Topic 11 Probability (Post-TT) [51]

1.

A bag of sweets contains 5 toffees, 3 chocolates and 2 mints.

Emmie and Sophie each pick one sweet at random.

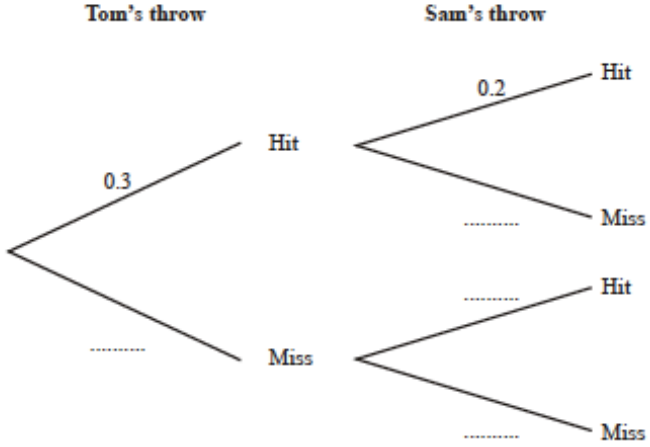
What is the probability that they pick sweets of the same kind?

(Total 4 marks)

2.

Tom and Sam take turns to throw a dart at a target.
The probability that Tom hits the target is 0.3
The probability that Sam hits the target is 0.2

(a) Copy and complete the tree diagram.



(1)

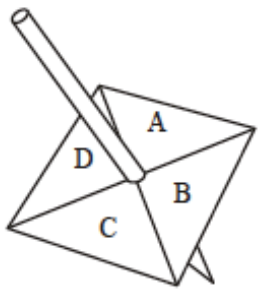
(b) What is the probability that Tom and Sam both hit the target?

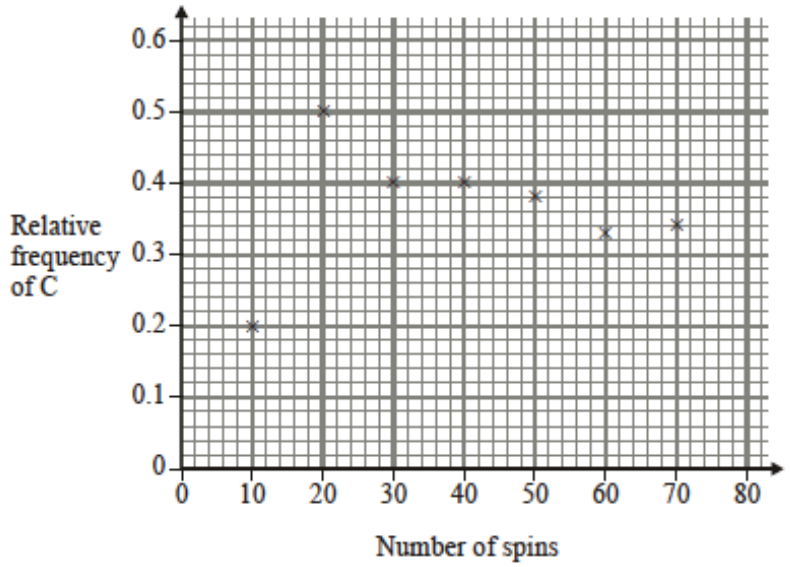
(2)

(Total 3 marks)

3. **N.B. For (b), state the coordinates of the point on the graph rather than plotting it.**

Julie has a square-shaped spinner with the letters A, B, C and D on it.
She spins the spinner and records the letter on which the spinner lands.
She plots the relative frequency of the letter C after every 10 spins.





(a) How many times did the letter C occur in the first 40 spins?

(2)

(b) After 80 spins the letter C occurred 30 times.
Plot the relative frequency for 80 spins on the diagram.

(2)

(c) Is the spinner biased? Give a reason for your answer.

(1)
(Total 5 marks)

4.

Ann picks a 4-digit number.

The first digit is **not** zero.

The 4-digit number is a multiple of 5

How many different 4-digit numbers could she pick?

[3 marks]

5.

In Britain the probability of a 17 year old passing the driving test at the first attempt is 0.6
Three people are chosen at random from the population of 17 year olds in Britain who are about to take their driving test.

What is the probability that exactly two of them pass the driving test at the first attempt?

(Total 3 marks)

6.

A bucket contains tennis balls which are identical apart from their colour.
There are 5 yellow balls, 3 white balls and 2 green balls in the bucket.

Martina chooses two of the balls at random and without replacement.
What is the probability that the balls are the same colour?

(Total 5 marks)

7.

A coin is rolled onto a grid of squares.

It lands randomly on the grid.

To win, the coin must land completely within one of the squares.

Meera and John each roll the coin a number of times and record their results.

	Number of wins	**Number of losses**
Meera	6	44
John	28	72

(a) Work out **two** different estimates for the probability of winning.

[2 marks]

(b) Which of your estimates is the better estimate for the probability of winning?

Give a reason for your answer.

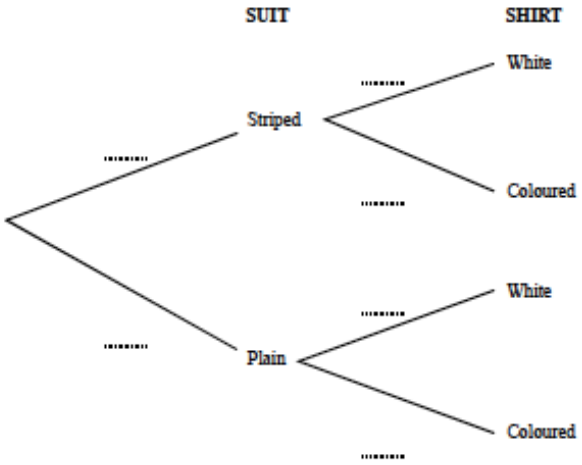
[1 mark]

8.

Greg has four suits, one is striped and the other three are plain.
He also has ten shirts, four are white and the other six are coloured.

Greg chooses a suit at random and then chooses a shirt at random.

(a) Copy and complete the following tree diagram.



(3)

(b) Calculate the probability that Greg chooses a plain suit and a coloured shirt.

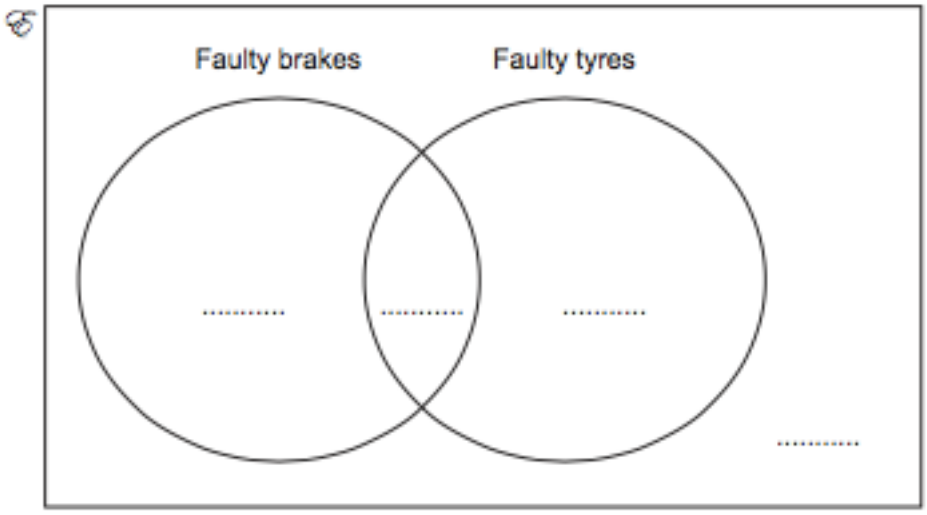
(2)
(Total 5 marks)

9.

A mechanic tests the brakes and tyres of 60 cars.
A car passes the test if both the brakes **and** the tyres are not faulty.

- 18 cars pass the test.
- 20 cars have faulty brakes.
- 29 cars have faulty tyres.

(a) Put this information into the Venn diagram below.



[3]

(b) One of these cars is chosen at random.
What is the probability that this car has faulty brakes, given that the car failed the test?

(2)
(Total 5 marks)

10.

A bag contains 20 balls.
Every ball is red or blue or green.

(a) Anjum takes a ball at random from the bag.
She notes its colour and replaces it.

She repeats this process 20 times.
8 of the balls she takes are red.

Anjum says

There are 8 red balls in the bag.

Explain why she may be wrong.

(b) Dan takes a ball at random from the bag.
He notes its colour and replaces it.

He repeats this process 120 times.

His results are shown in the table.

Colour	Red	Blue	Green
Frequency	66	47	7

Estimate the number of balls of each colour in the bag.

(Total 4 marks)

11.

A bag contains 4 red, 3 yellow and 2 purple discs.
A disc is taken, at random, from the bag and is **not** replaced.
A second disc is then taken, at random, from the bag.

Calculate the probability that the two discs taken from the bag are

(a) both red,

(2)

(b) different colours.

(3)
(Total 5 marks)

12.

There are 5 blue sweets, 3 red sweets, 2 green sweets and no other sweets in a box.

Waleed chooses 3 sweets at random from the box and puts them in his pocket.

(a) Waleed calculates the probability of choosing 3 red sweets as

$$\frac{3}{10} \times \frac{3}{10} \times \frac{3}{10} = \frac{27}{1000}.$$

What incorrect assumption has he made?

(1)

(b) Show that the probability of Waleed choosing three sweets of the same colour is $\frac{11}{120}$. **[5]**