

## Rounding (Senior 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. In 1998 a newspaper reported that “The world record for remembering the value of  $\pi$  to the greatest number of decimal places is 40 000 places, which took the record holder 17 hours and 21 minutes to recite.”

What was the average number of decimal places recited per minute, approximately?

- A 20                      B 40                      C 200                      D 400                      E 2000

2. An attempt by two men to sit in every one of the 72 000 seats in Cardiff's Millennium Stadium to raise money for charity ended in painful failure, despite their wearing manmade-fibre tracksuits to help them slide from seat to seat. Before the pain stopped them, they had managed 64 000 seats between them in 27 hours.

On average, roughly how long did each man take per seat?

- A 0.5 seconds      B 1 second      C 1.5 seconds      D 2 seconds      E 3 seconds

3. Climbers use ropes of different diameters. A 50m rope which is 9mm in diameter weighs about 2.7kg.

Roughly what would a 50m rope of the same material, but of diameter 11mm, weigh?

- A 2.7kg                      B 3.3kg                      C 4kg                      D 4.9kg                      E 6kg

4. Roughly how many seconds are there in a day?

- A  $10^3$                       B  $10^4$                       C  $10^5$                       D  $10^6$                       E  $10^7$

5. The probability of a single ticket winning the jackpot in the National Lottery is

$$\frac{6}{49} \times \frac{5}{48} \times \frac{4}{47} \times \frac{3}{46} \times \frac{2}{45} \times \frac{1}{44}.$$

If I buy one ticket every week, approximately how often might I expect to win the jackpot?

- A once every hundred years                      B once every twenty thousand years  
C once every hundred thousand years  
D once every quarter of a million years                      E once every million years

6. When rounded to 3 significant figures, the number  $x$  is written as 1000.

What is the largest range of possible values of  $x$ ?

- A  $999 \leq x < 1001$       B  $995 \leq x < 1005$       C  $990 \leq x < 1010$   
D  $999.5 \leq x < 1005$       E  $999.5 \leq x < 1000.5$

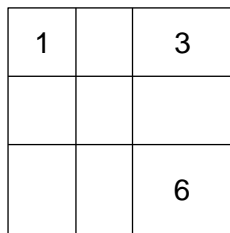
7. In 1954, a total of 6 527 mm of rain fell at Sprinkling Tarn and this set a UK record for annual rainfall. The tarn has a surface area of 23 450 m<sup>2</sup>.

Roughly how many million litres of water fell on Sprinkling Tarn in 1954?

- A 15      B 150      C 1 500      D 15 000      E 150 000

8. A square is divided into nine rectangles by two horizontal and two vertical lines. The areas of three of the small rectangles are as shown.

If the central small rectangle happens to be a square, what is the perimeter of the small rectangle in the bottom left corner?



- A  $2/\sqrt{3}$       B 2      C  $3\sqrt{3}$       D 6      E  $11/\sqrt{3}$

9. How many pairs of positive integers  $(x, y)$  satisfy the equation  $\sqrt{x} - \sqrt{17} = \sqrt{y}$ ?

- A 0      B 1      C 2      D 17      E infinitely many

10. Positive integers  $x$  and  $y$  satisfy the equation:  $\sqrt{x + \frac{1}{2}\sqrt{y}} - \sqrt{x - \frac{1}{2}\sqrt{y}} = 1$ .  
Which of the following is a possible value of  $y$ ?

- A 5      B 6      C 7      D 8      E 9