5.1 Probability: Test Pack

Calculator allowed · about 60 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A spinner can only land on red, blue or green. P(red) = 0.3 and P(blue) = 0.45. Find P(green).

(1)

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2 A car dealership sold 225 cars last month. 18 of the cars sold were electric. Find the probability, as a percentage, that a randomly chosen car sold last month was electric.

(2)

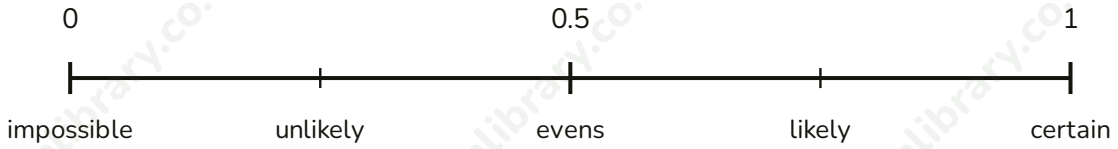
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3 A raffle has 250 tickets. Ali buys 5 tickets. Write his probability of winning as a fraction in simplest form.

(1)

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4 The probability scale below is used to describe how likely an event is.



(a) Write the probability of a certain event as a number. **(1)**

(b) Write the probability of an impossible event as a number. **(1)**

(c) An event is described as 'evens'. Write this probability as a fraction. **(1)**

(d) A weather app shows a 65% chance of rain tomorrow. Write this probability as a decimal. **(1)**

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5 Choose the correct letter for each question below.

(a) Which of these cannot be a probability? **(1)**

- [ ] A) 0
- [ ] B) 0.5
- [ ] C) 1
- [ ] D) 1.2

(b) A probability of 3/4 is the same as which percentage? **(1)**

- [ ] A) 34%
- [ ] B) 43%
- [ ] C) 75%
- [ ] D) 25%

(c) Which of these events is impossible for a normal fair six-sided dice numbered 1 to 6? **(1)**

- [ ] A) Rolling a 7
- [ ] B) Rolling an even number
- [ ] C) Rolling a 1
- [ ] D) Rolling a number less than 6

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6 A survey asked 90 students at a school in Leeds to name their favourite sport from football, tennis or swimming. Some of the results are shown in the table below.

	Football	Tennis	Swimming	Total
Boys	25	10		50
Girls	8		12	40
Total				

(a) Complete the table, showing the number of boys who chose swimming, the number of girls who chose tennis, and the totals for each sport and the grand total. **(3)**

(b) A student is picked at random from all those surveyed. Find P(the student is a girl who chose tennis). **(2)**

.....

(c) Find P(the student did not choose football). **(2)**

.....

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7 A fair coin (Heads, Tails) is flipped and, at the same time, a fair spinner with three equal sections labelled 1, 2 and 3 is spun.

(a) List all the possible outcomes (the sample space) for the coin and the spinner together. **(2)**

(b) Find P(Tails and an odd number). **(2)**

(c) Find P(Heads or the number 2). **(2)**

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8 A card is chosen at random from a standard pack of 52 playing cards. Work out the probability that it is a king.

(2)

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9 A bag contains 20 counters. 0 of them are purple and the rest are orange. A counter is taken at random.
Use one of the words impossible, unlikely, an even chance, likely or certain to describe the probability that the counter is purple.

(1)

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10 A bag contains 8 yellow, 7 purple sweets. One is taken at random. Write down the probability that it is yellow. Give your answer as a fraction in its simplest form.

(2)

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11 Tom suspects a dice is biased. He rolls it 150 times. His results are shown in the table below.

Number	1	2	3	4	5	6	**Total**
Frequency	20	18	22	19	41	30	**150**

(a) Estimate the probability that the dice lands on 5. **(1)**

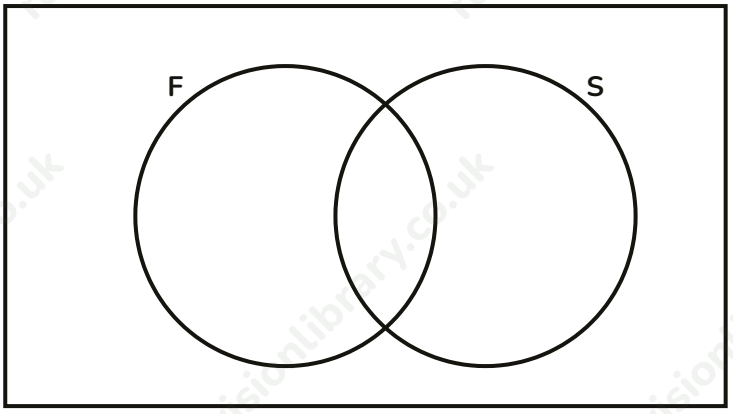
(b) Give a reason to support Tom's suspicion that the dice is biased. **(1)**

(c) Using Tom's data, estimate how many times the dice would land on 5 in 500 rolls. **(2)**

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12 In a class of 30 students, 18 study French (F) and 14 study Spanish (S). 7 students study both languages.

Class of 30 students



(a) Draw a Venn diagram to show this information, and find the number of students who study French only. **(2)**

(b) Find the number of students who study neither language. **(2)**

.....

(c) A student is picked at random from the class. Find P(the student studies Spanish only). **(1)**

.....

(d) Find P(the student studies at least one of the two languages). **(2)**

.....

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13 A drawer contains 5 black socks and 3 white socks. Two socks are taken at random, one after the other, without replacement.

(a) Find P(both socks are black). **(2)**

(b) Find P(one sock of each colour is taken, in either order). **(3)**

(c) Find P(at least one white sock is taken). **(2)**

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Mark scheme · 5.1 Probability: Test Pack

A correct answer earns full marks unless the question asks for working, a method, proof or explanation.

Question 1

0.25 cao **B1**

Answer: **0.25**

Question 2

form fraction 18/225 **M1**

8% cao **A1**

Answer: **8%**

Question 3

1/50 cao oe (e.g. 5/250) **B1**

Answer: **1/50**

Question 4

(a) 1 cao **B1**

(a) Answer: **1**

(b) 0 cao **B1**

(b) Answer: **0**

(c) 1/2 cao oe (e.g. 0.5) **B1**

(c) Answer: **1/2**

(d) 0.65 cao **B1**

(d) Answer: **0.65**

Question 5

(a) D cao **B1**

(a) Answer: **D**

(b) C cao **B1**

(b) Answer: **C**

(c) A cao **B1**

(c) Answer: **A**

Question 6

(a) Boys swimming = 15 **B1**

(a) Girls tennis = 20 **B1**

(a) Totals: football 33, tennis 30, swimming 27, grand total 90, all cao **B1**

(a) Answer: **Boys swimming = 15, Girls tennis = 20; totals: football 33, tennis 30, swimming 27, grand total 90**

(b) 20/90 seen, ft from part a **M1**

(b) 2/9 cao oe **A1**

(b) Answer: **2/9**

(c) 1 - 33/90, ft from part a **M1**

(c) 19/30 cao oe (e.g. 57/90) **A1**

(c) Answer: **19/30**

Question 7

(a) At least 4 of the 6 outcomes listed correctly **M1**

(a) All 6 outcomes correct: (H,1) (H,2) (H,3) (T,1) (T,2) (T,3) oe **A1**

(a) Answer: **(H,1), (H,2), (H,3), (T,1), (T,2), (T,3)**

(b) Identifies outcomes (T,1) and (T,3), ft from part a **M1**

(b) 1/3 cao oe (e.g. 2/6) **A1**

(b) Answer: **1/3**

(c) Identifies the 4 outcomes (H,1) (H,2) (H,3) (T,2) with no double counting, ft from part a **M1**

(c) 2/3 cao oe (e.g. 4/6) **A1**

(c) Answer: **2/3**

Question 8

4/52 seen **M1**

1/13 cao **A1**

Answer: **1/13**

Question 9

impossible cao **B1**

Answer: **impossible**

Question 10

8 out of 15 or 8/15 seen **M1**

8/15 cao **A1**

Answer: **8/15**

Question 11

(a) 41/150 cao oe awrt 0.27 **B1**

(a) Answer: **41/150 (awrt 0.27)**

(b) Compares 41/150 (approx 0.27) with the expected probability of 1/6 (approx 0.17) for a fair dice and notes 5 occurs much more often than expected oe **B1**

(b) Answer: **5 occurred far more often than the 1/6 expected for a fair dice, suggesting bias.**

(c) 41/150 x 500, ft from part a **M1**

(c) awrt 137 **A1**

(c) Answer: **awrt 137**

Question 12

(a) 18-7 seen (correct method) **M1**

(a) 11 cao, shown correctly in the French-only region of the Venn diagram **A1**

(a) Answer: **11**

(b) 30 - (11+7+7), ft from part a, where Spanish only = 14-7=7 **M1**

(b) 5 cao **A1**

(b) Answer: **5**

(c) 7/30 cao ft **B1**

(c) Answer: **7/30**

(d) 25/30, ft from part b (1 - P(neither)) **M1**

(d) 5/6 cao oe **A1**

(d) Answer: **5/6**

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Question 13

(a) 5/8 x 4/7 (correct method for without-replacement probability)	**M1**
(a) 5/14 cao oe (e.g. 20/56)	**A1**

(a) Answer: **5/14**

(b) 5/8 x 3/7 (black then white)	**M1**
(b) 3/8 x 5/7 (white then black)	**M1**
(b) 15/28 cao oe (e.g. 30/56)	**A1**

(b) Answer: **15/28**

(c) 1 - 5/14, ft from part a (correct complement method)	**M1**
(c) 9/14 cao	**A1**

(c) Answer: **9/14**

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