Pearson Edexcel A Level Mathematics 9MA0

Statistics – Probability

Time allowed: 45 minutes

School: www.CasperYC.club

Name:

Teacher:

Question	Points	Score
1	10	
2	8	
3	11	
4	10	
5	11	
Total:	50	

How I can achieve better:

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1. The table below shows the number of gold, silver and bronze medals won by two teams in an athletics competition.

	Gold	Silver	Bronze
Team A	29	17	18
Team C	21	23	17

The events G, S and B are that a medal is gold, silver or bronze respectively. Let A be the event that team A won a medal and C team C won a medal. A medal winner is selected at random. Find

(a) $\Pr(G)$ [2]

(b) $\Pr([AS]')$ [2]

(c) Explain, showing your working, whether or not events S and A are statistically independent. Give reasons for your answer. [2]

(d) Determine whether or not events B and C are mutually exclusive. Give a reason for your answer. [2]

(e) Given that 30% of the gold medal winners are female, 60% of the silver medal winners are female and 40% of the bronze medal winners are female, find the probability that a randomly selected medal winner is female. [2]

Total: 10

2. A mechanic carried out a survey on the defects of cars he was servicing. He found that the probability of a car needing a new tyre is 0.33 and that a car needing a new tyre has a probability of 0.7 of needing tracking. A car not needing a new tyre has a probability of 0.04 of needing tracking.

   (a) Draw a tree diagram to represent this information. [3]

   (b) Find the probability that a randomly chosen car has exactly one of the two defects, needing a new tyre or needing tracking. [2]

   The mechanic also finds that cars need new brake pads with probability 0.35 and that this is independent of needing new tyres or tracking. A car is chosen at random.

   (c) Find the probability that the car has at least one of these three defects. [2]

   (d) What advice would you give to motorists? [1]

Total: 8

3.

$$\Pr(E) = 0.25 \quad \text{and} \quad \Pr(F) = 0.4 \quad \text{and} \quad \Pr(EF) = 0.12$$

(a) Find $\Pr(E'|F')$. [2]

(b) Explain, showing your working, whether or not E and F are statistically independent. [2]

Give reasons for your answer.

The event G has $\Pr(G) = 0.15$.

The events E and G are mutually exclusive and the events F and G are independent.

(c) Draw a Venn diagram to illustrate the events E, F and G, giving the probabilities for each region. [5]

(d) Find $\Pr([FG]')$. [2]

Total: 11

4. In a factory, three machinists, Amy, Brad and Ceri, are used to sew shirts.

   Amy sews 40% of the shirts.

   Brad sews 35% of the shirts.

   Ceri sews the rest of the shirts.

   It is known that 5% of the shirts sewn by Amy are faulty, 2% of the shirts sewn by Brad are faulty and 3% of the shirts sewn by Ceri are faulty.

   (a) Draw a tree diagram to illustrate all the possible outcomes and associated probabilities. [3]

   A shirt is selected at random.

   (b) Calculate the probability that the shirt is sewn by Brad and is not faulty. [2]

   (c) Calculate the probability that the shirt is faulty. [2]

   (d) Given that the shirt is faulty, find the probability that it was not sewn by Ceri. [3]

Total: 10

5. A group of students were surveyed by a principal and $\frac{2}{3}$ were found to always hand in assignments on time. When questioned about their assignments $\frac{3}{5}$ said they always start their assignments on the day they are issued and, of those who always start their assignments on the day they are issued, $\frac{11}{20}$ hand them in on time.

   (a) Draw a tree diagram to represent this information. [3]

   (b) Find the probability that a randomly selected student:

      i. always start their assignments on the day they are issued and hand them in on time. [2]

      ii. does not always hand in assignments on time and does not start their assignments on the day they are issued. [4]

   (c) Determine whether or not always starting assignments on the day they are issued and handing them in on time are statistically independent. Give reasons for your answer. [2]

Total: 11