Logic and Maths Puzzles # 67 February 2018

1. If you start with the number one, and count by ones, spelling out each number as you go, (one, two, three….) how high will you count before you need to use your first letter “a”?

one, two, three …

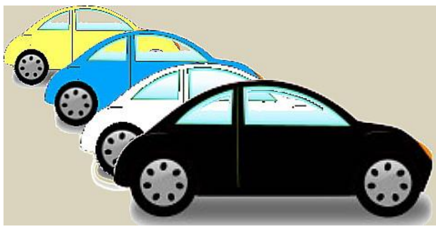
2. There is an enclosure in the zoo that holds both pigs and peacocks. If there are 30 eyes and 44 feet altogether, how many pigs and how many peacocks are there?

3. Which of these odd numbers is odd one out and why?

3, 5, 7, 9, 11, 13

4. King Bing II died 120 years after King Bing I was born.
Their combined ages when they died was 100 years.
King Bing I died in the year 40 BC.
In what year was King Bing II born?

5. What percentage is 30% of 30%?



6. Honest Joe has more than 50 but fewer than 100 used cars in stock. One quarter of them are blue, one third are white, 37.5% are black and the other four are yellow. How many cars are in stock in total?

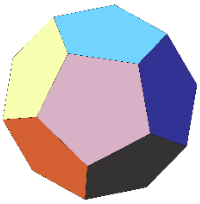
7. Fred made out his first will shortly after his first child was born. As he and his wife were both healthy, he expected to have more children, so he left one third of his estate to his first child and the rest to charity.

After the second child was born, he wrote a new will in which the first child still inherited one third, but the new child was left one quarter of his estate, with a smaller fraction going to charity.

When the third child was born, it was allowed one fifth of the estate, and so on.

As it turned out, when Fred died he was able to leave all his children their due inheritance following this pattern. A little bit was left over for charity (less than that received by any child)

a. How many children did Fred have?
b. If he left $6 million, how much went to charity?



8. There are only five regular solids: that is, 3D shapes that can be made that have identical faces. This simplest is the tetrahedron with 4 faces, then comes the hexahedron with 6 faces, then octahedron with 8 faces. What is the more common term for a hexahedron?

9. What prime number will divide exactly into **111, 222, 333, 444, 555, 666, 777, 888,** and **999?**

10. There are six code words below.
Each word is four letters long.
Nine different letters are used.
Each of the letters is worth a different one of the digits from 1 to 9.
Next to each word is the total that you get if you add up the values of its letters.
Find the value of each letter for one point each

FALL (18) (**F** + **A** + **L** + **L** = 18)

LOCK (10)

SAIL (25)

MILK (16)

FOLK (11)

KICK (12)

Solutions:

1. The answer **depends** on whether you are using Standard English (as in Britain or Australia) or American English. A Standard English speaker, counts *One hundred AND one, one hundred AND two*, etc, so the appropriate answer is "**One hundred and one**". Americans tend to count *One hundred one, one hundred two ….* and do not require the letter "a" until they reach **"One thousand"**

2. Seven pigs, eight peacocks

This can be done easily by trial-and-error; particularly because only whole number answers are possible.
However a mathematical approach using simultaneous equations might be
Let the number of pigs = x, the number of peacocks = y

Both peacocks and pigs have 2 eyes.

$x + y = 30/2 = 15$ (equation 1)

Since pigs have 4 feet and peacocks have 2 feet,

$4x + 2y = 44$

$2x + y = 22$ (equation 2)

Substituting $x = 15 - y$ from equation 1 into equation 2

$2(15 - y) + y = 22$

$30 - 2y + y = 22$

$y = 8$ there are 8 peacocks

$x + 8 = 15$

$x = 7$ there are 7 pigs

3. 9. The others are prime numbers

4. 20 BC

There were 120 years between the birth of King Bing II and the death of King Bing I, but since their ages amounted to 100 years, there must have been 20 years when neither existed. This would be the period between the death of King Bing 1, 40 B.C and the birth of King Bing II, 20 B.C.

5. 9%

30% is $\frac{3}{10}$

$\frac{3}{10} \text{ X } \frac{3}{10} = \frac{9}{100}$ or 9%

6. 96

Probably best done by trial and error based on the fact that only whole numbers of cars need be considered. Given that fractions are in quarters, thirds and eighths (37.5% is 3/8) the total number of cars must be some multiple of 2, 3 and 8.

Possible totals are 24, 48, 72 and 96 cars. Given that the number of cars is greater than 50 but fewer than 100, that leaves only 72 and 96 as possible answers.
If 72, there would be 18 blue cars, 24 white cars and 27 black cars; however, that only leaves 3 yellow cars, not 4 as stipulated.
So the correct answer must be 96 cars (24 blue, 32 white, 36 black and 4 yellow)

7. a. Fred had 4 children   b. $300,000 was left to charity

a. The sum of fractions must be less than 1.0

For 4 children, inherited fractions = $\frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \frac{1}{6}$

$$= \frac{20+15+12+10}{60}$$

$$= \frac{57}{60} \text{ or } \frac{19}{20}$$

For 5 children, inherited fractions = $\frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \frac{1}{6} + \frac{1}{7}$

$$= \frac{140+105+84+70+60}{420}$$

$$= \frac{459}{420}$$

So the maximum number of children that Fred could have and still maintain his set pattern was four.

b. If Fred left $6 million, $\frac{19}{20}$ went to his children, the remaining $\frac{1}{20}$ going to charity.

8. cube

9. 37

The numbers given are all clearly multiples of 111 which is **not** prime. By inspection, 111 is divisible by 3 as its digits add up to 3.

111 ÷ 3 = 37 which IS a prime number

10. **A** = 9   **C** = 4   **F** = 5   **I** = 6   **K** = 1   **L** = 2   **M** =7   **O** = 3   **S** = 8

Each of the letters is worth a different one of the digits from 1 to 9.

To avoid duplication, **LOCK** (value of 10) must be the sum of 1, 2, 3 and 4 whereas **FOLK** (value of 11) must be the sum of 1, 2, 3 and 5

FOLK, (value 11) is **LOCK** (value of 10) but with with **F** substituted for **C**.

C is therefore **4**, and **F = 5;** L, O and K are 1, 2 and 3 in some order

From **FALL,** (F + A + L + L =18)

If L = 1, 5 + A = 16, A =11 [not possible]

If L = 2, 5 + A = 14, A = 9

If L = 3, 5 + A = 12, A = 7

L = 2 or 3, A = 7 or 9

From **KICK** (K + I + C + K = 12)

If K = 1, I + 6 = 12, I = 6

If K = 2, I + 8 = 12, I = 4 [not possible, as C is already known to be 4]

If K = 3, I + 10 = 12, I =2 [not possible as either L or O would be 2]

K is therefore **1**, and **I** = **6**

From **MILK**, (M + I + L + K = 16)

If L = 2, M + 6 + 2 + 1 = 16 M = 7

If L = 3, M + 6 + 3 + 1 =16, M = 6 [not possible, as I =6]

L is therefore **2**, and **M** = **7**

From **FALL** above, **A** = **9**

From **LOCK** (L + O + C + K = 10) **O** = **3**

From **SAIL,** (S + A + I + L = 25)

S + 9 + 6 + 2 = 25

S = **8**