed reducing the weight by 23 ounces. A filet is usually about a 6-ounce portion. How many portions can you get?
   e. What is the cost of each portion in part d?

9. The ingredients for Pate A Brioche (from Mastering the Art of French Pastry, page 37) made by hand (not in a food processor or electric mixer) are listed below. The purchase cost for each ingredient is also given. Find the cost per ounce.

Pate A Brioche

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Amount</th>
<th>Cost per Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flour</td>
<td>17 ½ ounces</td>
<td>$0.45 per 16 ounces</td>
</tr>
<tr>
<td>Fresh yeast</td>
<td>1.2 ounces</td>
<td>$1.17 per 16 ounces</td>
</tr>
<tr>
<td>Light molasses or malt extract</td>
<td>1 tablespoon (.7 ounces)</td>
<td>$1.15 per 16 ounces</td>
</tr>
<tr>
<td>Water, warm</td>
<td>1 tablespoon (.4 ounces)</td>
<td>consider free</td>
</tr>
<tr>
<td>Sugar</td>
<td>3 tablespoons (1.3 ounces)</td>
<td>$0.49 per 16 ounces</td>
</tr>
<tr>
<td>Salt</td>
<td>2 ½ teaspoons (1.1 ounces)</td>
<td>$0.20 per 16 ounces</td>
</tr>
<tr>
<td>7 eggs, large, room temperature</td>
<td>~6 ounces</td>
<td>$1.32 per 16 ounces</td>
</tr>
<tr>
<td>butter, softened</td>
<td>12 ounces</td>
<td>$1.85 per 16 ounces</td>
</tr>
</tbody>
</table>
10. The following items were ordered from Charlie’s Produce. Charlie’s prices are also listed. What is the total cost for this order?

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Item</th>
<th>Price Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 bunches</td>
<td>broccoli</td>
<td>$0.90 per bunch</td>
</tr>
<tr>
<td>25 pounds</td>
<td>carrots</td>
<td>$9.50 per 25 pounds</td>
</tr>
<tr>
<td>12 bunches</td>
<td>green onions</td>
<td>$.30 per bunch</td>
</tr>
<tr>
<td>36 heads</td>
<td>iceberg lettuce</td>
<td>$4.98 per 12 heads</td>
</tr>
<tr>
<td>6 pounds</td>
<td>red onions</td>
<td>$2.70 per 2 pounds</td>
</tr>
<tr>
<td>5 bunches</td>
<td>parsley</td>
<td>$0.05 per bunch</td>
</tr>
<tr>
<td>10 pounds</td>
<td>red peppers</td>
<td>$5.45 per 5 pounds</td>
</tr>
<tr>
<td>10 pounds</td>
<td>green pepper</td>
<td>$3.35 per 5 pounds</td>
</tr>
</tbody>
</table>