Logic and Maths Puzzles # 68 March 2018

1. Joe bought a bag of oranges on Monday and ate one third of them.
On Tuesday he ate half of the remaining oranges.
When he looked in the bag on Wednesday he still had two oranges left.
How many oranges did he start with?

2. One inch is 2.5 centimetres approximate to the first decimal place.
What is the conversion factor:
(a) to the second decimal place?
(b) to the fourth decimal place?

3. In your sock drawer, you have three red socks, five blue socks, eight brown socks, seven white socks and four black socks.

You are in a hurry and there's a power failure.

How many socks do you have to take out of the sock drawer in the dark to be sure of having a matching pair?

4. One boy can eat 50 chocolates per minute, and another can eat half as many in twice the time.

Assuming they can keep up the pace, How many chocolates can both eat between them in 2 minutes?

5. A man makes the following proposition to his friend:

"I will let you flip a coin 20 times. Each time the coin lands on heads, I will give you $2.00. However, each time the coin lands on tails, you must give me $3.00."

His friend flips the coin 20 times and the end result is that no money is to change hands. How many times did the coin land on heads?

6. Eight times a certain number exceeds half of that number by fifteen.
What is the number?

7. John is half Bill's age. In six years, John will be two-thirds as old as Bill.
How old are John and Bill now?

8. Which two of the following are not prime numbers?

17,19,23,29,31,37,41,43,47,53,57,59,61,67,71,73,79,83,89,91,97

9. In the Roman army, decimation was a punishment, usually for cowardice, in which an entire group of soldiers were required to beat one tenth of their number (selected at random) to death.

The 99th "Pullum" Legion ran away from their first three engagements, and consequently suffered no battle casualties whatever.

However, their commander ordered them decimated each time and refused to allow their numbers to be made up with replacements. If they commenced their fourth battle 3,645 strong, how many soldiers originally made up the group?

10. There are five women having dinner at a circular table. Mrs. Smith is sitting between Miss Cooper and Miss Andrews. Annie is sitting between Connie and Mrs. Grey. Miss Cooper is seated between Annie and Yvette. Elizabeth is seated with Mrs. Summers on her left and Miss Andrews on her right. Teresa paid the bill.
What are the full names of these five women?

Solutions:

1. Six oranges

This can be worked out easily by trial-and-error.
Here's a solution using algebra:

Let the original number of oranges (purchased on Monday) equal "***n***".

On Tuesday Joe started with 2/3 ***n*** oranges.

On Wednesday he started with 1/2 of 2/3 ***n***, or 2/6 ***n***, or 1/3 ***n*** oranges which, we're told was 2 oranges.

$1/6\ n = 2$

$n = 6$

2. (a) 1 inch = 2.54 cm
   (b) 1 inch = 2.5400 cm.

The relationship was standardised in 1959 to make 1 inch exactly equal to 2.54 cm

3. Six (providing you don't care which colour the matching pair is)

If there is a trick to this question, it is that the number of each colour sock doesn't matter much so long as there are at least two of each colour. There are five different colours. It's **possible** that you will pull out all five colours in your first five picks; however, on your sixth pick you will have to match at least one of those colours.

4. 125 chocolates

Boy 1 eats 50 chocolates each minute, therefore 100 in 2 minutes. Boy 2 eats half of 50 or 25 chocolates in two minutes. 100 + 125 = 125

5. 12 times

This can be easily solved by trial-and-error.
Here's a solution using algebra:

Let the number of Heads = ***H***, the number of Tails = ***T***.

Then ***T*** = 20 – ***H*** equation[1]

and

2***H*** – 3***T*** = 0 equation [2]

2***H*** = 3***T***

Substituting for T from equation [1]

2***H*** = 3(20-***H***)

2***H*** = 60 – 3***H***

5***H*** = 60

H = 12

6. 2

Let the number equal n

$8n = \frac{n}{2} + 15$ [multiply both sides by 2]

$16n = n + 30$

$15n = 30$

$n = 2$

7. John is 6 Bill is 12

Let John's age now equal j years, Bills age equal b years

$b = 2j$ [equation 1]

$j + 6 = \frac{2(b+6)}{3}$ [equation 2]

Substituting from equation 1

$j + 6 = \frac{2(2j+6)}{3}$

$j + 6 = \frac{4j+12}{3}$

$3J + 18 = 4J + 12$

$18\text{-}12 = 4J - 3J$

$J = 6$

$b = 2J$

$b = 12$

8. 57 (3 X 19) and 91 (7 X 13)

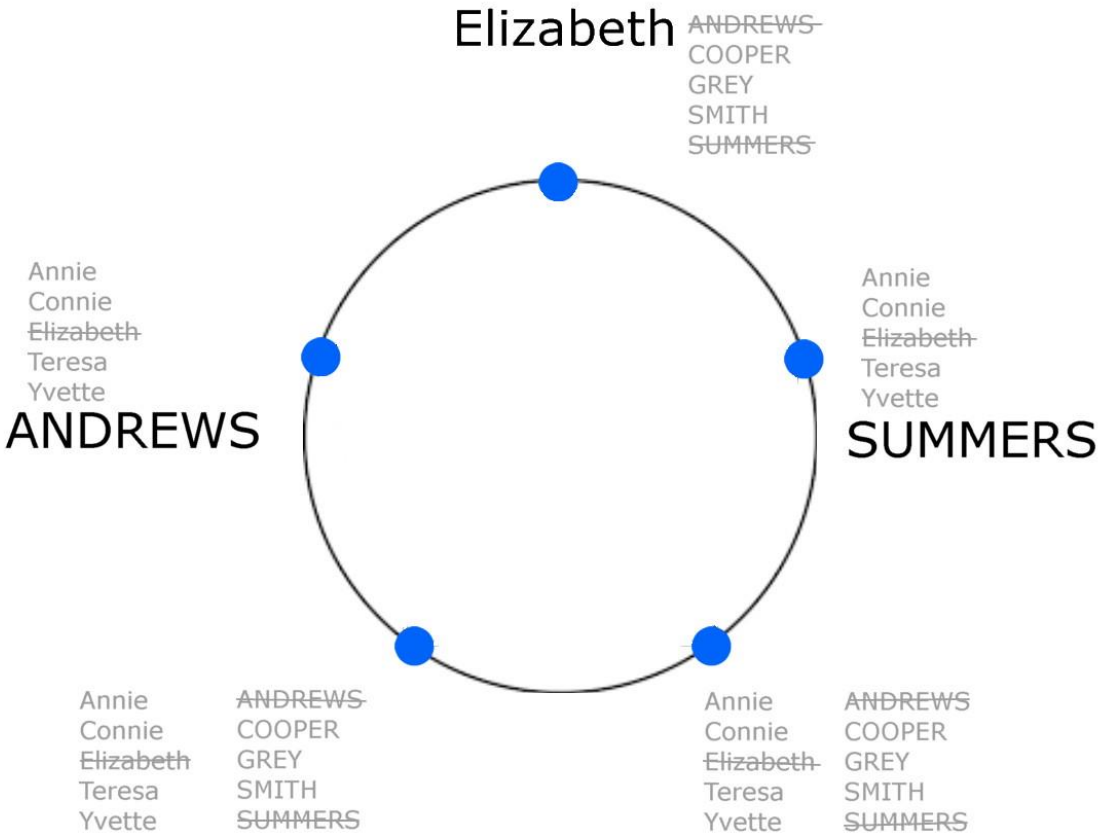
9. 5000 soldiers

This can be done by trial and error. Another approach is to reverse the order of operations which led to the solution. Decimation results in 0.9 of the original total remaining. Three subsequent decimations would reduce the figure to 0.9 X 0.9 X 0.9 = 0.729. **Dividing** 3645 by 0.729 provides the starting figure of 5000.

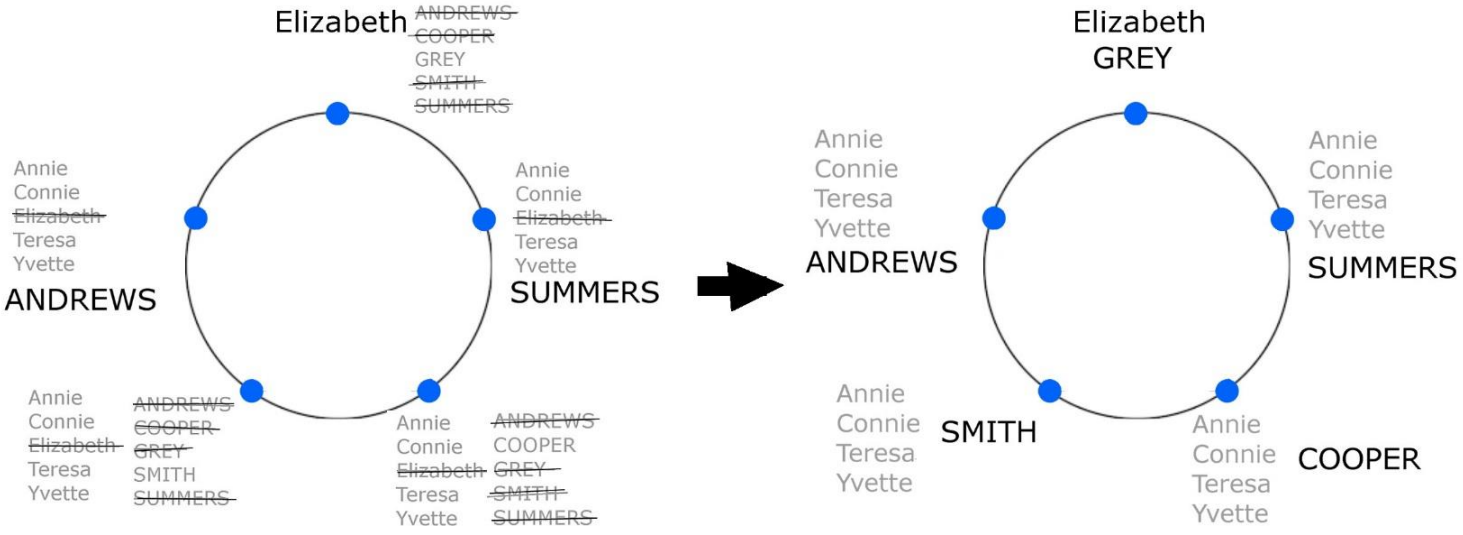
10. Annie Summers, Elizabeth Grey, Teresa Andrews, Yvette Smith, Connie Cooper

It may help to draw the table and the five seating positions
From the clues supplied, the first names are Annie, Connie, Yvette, Elizabeth and Teresa
The surnames are Andrews, Cooper, Gray, Smith and Summers.

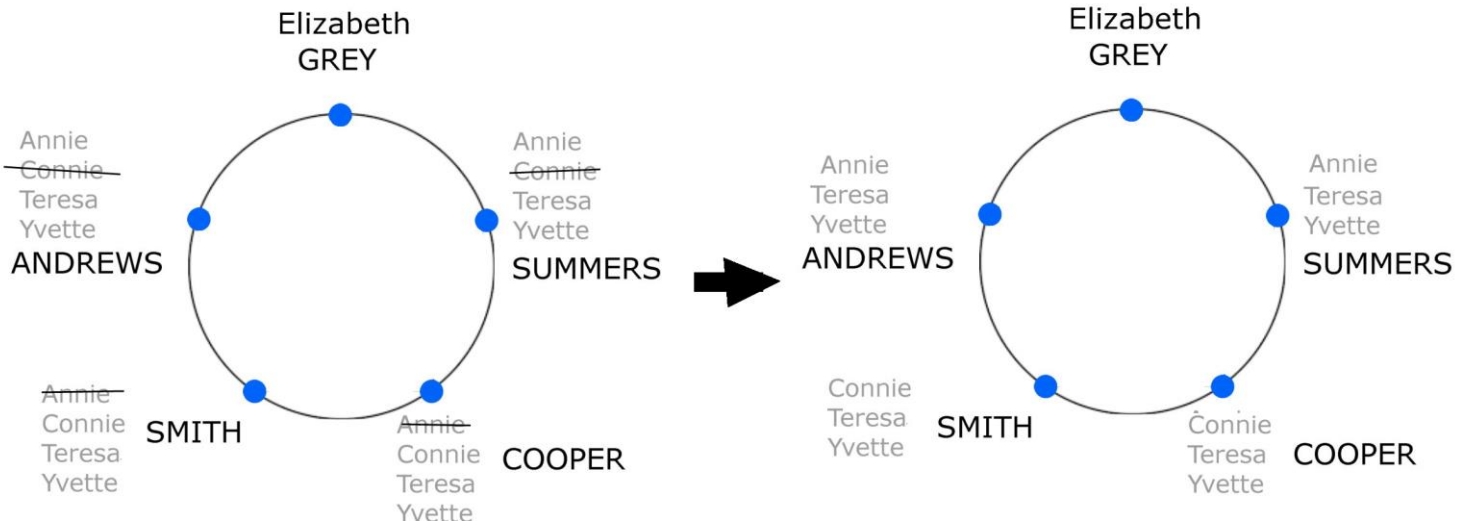
Start with the known relative seating positions of Mrs Summers, Elizabeth and Miss Andrews. Note the possible first names and surnames that remain for each of the seating positions; they will be successively eliminated.



"Mrs Smith is sitting between Miss Cooper and Miss Andrews"



"Annie is sitting between Connie and Mrs Grey"



And finally, "Miss Cooper is seated between Annie and Yvette"