4.19 Probability (Higher): 1-hour Pack

EDEXCEL 1MA1 · Calculator allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 P(Idris wins a prize in the tombola) = 2/9. Write down the probability that Idris does not win a prize.

(Total for Question 1 is 1 mark)

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2 A coin is flipped twice. List all possible outcomes using H for heads and T for tails, and then write down the probability of getting exactly one head.

(a) List all possible outcomes. **(1)**

.....

(b) Work out the probability of exactly one head. **(2)**

.....

(Total for Question 2 is 3 marks)

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3 A spinner can land on red, blue, green or yellow. The table shows the probability of each colour in terms of x.

Colour	Red	Blue	Green	Yellow
Probability	2x	3x	x	4x

(a) Work out the value of x. **(2)**

.....

(b) Work out P(blue). **(1)**

.....

(c) The spinner is spun 300 times. Work out the expected number of times it lands on green. **(2)**

.....

(Total for Question 3 is 5 marks)

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4 60 students were asked whether football or tennis is their favourite sport. The incomplete two-way table shows some of the results.

	Football	**Tennis**	**Total**
Boys	18	16	34
Girls	20	?	26
Total	?	22	60

	Football	Tennis	Total
Boys	18	16	34
Girls	20	?	26
Total	?	22	60

(a) Complete the two-way table. **(2)**

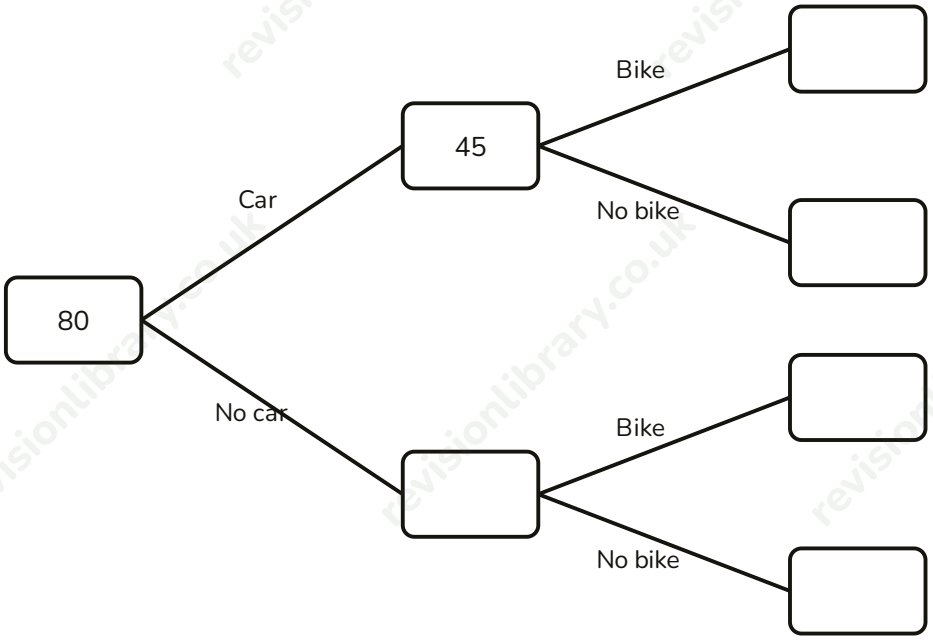
(b) One student is picked at random from all 60 students. Find the probability that the student is a girl who prefers football. **(2)**

.....

(Total for Question 4 is 4 marks)

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5 80 adults were asked whether they own a car and whether they own a bike. 45 of the adults own a car. Of the adults who own a car, 18 also own a bike. Of the adults who do not own a car, 21 own a bike.



(a) Complete the frequency tree to show this information. **(3)**

(b) Work out the probability that a randomly selected adult owns a bike. **(2)**

.....

(Total for Question 5 is 5 marks)

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6 A biased spinner has P(lands on blue) = 0.3. The spinner is spun twice. Find the probability that it lands on blue both times.

(Total for Question 6 is 2 marks)

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7 Jakub spins a spinner 80 times. It lands on green 24 times.

(a) Calculate the relative frequency of green. **(1)**

.....

(b) Jakub is going to spin the spinner a further 220 times. Estimate how many more times it will land on green. **(2)**

(Total for Question 7 is 3 marks)

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8 Spinner X can land on red or green. Spinner Y can land on 1, 2 or 3. Both spinners are spun once. List all the possible outcomes.

(Total for Question 8 is 2 marks)

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9 A fair dice is numbered 1 to 20. It is rolled once. Find the probability that the number is a multiple of 5 or a multiple of 8.

(Total for Question 9 is 2 marks)

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10 The probability that Elena is late for school on any given day is 0.15. Assume this probability is the same and independent each day. Elena has school on each of the next 3 days. Work out the probability that she is late on at least one of these 3 days.

(Total for Question 10 is 3 marks)

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11 A holiday company surveyed 120 travellers. 70 of the travellers were adults and the rest were children. 45 of the adults travelled by plane and the rest of the adults travelled by coach. Of the children, 28 travelled by coach and the rest travelled by plane.

(a) Use this information to draw and complete a two-way table showing adults and children against plane and coach. **(4)**

(b) One traveller is picked at random from all 120 travellers. Find the probability that the traveller is a child who travelled by plane. **(2)**

(Total for Question 11 is 6 marks)

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12 A fair five-sided spinner is numbered 1, 2, 3, 4, 5. It is spun twice and the two scores are added together. Sara says, 'The probability of getting a total of 6 is the same as the probability of getting a total of 10.' Determine whether Sara is correct. You must show your working.

(Total for Question 12 is 4 marks)

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13 A box contains 4 white balls and 6 black balls. Two balls are selected at random with replacement. Let X be the number of white balls selected.

(a) State the probability distribution for X (X can be 0, 1 or 2). **(3)**

(b) Find E(X), the expected number of white balls in the two draws. **(3)**

(Total for Question 13 is 6 marks)

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Mark scheme · 4.19 Probability (Higher): 1-hour Pack

Question 1

7/9 oe **B1**

Answer: 7/9

Question 2

(a) list: HH, HT, TH, TT (in any order) oe **B1**

(a) Answer: HH, HT, TH, TT

(b) 2 favourable outcomes (HT, TH) shown out of 4 **M1**

(b) 1/2 cao **A1**

(b) Answer: 1/2

Question 3

(a) 2x + 3x + x + 4x = 1 oe **M1**

(a) x = 0.1 cao **A1**

(a) Answer: x = 0.1

(b) 0.3 cao, ft their x **B1**

(b) Answer: 0.3

(c) 0.1 x 300 oe, ft their x **M1**

(c) 30 cao **A1**

(c) Answer: 30

Question 4

(a) Girls Tennis = 6 **B1**

(a) Total Football = 38 **B1**

(a) Answer: Girls Tennis = 6, Total Football = 38

(b) 20/60 oe **M1**

(b) 1/3 cao **A1**

(b) Answer: 1/3

Question 5

(a) Car branch: Bike = 18, No bike = 27 **B1**

(a) No car branch: Bike = 21, No bike = 14 **B1**

(a) No car total = 35 shown correctly **B1**

(a) Answer: Car (45): Bike 18, No bike 27. No car (35): Bike 21, No bike 14.

(b) 18 + 21 oe, ft their tree **M1**

(b) 39/80 cao **A1**

(b) Answer: 39/80

Question 6

0.3 x 0.3 **M1**

0.09 cao **A1**

Answer: 0.09

Question 7

(a) 0.3 oe (accept 3/10, 30%) **B1**

(a) Answer: 0.3

(b) 0.3 x 220 oe, ft their (a) **M1**

(b) 66 cao **A1**

(b) Answer: 66

Question 8

at least 4 correct outcomes shown **M1**

all 6 outcomes listed with no repeats: (red,1), (red,2), (red,3), (green,1), (green,2), (green,3) **A1**

Answer: (red,1), (red,2), (red,3), (green,1), (green,2), (green,3)

Question 9

identifies 4 multiples of 5 (5, 10, 15, 20) and 2 multiples of 8 (8, 16), with no overlap between them **M1**

3/10 oe cao **A1**

Answer: 3/10

Question 10

identifies strategy P(at least one late day) = 1 - P(no late days in 3 days) **P1**

0.85^3 oe (= 0.614125) **M1**

0.385875 oe, awrt 0.386, cao **A1**

Answer: 0.385875 (awrt 0.386)

Question 11

(a) number of children = 50 **B1**

(a) adults who travelled by coach = 25 **B1**

(a) children who travelled by plane = 22 **B1**

(a) correct row and column totals throughout: coach total 53, plane total 67, grand total 120 **B1**

(a) Answer: Adults: plane 45, coach 25 (total 70). Children: plane 22, coach 28 (total 50). Totals: plane 67, coach 53 (grand total 120).

(b) 22/120 oe, ft their (a) **M1**

(b) 11/60 cao ft **A1**

(b) Answer: 11/60

Question 12

identifies all 5 pairs giving a total of 6: (1,5), (2,4), (3,3), (4,2), (5,1) **M1**

identifies the 1 pair giving a total of 10: (5,5) **M1**

P(total=6) = 5/25 = 1/5 and P(total=10) = 1/25, both correct **A1**

correct conclusion: Sara is incorrect, since 1/5 does not equal 1/25 cso **C1**

Answer: Sara is incorrect

Question 13

(a) identify p(white) = 4/10 = 2/5 and p(black) = 3/5 **M1**

(a) $p(0) = (3/5)^2 = 9/25$ and $p(2) = (2/5)^2 = 4/25$ **M1**

(a) p(1) = 1 - p(0) - p(2) = 12/25 cao **A1**

(a) Answer: P(X=0)=9/25, P(X=1)=12/25, P(X=2)=4/25

(b) use E(X)=sum xP(x) or note linearity E(X)=2 x p(white) **M1**

(b) compute E(X)=0*(9/25)+1*(12/25)+2*(4/25)=20/25 **A1**

(b) final simplified value 4/5 cao **A1**

(b) Answer: 4/5

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