Fractions (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. What is the value of $\frac{67\times(67+67)}{67}$?

A 8978 B 134 C 68 D 67 E 2

2. One quarter of a number is 24. What is one third of the original number?

A 6 B 8 C 32 D 72 E 96

3. A fair die has just been rolled five times − giving scores of 1, 2, 3, 4, 5 in that order.

How likely is it that the score on the next roll will be a 6?

A no chance B less than evens C evens

D better than evens E certain

4. On the first day after the flood, half of Noah's animals escaped. On the second day one third of the remainder wandered off. On the third day one quarter of the rest hopped it.

What fraction of Noah's original ménagerie was then left?

A $\frac{1}{24}$ B $\frac{1}{4}$ C $\frac{1}{3}$ D $\frac{1}{2}$ E $\frac{3}{4}$

5. Which of the following is midway between $\frac{1}{4}$ and $\frac{1}{8}$?

A $\frac{3}{16}$ B $\frac{1}{6}$ C $\frac{5}{24}$ D $\frac{1}{5}$ E $\frac{7}{32}$

6. Albert Einstein was standing on the station platform thinking about relativity when he noticed that he could see two station clocks. Each clock was digital, showing only hours and minutes. He observed that the display on one clock changed to the next minute 10 seconds before the correct time, whereas the display on the other clock changed to the next minute 10 seconds after the correct time.

For what fraction of the day did the clocks show the same time?

A $\frac{1}{6}$ B $\frac{1}{3}$ C $\frac{2}{3}$ D $\frac{5}{6}$ E $\frac{7}{6}$

7. What fraction of a 24-hour day does school take up, if school starts at 8:30am and finishes at 3:15pm?

A $\frac{9}{32}$ B $\frac{25}{96}$ C $\frac{13}{48}$ D $\frac{31}{96}$ E $\frac{18}{32}$

8. A solid wooden cube is painted blue on the outside. The cube is then cut into 27 smaller cubes of equal size.

What fraction of the total surface area of these new cubes is blue?

A $\frac{1}{6}$ B $\frac{1}{5}$ C $\frac{1}{4}$ D $\frac{1}{3}$ E $\frac{1}{2}$

9. Given that $x = \frac{111110}{111111}, y = \frac{222221}{222223}, z = \frac{333331}{333334}$, which of the following statements is correct?

A $x < y < z$ B $x < z < y$ C $y < z < x$ D $z < x < y$ E $y < x < z$

10. Sam is holding two lengths of rope by their mid-points. Pat chooses two of the loose ends at random and ties them together.

What is the probability that Sam now holds one untied length of rope and one tied loop of rope?

A $\frac{1}{2}$ B $\frac{1}{3}$ C $\frac{1}{4}$ D $\frac{1}{5}$ E $\frac{1}{6}$