

## **Indices and rounding (Intermediate UKMT)**

These questions must be attempted **without a calculator**

Topics covered in the questions below may not necessarily be from the topic of the title.

1. The *World Wide Fund for Nature* estimates that 54 acres of Brazilian rainforest are destroyed every minute of every day.

Approximately how many acres are lost each week?

- A 50 000      B 80 000      C 200 000      D 500 000      E 2 000 000

2. In March 2003 Welshman Tony Evans dropped a ball from an aircraft a mile above the Mojave desert to see if it would bounce. The ball was made from 6 million rubber bands, had a circumference of 14 ft 8 in, weighed 2600 pounds and took Mr Evans five years to build.

On average, roughly how many rubber bands did he add each day whilst building the ball?

- A 3              B 33              C 330              D 3300              E 33 000

3. One gallon of honey provides enough fuel for a bee to fly about seven million miles. Roughly how many bees could fly one thousand miles if they had ten gallons of honey to share between them?

- A 7 000      B 70 000      C 700 000      D 7 000 000      E 70 000 000

4. The number  $3^4 \times 4^5 \times 5^6$  is written out in full.

How many zeros are there at the end of the number?

- A none      B 4      C 5      D 6      E more than 6

5. Given that  $4^x + 4^x + 4^x + 4^x = 4^{16}$ , what is the value of  $x$ ?

- A 2      B 4      C 8      D 12      E 15

6. Given that  $5^j + 6^k + 7^l + 11^m = 2006$ , where  $j, k, l$  and  $m$  are different non-negative integers, what is the value of  $j + k + l + m$ ?

A 6                      B 7                      C 8                      D 9                      E 10

7. A garden has the shape of a right-angled triangle with sides of length 30, 40 and 50. A straight fence goes from the corner with the right-angle to a point on the opposite side, dividing the garden into two sections which have the same perimeter.

How long is the fence?

A 25                      B  $8\sqrt{3}$                       C  $5\sqrt{11}$                       D  $5\sqrt{39}$                       E  $12\sqrt{5}$