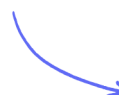


Practice Paper 5 (Probability & Statistics 1)

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Total Marks

/50

- 1 (a)** Derek is watching cars pass his window. He knows there's a 25% chance that a passing car will be blue.

Find the probability that the first blue car Derek sees is the 8th car to pass his window.

(2 marks)

- (b)** Find the probability that Derek will see a blue car within the first 8 cars that pass his window.

(2 marks)

- (c)** Find the expected number of cars to pass Derek's window until he sees his first blue car.

(1 mark)

- 2** The Mythical Creatures Research Centre measures the heights, h , of nine unicorns to the nearest centimetre. The heights are shown below:

276 219 198 154 213 243 192 161 218

Find the mean and standard deviation of the nine heights.

(4 marks)

- 3 (a)** A bag contains 12 orange marbles, 8 purple marbles and 5 red marbles. A marble is taken from the bag and its colour is recorded, but it is not replaced in the bag. A second marble is then taken from the bag and its colour is recorded.

Draw a tree diagram to represent this information.

(4 marks)

- (b)** Find the probability that:

- i) both marbles are different colours
- ii) the second marble is purple, given that both marbles are different colours.

(4 marks)

- 4 (a)** The discrete random variable X has the probability distribution shown in the following table:

x	-2	0	2	4	6
$P(X = x)$	p	$\frac{1}{2}$	q	$\frac{1}{15}$	q

It is given that $E(X) = 0$.

Show that $p - 4q = \frac{2}{15}$.

(2 marks)

- (b)** Write down a second equation involving p and q .

(1 mark)

- (c)** Hence find the values of p and q .

(2 marks)

- (d)** Find $\text{Var}(X)$.

(2 marks)

5 (a) Three letters are chosen at random from the letters in the word REVISION. Find the number of ways that the selection may contain

- (i) no Is
- (ii) exactly one I
- (iii) two Is.

(4 marks)

(b) Write down the number of arrangements of three letters chosen at random from the word REVISION that have exactly one letter I.

(2 marks)

- 6 (a)** Riley is going on holiday and is allowed to bring along four of his toys. At home he has nine different plastic dinosaurs, six different toy cars, and five different wooden reptiles.

How many different selections of his toys can he make if he chooses at least one of each type of toy?

(4 marks)

- (b)** Riley can't decide so he persuades his parents to allow him to bring along five toys instead.

Given that he brings more plastic dinosaurs than any other type of toy, how many different selections can he make now?

(4 marks)

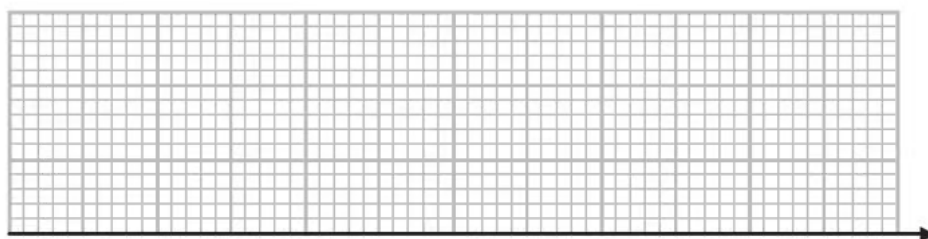
- 7 (a)** A taxi firm, JustDrive, records data on the amount of time, to the nearest minute, that customers had to wait before their taxis arrived. A random sample of 20 times is given below:

6	7	16	30	24
27	20	7	5	8
20	24	27	12	34
32	31	6	19	14

Find the median and interquartile range of the waiting times.

(3 marks)

- (b)** On the grid, draw a box plot for the information given above.



(3 marks)

- 8** The weight, W kg, of the feed in a sack of pheasant feed produced by a certain manufacturer is modelled as $W \sim N\left(20, \frac{1}{3600}\right)$.

Roger buys twelve sacks of the manufacturer's pheasant feed to feed to the pheasants who have begun showing up at his backyard bird feeding station.

Find the probability that all twelve sacks contain feed with a weight that is within 35 g of 20 kg.

(6 marks)