2.12 Probability (Foundation): 1-hour Pack

EDEXCEL 1MA1 · Calculator allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A day of the week is chosen at random from the seven days Monday to Sunday.

(a) Write down the probability that the day chosen begins with the letter S. **(1)**

.....

(b) Write down the probability that the day chosen is a weekday (Monday to Friday). **(1)**

.....

(Total for Question 1 is 2 marks)

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2 150 raffle tickets are sold, numbered 1 to 150. Sheila buys ticket number 72. One winning ticket is chosen at random.

(a) Work out the probability that Sheila's ticket is the winning ticket. **(1)**

.....

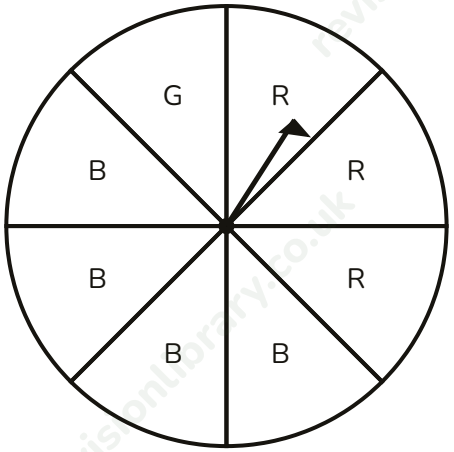
(b) Work out the probability that the winning ticket number is a multiple of 10. **(2)**

.....

(Total for Question 2 is 3 marks)

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3 A fair spinner has 8 equal sections. 3 sections are red, 4 sections are blue and 1 section is green. The spinner is spun once.



(a) Write down the probability that the spinner lands on green. **(1)**

.....

(b) Work out the probability that the spinner lands on red or blue. **(1)**

.....

(c) Work out the probability that the spinner does not land on blue. **(1)**

.....

(Total for Question 3 is 3 marks)

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4 A bag contains 12 counters. 5 of the counters are yellow, 4 of the counters are purple and the rest of the counters are white. A counter is taken from the bag at random. Work out the probability that the counter is white.

(Total for Question 4 is 2 marks)

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5 The probability that it will rain tomorrow is 0.65.

(a) Work out the probability that it will not rain tomorrow. **(1)**

.....

(b) Assuming the probability stays the same, work out an estimate for the number of days without rain over the next 40 days. **(2)**

.....

(Total for Question 5 is 3 marks)

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6 Ben plays a card game 25 times. He wins 15 of these games.

(a) Work out the relative frequency of Ben winning a game. **(1)**

.....

(b) Ben is about to play the game again. Estimate the probability that Ben wins this game. **(1)**

(Total for Question 6 is 2 marks)

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7 The probability that a customer at a cafe buys a hot drink is 0.6.

(a) Work out the probability that a customer does not buy a hot drink. **(1)**

.....

(b) There are 45 customers at the cafe today. Work out an estimate for the number of these customers who buy a hot drink. **(2)**

.....

(Total for Question 7 is 3 marks)

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8 A fair spinner has 12 equal sections, numbered 1 to 12. The spinner is spun once.

(a) Find the probability that the spinner lands on a multiple of 4. **(1)**

.....

(b) Find the probability that the spinner lands on a factor of 12. **(1)**

.....

(c) Find the probability that the spinner lands on a square number. **(1)**

.....

(Total for Question 8 is 3 marks)

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9 The two-way table shows information about 45 Year 11 students and whether they play a musical instrument.

	Play instrument	Do not play	Total
Boys	9	?	25
Girls	?	13	?
Total	?	?	45

Some values in the table are missing (shown as ?).

(a) Complete the two-way table. **(3)**

(b) One student is picked at random from the 45. Find the probability that the student is a girl who plays an instrument. **(1)**

.....

(Total for Question 9 is 4 marks)

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10 A bag contains only red, blue and green counters. P(red) = 0.25. The probability that a counter is blue is twice the probability that a counter is green.

(a) Find P(green). **(2)**

.....

(b) Find P(blue). **(1)**

.....

(c) There are 60 counters in the bag. Work out how many more blue counters than green counters there are. **(2)**

.....

(Total for Question 10 is 5 marks)

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11 A greengrocer checks a random sample of 50 apples from a large delivery of 2000 apples and finds that 4 are bruised.

(a) Estimate the probability that an apple from the delivery is bruised. **(1)**

(b) Use your answer to part (a) to estimate the number of apples in the delivery that are NOT bruised. **(2)**

(c) The greengrocer then checks a second random sample of 40 apples from the same delivery and finds that 2 are bruised. Use this second sample to find another estimate of the probability that an apple is bruised, and comment on what this suggests about the estimate found in part (a). **(2)**

(Total for Question 11 is 5 marks)

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12 Priya is working out the probability of rolling at least one 6 when a fair six-sided dice is rolled twice. Her working is shown below:

P(at least one 6) = P(6) + P(6) = 1/6 + 1/6 = 2/6 = 1/3

(a) Identify the error in Priya's method. **(1)**

(b) Work out the correct probability that at least one 6 is rolled. **(3)**

(Total for Question 12 is 4 marks)

13 In a class of 50 students, x study Biology only, 2x study Chemistry only, 8 study both Biology and Chemistry, and 9 study neither subject. Let B be the event that a student studies Biology and C be the event that a student studies Chemistry.

(a) Show that 3x + 17 = 50, and hence find the value of x. **(3)**

(b) Find P(B), the probability that a randomly selected student studies Biology. **(2)**

(c) Two students are then chosen at random, without replacement, from the whole class of 50 students. Find the probability that both students study neither subject. **(2)**

(Total for Question 13 is 7 marks)

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Mark scheme · 2.12 Probability (Foundation): 1-hour Pack

Question 1

(a) 2/7 oe **B1**

(a) Answer: 2/7

(b) 5/7 oe **B1**

(b) Answer: 5/7

Question 2

(a) 1/150 oe **B1**

(a) Answer: 1/150

(b) 15 identified as the number of multiples of 10 from 1 to 150 (10, 20, ..., 150) **M1**

(b) 1/10 oe cao **A1**

(b) Answer: 1/10

Question 3

(a) 1/8 oe **B1**

(a) Answer: 1/8

(b) 7/8 oe **B1**

(b) Answer: 7/8

(c) 1/2 oe (accept 4/8, 0.5) **B1**

(c) Answer: 1/2

Question 4

12 - 5 - 4 (= 3) to find the number of white counters **M1**

1/4 oe (accept 3/12, 0.25, 25%) **A1**

Answer: 1/4

Question 5

(a) 0.35 cao **B1**

(a) Answer: 0.35

(b) 0.35 x 40, ft their (a) **M1**

(b) 14 cao **A1**

(b) Answer: 14 days

Question 6

(a) 0.6 oe (accept 15/25, 3/5, 60%) **B1**

(a) Answer: 0.6

(b) 0.6 oe, ft their (a) **B1**

(b) Answer: 0.6

Question 7

(a) 0.4 cao **B1**

(a) Answer: 0.4

(b) 0.6 x 45 **M1**

(b) 27 cao **A1**

(b) Answer: 27

Question 8

(a) 3/12 oe (1/4) **B1**

(a) Answer: 1/4

(b) 6/12 oe (1/2) **B1**

(b) Answer: 1/2

(c) 3/12 oe (1/4) **B1**

(c) Answer: 1/4

Question 9

(a) Boys who do not play = 16 (25 - 9) **B1**

(a) Girls total = 20 (45 - 25) and Girls who play = 7 (20 - 13) **B1**

(a) Total who play = 16 (9 + 7) and Total who do not play = 29 (16 + 13) **B1**

(a) Answer: Boys not-play = 16; Girls total = 20, Girls play = 7; Total play = 16, Total not-play = 29

(b) 7/45 ft from part (a) **B1**

(b) Answer: 7/45

Question 10

(a) 0.25 + g + 2g = 1 (oe: 3g = 0.75) **M1**

(a) 0.25 cao **A1**

(a) Answer: 0.25

(b) 0.5 ft from part (a) **B1**

(b) Answer: 0.5

(c) 0.5 x 60 (= 30) and 0.25 x 60 (= 15) both found, ft their parts (a) and (b) **M1**

(c) 15 cao **A1**

(c) Answer: 15

Question 11

(a) 4/50 oe (2/25, 0.08) **B1**

(a) Answer: 2/25

(b) 1 - 2/25 (= 23/25) x 2000, ft from part (a) **M1**

(b) 1840 cao **A1**

(b) Answer: 1840

(c) 2/40 = 0.05 found **M1**

(c) valid comparison-based comment, e.g. the two samples give different estimates (0.08 and 0.05), so neither sample alone is fully reliable and a larger combined sample would give a more trustworthy estimate, oe **A1**

(c) Answer: The second sample gives an estimate of 0.05, which is lower than the 0.08 from part (a); the two estimates disagree, showing that a sample of 50 (or 40) may not be large enough to give a fully reliable estimate

Question 12

(a) simply adding the two single-roll probabilities is not a valid method for 'at least one' across two rolls, because it does not correctly account for the outcome where a 6 occurs on both rolls, oe **B1**

(a) Answer: Priya cannot find P(at least one 6) by adding the two single-roll probabilities; that method does not correctly handle the outcome where both rolls are 6

(b) P(no six on either roll) = 5/6 x 5/6 (= 25/36) **M1**

(b) 1 - 25/36 **M1**

(b) 11/36 cao **A1**

(b) Answer: 11/36

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Question 13

(a) x + 2x + 8 + 9 = 50 (all four regions summed to the total) **M1**

(a) correctly simplifies to 3x + 17 = 50 **M1**

(a) x = 11 cso **A1**

(a) Answer: x = 11

(b) (11 + 8)/50, ft their part (a) **M1**

(b) 19/50 oe (0.38) **A1**

(b) Answer: 19/50

(c) 9/50 x 8/49 **M1**

(c) 72/2450 oe (36/1225, awrt 0.0294) **A1**

(c) Answer: 36/1225

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