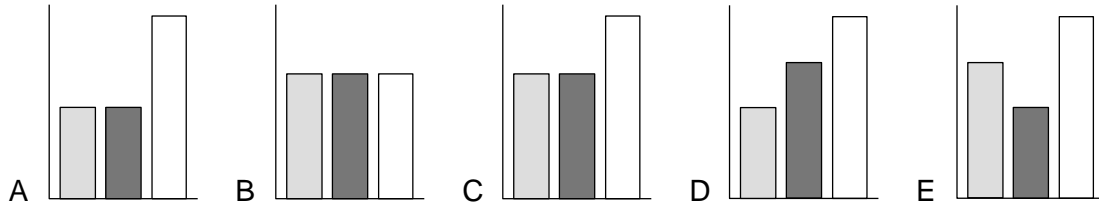
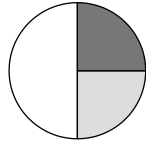


Statistics and combinatorics (J UKMT)

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. Which of the following bar charts could represent the data from the pie chart below?



2. A sheet of graph paper is placed with its x -axis pointing due East and its y -axis pointing due North. A sluggish snail starts at point $(0, 0)$ and slowly, but smoothly, slithers 1 unit North, 2 units East, 3 units South, 4 units West, 5 units North, 6 units East, 7 units South, 8 units West, 9 units North and (lastly!) 10 units East.

At which point does the snail finally arrive?

- A $(-6, 5)$ B $(5, 6)$ C $(6, 5)$ D $(6, -5)$ E $(-4, 5)$
3. I have some strange dice: the faces show the numbers 1 to 6 as usual, except that the odd numbers are negative (i.e. $-1, -3, -5$ in place of 1, 3, 5).

If I throw two such dice, which total cannot be achieved?

- A 3 B 4 C 5 D 7 E 8
4. It is well known that the Pobble has no toes, and that the three-toed sloth has 12 toes (3 on each of its 4 feet). A synchronised swimming team is made up of 7 Pobbles and 5 three-toed sloths.

What is the mean number of toes per team member?

- A 3 B 4 C 5 D 6 E 7
5. Yesterday, the reading on Granny's electricity meter was 098657. She was shocked to realize that all six of these digits are different.

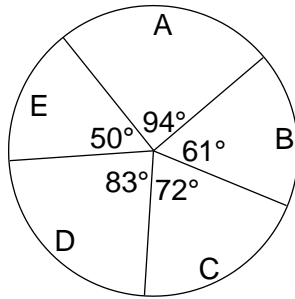
How many more units of electricity will she use before the next time all the digits are different?

- A 1 B 4 C 14 D 55 E 3688
6. The mean age of the four members of 'All Sinners' boy band is 19.

What is the mean age when an extra member who is 24 years old joins them?

- A 19 B 20 C 21 D 22 E 24

7. Which one of the sectors in the pie chart represents the **mode**?



A B C D E

8. The six-member squad for the Ladybirds five-a-side team consists of a 2-spot ladybird, a 10-spot, a 14-spot, an 18-spot, a 24-spot and a pine ladybird (on the bench). The average number of spots for members of the squad is 12.

How many spots has the pine ladybird?

A 4 B 5 C 6 D 7 E 8

9. A list of ten numbers contains two of each of the numbers 0, 1, 2, 3, 4. The two 0s are next to each other, the two 1s are separated by one number, the two 2s by two numbers, the two 3s by three numbers and the two 4s by four numbers. The list starts 3, 4,

What is the last number?

A 0 B 1 C 2 D 3 E 4

10. Teams from two schools contest a swimming match. Each school enters two swimmers for each event, with 5 points awarded for first place, 3 points for second place, 2 points for third place, and 1 point for fourth place. After six events no swimmer has been disqualified and the leading school's score is the reverse of the other school's score.

What is the difference between their two scores at this stage?

A 12 B 18 C 27 D 36 E can't be sure

11. Points P and Q have coordinates $(1, 4)$ and $(1, -2)$ respectively.

For which of the following possible coordinates of point R would triangle PQR **not** be isosceles?

A $(-5, 4)$ B $(7, 1)$ C $(-6, 1)$ D $(-6, -2)$ E $(7, -2)$

12. The list 2, 1; 3, 2; 2, 3; 1, 4; describes itself, since there are two 1s, three 2s, two 3s and one 4. There is exactly one other list of eight numbers containing only the numbers 1, 2, 3, and 4 that, in the same way, describes the numbers of 1s, 2s, 3s and 4s in that order.

What is the total number of 1s and 3s in this other list?

A 2 B 3 C 4 D 5 E 6