5.1 Probability: 1-hour Pack

Calculator allowed · about 60 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A biased die has P(rolling a 6) = 0.3. The die is rolled twice. Find the probability that it shows a 6 both times. Give your answer as a decimal.

(2)

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2 Two fair six-sided dice are rolled and the two scores are multiplied together. Find the probability that the product is 12. Give your answer as a fraction.

(2)

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3 A garden centre recorded the colours of 150 tulip bulbs sold in a day: 45 were red, 60 were yellow, and the rest were pink.

(a) Find the relative frequency of a pink bulb being sold, giving your answer as a decimal. **(1)**

(b) Based on this data, estimate how many pink bulbs would be sold out of the next 500 bulbs sold. **(2)**

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4 Two smoothie machines break down independently. The probability the first machine breaks down on a given day is 0.15. The probability the second machine breaks down on the same day is 0.2.

(a) Find P(both machines break down on the same day). **(1)**

.....

(b) Find P(neither machine breaks down on that day). **(2)**

.....

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5 A factory tests components from two independent production lines. The probability a component from line A is faulty is 0.08. The probability a component from line B is faulty is 0.05. One component is picked from each line. Find the probability that at least one of the two components is faulty.

(3)

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6 Two fair six-sided dice are rolled and the two scores are multiplied together. Find the probability that the product is even. Give your answer as a fraction in simplest form.

(3)

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7 A biased coin has P(Heads) = 0.55. Write P(Tails).

(1)

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8 A spinner is divided into three sectors: red (144 degrees), blue (108 degrees) and the rest is green. Find P(green) as a fraction of the full 360 degree circle, giving your answer in simplest form.

(2)

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9 A fair spinner has sectors: 1/2 red, 1/4 blue, and the rest yellow. Find P(yellow).

(2)

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10 A bag contains 12 counters: 5 red, 4 blue and 3 green. One counter is picked at random.

(a) Find P(the counter is red). **(1)**

(b) Find P(the counter is not blue). **(2)**

(c) Amelia says, 'the probability of picking a green counter is 3.' Give a reason why Amelia is wrong. **(1)**

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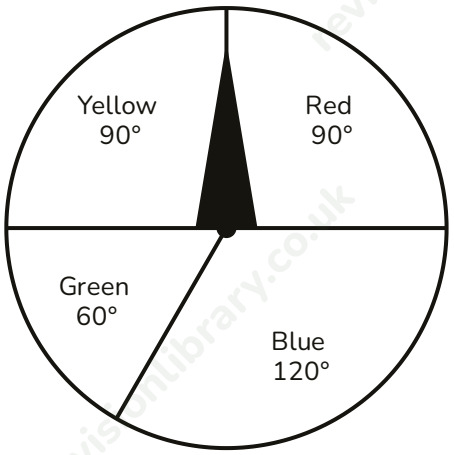
11 A biased spinner lands on one of four colours: red, blue, green or yellow only. P(red)=1/4, P(blue)=3/10, P(green)=1/5.

(a) Find P(the spinner lands on yellow). **(2)**

(b) The spinner is spun 60 times. Work out the expected number of times it lands on yellow. **(2)**

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12 A spinner is divided into four sectors: red (90 degrees), blue (120 degrees), green (60 degrees) and yellow (90 degrees).



(a) Find P(the spinner lands on blue). **(2)**

.....

(b) The spinner is spun 180 times. Work out the expected number of times it lands on green. **(2)**

.....

(c) Find P(the spinner lands on red or yellow). **(2)**

.....

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13 A school raffle sells 500 tickets in total. Priya buys 20 tickets. One winning ticket is drawn at random.

(a) Find the probability that Priya wins the raffle. **(2)**

(b) The same raffle (500 tickets, with Priya always buying 20) is held once a week for 25 weeks of the school year, with all tickets replaced and re-sold each week. Work out how many times Priya would expect to win over the 25 weeks. **(2)**

(c) Give a reason why the number of times Priya actually wins over the 25 weeks might not equal your answer to part (b). **(1)**

14 One letter is chosen at random from the word MISSISSIPPI. Work out the probability that it is the letter P.

(2)

15 The probability that a seed grows into a plant is 2/5. Sam plants 40 seeds. How many plants should he expect?

(2)

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

(2)

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Mark scheme · 5.1 Probability: 1-hour Pack

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

Question 1

recognise independent events and multiply 0.3 x 0.3 **M1**

0.09 cao **A1**

Answer: **0.09**

Question 2

identify the sample space of 36 outcomes and list favourable pairs with product 12: (2,6),(6,2),(3,4),(4,3) **M1**

1/9 cao oe (e.g. 4/36) **A1**

Answer: **1/9**

Question 3

(a) 0.3 cao **B1**

(a) Answer: **0.3**

(b) use 0.3 x 500, ft from part a **M1**

(b) 150 cao **A1**

(b) Answer: **150**

Question 4

(a) 0.03 cao **B1**

(a) Answer: **0.03**

(b) use 0.85 x 0.8 **M1**

(b) 0.68 cao **A1**

(b) Answer: **0.68**

Question 5

find P(neither faulty) = 0.92 x 0.95 **M1**

compute the complement, 1 - 0.874 **M1**

0.126 cao **A1**

Answer: **0.126**

Question 6

recognise the product is odd only when both dice show an odd number **M1**

find P(both odd) = 3/6 x 3/6 = 9/36, then use the complement **M1**

3/4 cao **A1**

Answer: **3/4**

Question 7

0.45 cao **B1**

Answer: **0.45**

Question 8

find green sector = 360 - 144 - 108 = 108 degrees **M1**

3/10 cao oe (e.g. 108/360) **A1**

Answer: **3/10**

Question 9

use common denominators: 1 - 1/2 - 1/4 **M1**

1/4 cao **A1**

Answer: **1/4**

Question 10

(a) 5/12 cao **B1**

(a) Answer: **5/12**

(b) 1 - 4/12 (correct method using not-event) **M1**

(b) 2/3 cao oe (e.g. 8/12) **A1**

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

(c) States that a probability must be between 0 and 1 (inclusive), so 3 is not a valid probability oe **B1**

(c) Answer: **Probabilities must be between 0 and 1; the correct probability is 3/12 = 1/4.**

Question 11

(a) 1 - (1/4 + 3/10 + 1/5), or equivalent common-denominator method **M1**

(a) 1/4 cao oe (e.g. 5/20) **A1**

(a) Answer: **1/4**

(b) 1/4 x 60, ft from part a **M1**

(b) 15 cao **A1**

(b) Answer: **15**

Question 12

(a) 120/360 seen (correct method using angle fraction) **M1**

(a) 1/3 cao oe **A1**

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

(b) 60/360 x 180 (correct method) **M1**

(b) 30 cao **A1**

(b) Answer: **30**

(c) (90+90)/360 (correct method, since red and yellow are mutually exclusive) **M1**

(c) 1/2 cao oe **A1**

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

Question 13

(a) 20/500 (correct method) **M1**

(a) 1/25 cao oe (e.g. 0.04) **A1**

(a) Answer: **1/25**

(b) 1/25 x 25, ft from part a **M1**

(b) 1 cao **A1**

(b) Answer: **1**

(c) States that probability gives an expected/average value only; actual results can vary due to chance oe **B1**

(c) Answer: **The expected value is an average based on probability; actual results are random and can differ from it.**

Question 14

2 out of 11 **M1**

2/11 cao **A1**

Answer: **2/11**

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Question 15

2/5 x 40	**M1**
16 cao	**A1**

Answer: **16**

Question 16

7 out of 22 or 7/22 seen	**M1**
7/22 cao	**A1**

Answer: **7/22**

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