Yields

There are several kinds of yields in Culinary Arts. You have already done recipe yields when you found the number of portions in a particular recipe on Worksheet #3. Another important kind of yield has to do with the AP (As Purchased) amount and EP (Edible Portion) or AS (As Served) amount. To anticipate the actual quantity of a food item that will be served, you need to know how much is useable, the EP. Also, if a food item expands or shrinks considerably when cooked, it is necessary to know how much will be available for serving (AS). The Book of Yields is a reference book of food measures. The yield percentage of most food items is given in this book. You do not need The Book of Yields for this math class. However, it is of vital use in some of the Culinary Arts courses. To find the yield of a particular food item, you divide the EP by the AP of that food item. Sometimes you need to use the AS rather than EP.

This formula can also be written as a proportion:
\[
\text{yield percent} = \frac{\text{EP}}{\text{AP}} \quad \text{OR} \quad \text{yield percent} = \frac{\text{EP}}{1} \cdot \frac{1}{\text{AP}}
\]

Example 1: finding the yield percent
In Worksheet #3, an example was given of a 16-ounce pork tenderloin (AP) that reduced to 14-ounces (EP) when trimmed. Find the yield percent.

\[
\text{yield percent} = ??
\]

EP = 14 ounces
AP = 16 ounces

\[
\frac{n}{16} = \frac{14}{16}
\]

n = .875
n = 87.5%

This pork tenderloin has a yield percent of 87.5%.

Example 2: finding the yield percent using the proportion
Sixty-four fluid ounces of whole butter yield 48 ounces of clarified butter. What is the yield percent?

\[
\text{yield percent} = ??
\]

EP = 48 ounces
AP = 64 ounces

\[
\frac{n}{64} = \frac{48}{64}
\]

n*64 = 1*48
64n = 48

\[
\frac{64n}{64} = \frac{48}{64}
\]

n = .75
n = 75%

The yield percent of whole butter to clarified butter is 75%.
Most of the time, the average yield percent and the AP amount of a food item are already known. What is missing is the EP or AS amount so that the number of portions and the cost per portion can be determined.

Example 3: find the EP amount
is purchased. How many pounds of trimmed filet will 44.4 pounds of swordfish loin yield if the yield percent is 90.1%?

\[
\text{yield percent} = 90.1\% = 0.901 \\
\text{EP} = ?? \text{ pounds} \\
\text{AP} = 44.4 \text{ pounds}
\]

\[
\frac{0.901}{1} = \frac{n}{44.4} \\
1 \times n = 0.901 \times 44.4 \\
n = 40
\]

The 44.4 pounds of swordfish loin yields 40 pounds of edible swordfish.

Sometimes a yield is more than 100%. This means a food item has expanded rather than gotten smaller.

Example 4: finding the AS amount
Pearl tapioca grain has a raw to cooked weight yield of 634%. (This means one unit of raw tapioca expands into 6.34 units of cooked tapioca.) Suppose you have 1.2 pounds of raw tapioca. How many pounds of cooked tapioca do you have?

\[
\text{yield percent} = 634\% = 6.34 \\
\text{AS} = ?? \text{ pounds} \\
\text{AP} = 1.2 \text{ pounds}
\]

\[
\frac{6.34}{1} = \frac{n}{1.2} \\
6.34 \times 1.2 = 1 \times n \\
7.6 = n
\]

1.2 pounds of raw pearl tapioca grain yield 7.6 pounds of cooked tapioca.

This very same formula can also be used to figure out how much of a food item you need to order.

Example 5: finding the AP amount
Suppose a recipe calls for 25 pounds of trimmed and cleaned baker-Russet potatoes. Russet potatoes have a yield percent of 78.1%. How many pounds of Russet potatoes do you need to order for this recipe?

\[
\text{yield percent} = 78.1\% = 0.781 \\
\text{EP} = 25 \text{ pounds} \\
\text{AP} = ?? \text{ pounds}
\]

\[
\frac{0.781}{1} = \frac{25}{n} \\
0.781 \times n = 1 \times 25
\]

\[
\frac{0.781n}{0.781} = \frac{25}{0.781} \\
n = \frac{25}{0.781}
\]
n = 32
An order of 32 pounds of Russet potatoes is needed to yield 25 pounds of edible potatoes.

Sometimes information available is in terms of the waste produced rather than the EP or AS. This is simply a matter of subtracting the percent of waste from 100% to find the yield percent.

\[ 100\% - \text{waste} \% = \text{yield} \% \]

Example 6: finding the yield percent
A whole beef tenderloin loses 41.3% in waste. What is the yield?

\[ 100\% - 41.3\% = 58.7\% \]
A whole beef tenderloin with 42.3% waste has a yield percent of 58.7%

Example 7: finding the yield percent
Iceberg lettuce loses 26.9% in waste due to trimming and cleaning. What is the yield percent of iceberg lettuce?

\[ 100\% - 26.9\% = 73.1\% \]
Iceberg lettuce has a yield percent of 73.1%.

**Food Cost Percent**

Once food is prepared, the plan is to sell it. A selling price or menu price must have been determined. The menu prices will vary greatly between restaurants due to location, dining emphasis (casual, formal) and the many costs incurred in any restaurant. However, the menu prices have to be prices a customer is willing to pay as well as prices high enough to cover all the restaurant’s expenses (labor, rent, food items, equipment, taxes, etc.). The food cost percent is used to set menu prices. The food cost percent equals the plate cost (raw food cost) divided by the selling price (menu price).

\[ \text{food cost percent} = \frac{\text{plate (raw food) cost}}{\text{selling (menu) price}} \text{ OR } \frac{\text{food cost percent}}{1} = \frac{\text{plate cost}}{\text{selling price}} \]

Example 8: finding the food cost percent
If the raw food cost is $2.93 and the menu price is $4.00, what is the food cost percent?

\[ \text{food cost percent} = \frac{2.93}{4.00} = 0.7325 \]
\[ n = 73.25\% \]
The food cost percent is 73.25%.

Usually the food cost percent is known and, as you know, the raw food (plate cost) is easily calculated. The menu or selling price then must be determined.

Example 9: finding the menu price
Say the food cost percent is 60%. The plate cost is $4.39. The selling price should be what?
food cost percent = 60% = .60
plate cost = $4.39
selling price = ??

\[0.60 = \frac{4.39}{1}, \quad n \]
\[0.60 \times n = 1 \times 4.39\]

\[0.60n = 4.39\]
\[-60 \quad 0.60\]
\[n = 7.3167\]
The selling price should be $7.32.

Note: Frequently prices are listed with cents ending in zero or 5 or as 25 cents, 50 cents or 95 cents, the decision might be made to set the selling price in the above example at $7.30 or $7.35 or even $7.50.

Example 10: finding the plate (raw food) cost
Suppose you are thinking of adding Grilled Quail Wrapped in Prosciutto with Figs and Wild Mushrooms (recipe in *Techniques of Healthy Cooking*) to your menu for a selling price of $27.95. The food cost percent is 46.5%. What is the maximum raw food cost for this plate?

food cost percent = 46.5% = .465
plate cost = ??
menu cost = $27.95

\[0.465 = \frac{n}{1}, \quad 27.95\]
\[0.465 \times 27.95 = 1 \times n\]

\[13.00 = n\]
The raw food cost must not exceed $13.00.

**Markup Rate**

When talking about raw food costs and selling prices, two other terms that frequently come up are markup and markup rate. The markup is the money amount added to the raw food cost to get the selling price. That is, the markup equals the selling price minus the raw food cost.

\[
\text{markup} = \text{selling price} - \text{raw food cost}
\]

This means the markup plus the raw food cost is the selling price

\[
\text{markup} + \text{raw food cost} = \text{selling price}
\]

The markup is always a dollar amount. The markup rate equals the ratio between the markup and the raw food price. The markup rate is always a percent.

\[
\text{markup rate} = \frac{\text{marked up}}{\text{raw food cost}}
\]
Example 11: finding the markup rate
Suppose the selling price of a dozen cookies is $5.00, but the raw food cost is only $2.05 a dozen. What is the markup rate?
First, find the markup:
markup = 5.00 – 2.05 = 2.95
The markup is $2.95.

\[
\text{markup rate} = ??? \\
\text{markup} = 2.95 \\
\text{raw food cost} = 2.05 \\
\]

\[
n = \frac{2.95}{2.05} \\
n = 1.44 \\
n = 144\% \\
The \text{markup rate for the dozen cookies is 144\%} \\
\]

Example 12: finding the plate cost using a markup rate
Suppose you want a markup rate of 50% on a plate costing $7.22. What is your selling price?
First find the markup using the markup rate formula:
markup rate = 50% = .50
markup = ??
raw food cost = $7.22

\[
\frac{.50}{1} = \frac{n}{7.22} \\
.50 \times 7.22 = 1 \times n \\
3.61 = n \\
The \text{markup is$3.61}. \\
\]

Now find the selling price:
3.61 + 7.22 = 10.83
The selling price is $10.83, but will probably be set at$10.85 (or $10.95).

Here is a chart showing the raw food cost and selling price along with the markup rate and the food cost percent for the last five examples. Look carefully at the various components. Can you verify the markup rates and food cost percents?

<table>
<thead>
<tr>
<th>Example</th>
<th>raw food cost</th>
<th>markup rate</th>
<th>food cost percent</th>
<th>selling price</th>
</tr>
</thead>
<tbody>
<tr>
<td>#8</td>
<td>$2.93</td>
<td>36.5%</td>
<td>73.25%</td>
<td>$4.00</td>
</tr>
<tr>
<td>#9</td>
<td>$4.39</td>
<td>66.7%</td>
<td>60%</td>
<td>$7.32</td>
</tr>
<tr>
<td>#10</td>
<td>$13.31</td>
<td>110%</td>
<td>46.5%</td>
<td>$27.95</td>
</tr>
<tr>
<td>#11</td>
<td>$2.05</td>
<td>144%</td>
<td>41%</td>
<td>$5.00</td>
</tr>
<tr>
<td>#12</td>
<td>$7.22</td>
<td>50%</td>
<td>66.7%</td>
<td>$10.80</td>
</tr>
</tbody>
</table>

Again, the markup rate compares the markup to the raw food cost, while
the food cost percent compares the raw food cost to the selling price.

Problems

1. A shipment of forty pounds of fresh, drawn (gutted) salmon is purchased for $4.50 per pound. The filet yield of this fish is 27.2 pounds of salmon. What is the yield percent of the drawn salmon?

2. Suppose you need 305 ounces of boneless, skinless half breasts of chicken. Suppose you order untrimmed half breasts for $2.16 per pound. Each pound of untrimmed half breast of chicken yields about 10.5 ounces of boneless, skinless half breasts. What is the yield percent of the untrimmed half breasts of chicken?

3. Thirty pounds of drawn salmon are purchased for $4.50 per pound. The yield percent is 68%. What is the expected EP of this purchase?

4. The menu price of a meal is $11.50. The plate cost is $3.93. What is the food cost percent?

5. The raw food cost of a particular meal is $2.01 and the food cost percent is 30%.
   a. What is menu price?
   b. If the food cost percent is changed to 60%, then what is the menu price?

6. The selling price of a meal is $9.95 and the food cost percent is 55%.
   a. What is the raw food cost?
   b. What is the markup?

7. If a plate cost is $6.23 and the menu price is $20.95, what is the markup rate?

8. Say the raw food cost is $2.48 and you want a markup rate of 250%. What is your menu price?

9. Here is a chart that shows what happens to the selling price of a plate or food as the food percent is increased.
   a. Fill in the missing information.

<table>
<thead>
<tr>
<th>Raw food cost</th>
<th>Markup rate</th>
<th>Food cost percent</th>
<th>Selling price</th>
</tr>
</thead>
<tbody>
<tr>
<td>$3.00</td>
<td>10%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$3.00</td>
<td>20%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$3.00</td>
<td>30%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$3.00</td>
<td>40%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$3.00</td>
<td>50%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   b. What happens to the markup rate as the food cost percent increases?
10. Here is a chart that shows what happens to the selling price of a plate of food as the markup rate is increased.
   a. Fill in the missing information.
      | Raw food cost | Markup rate | Food cost percent | Selling price |
      | $3.00         | 50%         |                 |              |
      | $3.00         | 100%        |                 |              |
      | $3.00         | 150%        |                 |              |
      | $3.00         | 200%        |                 |              |
      | $3.00         | 300%        |                 |              |
      | $3.00         | 400%        |                 |              |
   b. What happens to the food cost percent as the markup rate increases?