QUICK-FIRE TRICKSY MATHS 2

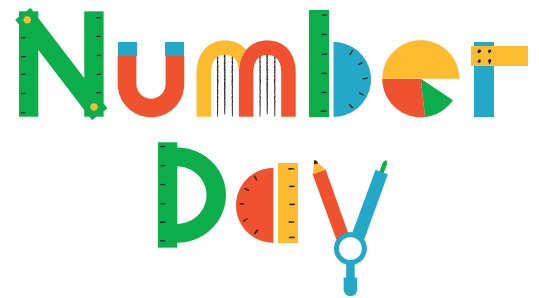**Number Day**

Get ready, get set, go! But don't forget your thinking cap for these quick-fire maths questions.

1. Can you make the number 100 using only the number 3 and the operations +, −, x, ÷ ?

2. $\frac{1}{12}, \frac{1}{6}, \frac{1}{4}, \frac{1}{3}$ ... What comes next in the sequence?

3. A straight tunnel is created through a concrete bank, the tunnel has length 3 m and a circular crosssection with diameter 50 cm. How much soil has been removed to make the tunnel?

4. It takes 11 women 5 hours to build a fence. How long would it take 5 women to build the same fence?

5. A length of rope is wrapped once around the equator of the Earth and pulled taut. The rope is then loosened and raised from the surface of the Earth by 1 metre at each point on the equator. How much extra rope is needed for this process?

6. Dylan drives to the supermarket. On the way there he drives at 40 mph, on the way back he drives at 20 mph. What is his mean speed for the whole journey?

7. **Crack the codes**

   Simon works at an antique shop. The shop is about to be demolished by a wrecking ball and Simon must clear out three safes to salvage the shop's most valuable possessions. Unfortunately, he cannot remember the codes.

   Can you figure out the code for each safe before the valuable antiques are lost forever?

a. Safe 1 (Containing a historical artefact)
The 5-digit code uses digits between 0 and 9.

The numbers are arranged in descending order.

The range is equal to the first digit.

The mode is equal to the median.

The mean is 5.

The last digit is equal to the difference between the second and third digits.

The difference between the second and fourth digits is 5.

The median is a prime greater than 5.

b. Safe 2 (Containing a priceless painting by Rembrandt)
The 5-digit code uses digits between 1 and 9 and no digit is repeated.

Digits in prime positions are not prime numbers.

The ratio of the third digit to the second digit is equal to the ratio of the second digit to the fourth digit.

The largest digit is a cube number.

The second and fourth digits add to give the fifth digit.

The third digit is the largest digit.

The last digit is the median of the five digits.

c. Safe 3 (Containing a diamond tiara)
The 5-number code uses numbers between 10 and 50 and no number is repeated.

The numbers are arranged in ascending order.

The product of the second and fourth numbers is equal to the square of the third number).

Three numbers have an odd number of factors.

The smallest number can be written $(a^a)^a$ where a is a positive integer.

The LCM of the two largest numbers is the square of their HCF.

Exactly two numbers have only one prime factor each.

The first number is a factor of the fifth number.

Three of the numbers are multiples of 6.

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THE ANSWERS

Number Day
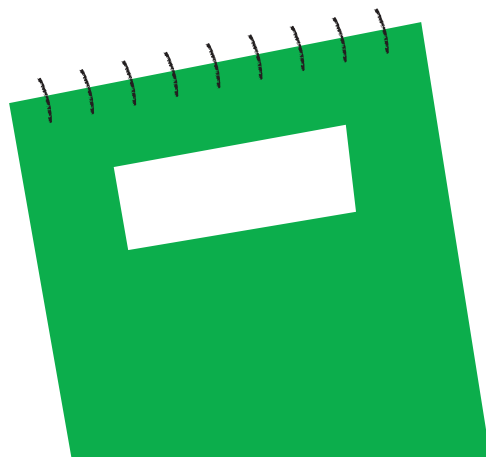
1. Many answers possible e.g. $3 \times 3 \times 3 \times 3 + 3 \times 3 + 3 \times 3 + \frac{3}{3} = 100$, $\left(3\frac{3+3}{3} + \frac{3}{3}\right)^{\frac{3+3}{3}} = 100$, $(3^3 + 3) \times 3 + (3 \times 3 + \frac{3}{3}) = 100$, $3^{3+\frac{3}{3}} + 3^{3-\frac{3}{3}} + 3^{3-3} = 100$.

2. $\frac{5}{12}$, the numbers go up by $\frac{1}{12}$ each time.

3. $0.589 m^3$ of concrete.

4. None as it has already been built (or 11 hours).

5. 2π or approximately 6.28 metres extra.

6. 26.7 mph.

Crack the codes

Safe 1
9 7 7 2 0

Safe 2
74826

Safe 3
16 25 30 36 48

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