Number (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. My local greengrocery, 'Apples and Pears' (known as 'AP' for short), charges 24p for the first apple bought, 23p for the second, 22p for the third, and so on, each apple costing 1p less than the one before.

How much change should I receive if I buy 9 apples and I give the shopkeeper £2?

A 24p   B 23p   C 22p   D 21p   E 20p

2. Granny has made another of her special super-heavy giant rock cakes. At her birthday party, five of the guests tried to guess the weight of the cake. Their guesses were 5040g, 5060g, 5110g, 5120g, and 5150g. Actually, none of them was right. Only two were more than 30 grams out, and they were out by 70g and 90g.

What was the weight of the cake?

A 5070g   B 5080g   C 5090g   D 5110g   E 5130g

3. If the following numbers are arranged in increasing order of size, which one is in the middle?

A 4.04   B 4.004   C 4.4   D 4.44   E 4.044

4. Gill is nine years old this year so she was fascinated to discover that an integer is divisible by 9 precisely when the sum of its digits is also divisible by 9. If the six-digit number "1* 3456" is to be a multiple of 9, what must the missing digit be?

A 2   B 3   C 5   D 8   E 9

5. Four of these points lie on a single straight line.

Which is the odd one out?

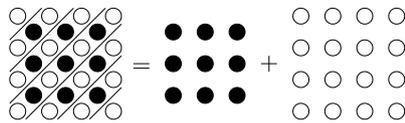A (−3, −3)   B (−2, −1)   C (2, 5)   D (4, 11)   E (5, 13)

6. It has been estimated that the mass of insects caught by spiders in a year in the UK is equal to the mass of the human population of the UK.

Assuming this population is 60 million and the average mass of a human is 70 kg, what is the mass, in tonnes, of insects caught by spiders per year in the UK?

A 4.2   B 42   C 4200   D 420 000   E 4 200 000

7. The diagram shows that $1 + 3 + 5 + 7 + 5 + 3 + 1 = 3^2 + 4^2$.

What is $1 + 3 + 5+…+1999 + 2001 + 1999 +…+5 + 3 + 1$?

A $999^2 + 1000^2$ B 1000^2+1001^2 C $1999^2 + 2000^2$

D 2000^2+2001^2 E none of these

8. I made just enough sticky treacle mixture to exactly fill a square tin of side 12 inches. But all I could find were two $8\frac{1}{2}$ inch square tins. How well would the mixture fit?

A easily   B just (with a teeny bit of room to spare)   C an exact fit

D nearly (with a small overflow)   E no way (major overflow)