Example: Two different bus lines stop at a Union Square bus stop. The M14D bus comes every 15 minutes (at 8:00 a.m., 8:15 a.m. and 8:30 a.m., etc). The M14A bus comes every 12 minutes (at 8:00 a.m., 8:12 a.m., and 8:24 a.m., etc).

The schedules of both buses continue at the same rate throughout the day. What is the first time they are scheduled to arrive together at the Union Square bus stop after 8:00am?

Solution: To answer the question, we can complete the chart below:

<table>
<thead>
<tr>
<th></th>
<th>8:00</th>
<th>8:15</th>
<th>8:30</th>
<th>8:45</th>
<th>9:00</th>
<th>9:15</th>
<th>9:30</th>
</tr>
</thead>
<tbody>
<tr>
<td>M14D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M14A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From the chart above, we can see that the buses will reach the stop together at 9:00 am.

Is there a faster way to find when they'll reach the bus stop together?

Let us stop and think. Since the M14D bus comes every 15 minutes, the interval between arrival times for the M14D bus will be in multiples of 15. Similarly, the interval for the M14A will be multiples of 12.

Thus, the buses will arrive together at an interval that is a common multiple of both 12 and 15!

Since the least common multiple of 12 and 15 is 60, they will first meet again after 60 minutes (i.e. at 9AM).

1) On Sundays the situation changes: the M14D arrives every 12 minutes, and the M14A every 18 minutes. What is the first time after 8:00am they will meet at the Union Square bus stop? Explain:
2) On Christmas day the schedule changes again. The M14D arrives every 18 minutes and the M14A every 42 minutes. What is the first time they will meet at the Union Square bust stop after 8:00 a.m.? Justify your answer:

Making Hamburgers

   
   a) When you put together the hamburgers (with one patty per bun), what is the least number of burgers you'll need to make it so that there are no left over buns or meat? Explain your answer:

b) How many packages of hamburger buns should you buy?

c) How many packages of hamburger meat patties should you buy?

d) To host a party of 140 guests, what is the least number of “bun-packages” you should buy so each guest will have at least one hamburger? Explain: (Hint: how many buns do you need?)
e) To host a party of 160 guests, what is the least amount of "bun-packages" you should buy so each guest will have at least one hamburger? What is the least number of "patty-packages" you need to buy? Explain:

f) If each of the 160 guests has only one burger, how many patties will be thrown away? Justify your answer:

Suppose you’re still hosting 160 guests with a burger for each, but you’re trying to waste as little food as possible. (One study says that “40 percent of all the food produced in the US is thrown out” *). You go to several different grocery stores, ‘til you find one that carries hamburger buns in packages of 10. Hamburger meat patties there come in a package of 8.

4) Greeting cards come in packages of 10. Envelops come in packages of 12. Max wants to purchase the smallest number of greeting cards and envelopes so that he will have exactly 1 greeting card per envelop. How many packages of greeting cards and envelopes should Max buy?
Meeting for Coffee

5). Susan goes swimming every 4 days. Jackie goes swimming every 6 days. Lisa goes swimming every 10 days. They decide to meet up to have coffee on days that they all go swimming. Today they all went swimming and had coffee.

How many days later will they again all go swimming and then have coffee? Explain your answer.

Extra Credit Questions

6). 40 women and 32 men want to form groups for teamwork. Within groups the number of women may or may not be the same as the number of men, but every group must have the same number of men and the same number of women as every other group. What is the greatest number of groups that can be formed? How many women and men will be on each group?

7). Least Common Multiple
Revisit questions 1 to 5 and identify which problems you can solve by finding the least common multiple and explain why it is so.

• http://www.livescience.com/5919-americans-toss-40-percent-food.html