



S22-30min Sample Space Diagrams: 30-minute Pack

EDEXCEL 1ST0 · Calculator allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** Two fair six-sided dice, each numbered 1 to 6, are rolled together and the two scores are added. The sample space diagram below shows the sum of the two scores for some of the outcomes.

Sum	D1: 1	D1: 2	D1: 3	D1: 4	D1: 5	D1: 6
D2: 1	2	3	4		6	7
D2: 2	3		5	6	7	8
D2: 3	4	5	6	7	8	
D2: 4		6	7	8		10
D2: 5	6	7		9	10	11
D2: 6	7		9	10	11	12

- (a) Complete the sample space diagram. (3)
- (b) Write down the probability that the sum of the two scores is 7. (2)
- (c) Find the probability that the sum of the two scores is greater than 8. (2)

(Total for Question 1 is 7 marks)

- 2 Spinner A has four equal sections numbered 1, 2, 3, 4. Spinner B has three equal sections numbered 1, 2, 3. Both spinners are spun together and the two scores are multiplied. The sample space diagram below shows the product of the two scores for some of the outcomes.

Product	A: 1	A: 2	A: 3	A: 4
B: 1	1	2		4
B: 2		4	6	8
B: 3	3		9	

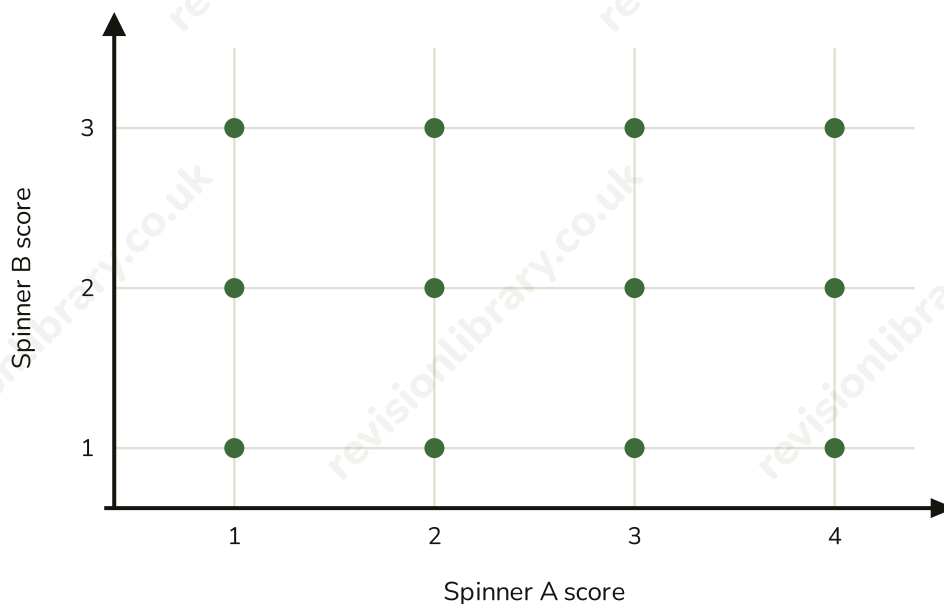
(a) Complete the sample space diagram. (3)

(b) Write down the probability that the product of the two scores is an even number. (2)

(c) Find the probability that the product of the two scores is greater than 6. (2)

(Total for Question 2 is 7 marks)

- 3** The diagram shows the sample space for two fair spinners, plotted as coordinate points. Spinner A (horizontal axis) has four equal sections numbered 1 to 4. Spinner B (vertical axis) has three equal sections numbered 1 to 3. Each point marks one possible outcome (Spinner A score, Spinner B score).



- (a) Use the diagram to write down the total number of possible outcomes. (1)

- (b) Use the diagram to find the probability that the Spinner A score is greater than the Spinner B score. (3)

- (c) Find the probability that the two scores are equal. (1)

(Total for Question 3 is 5 marks)

4 Spinner E has three equal sections numbered 2, 4, 6. Spinner F has four equal sections numbered 1, 3, 5, 7. Both spinners are spun together and the two scores are added.

(a) List, as ordered pairs (Spinner E score, Spinner F score), all the outcomes for which the sum of the two scores is a prime number. **(3)**

(b) Hence write down the probability that the sum of the two spinners is a prime number. **(1)**

(c) The two spinners are spun together 96 times. Work out the expected number of times the sum is a prime number. **(2)**

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(Total for Question 4 is 6 marks)

- 5 Spinner G has five equal sections. Two of the sections are both labelled 2; the other three sections are labelled 1, 3 and 4. Spinner H has three equal sections labelled 1, 3, 5. Both spinners are spun together and the two scores are added. A player wins if the sum of the two scores is at least 6.

Sum	Section a (1)	Section b (2)	Section c (2)	Section d (3)	Section e (4)
Spinner H: 1	2	3		4	
Spinner H: 3		5	5		7
Spinner H: 5	6		7	8	9

- (a) Explain why there are 15 equally likely outcomes when spinner G and spinner H are spun together, even though spinner G shows only four different numbers. (2)
- (b) Complete the sample space diagram to show the sum of the two spinners for all 15 outcomes. (3)
- (c) Find the probability that the sum of the two spinners is at least 6. (2)
- (d) The game is played 150 times. Work out the expected number of times the sum is at least 6. (2)

(Total for Question 5 is 9 marks)

Mark scheme · S22-30min Sample Space Diagrams: 30-minute Pack

Question 1

- (a) **B1** at least 4 of the 7 missing sums correct
- (a) **B1** at least 6 of the 7 missing sums correct
- (a) **B1** all 7 missing sums correct: 5, 4, 9, 5, 9, 8, 8
- (a) **Answer: 5, 4, 9, 5, 9, 8, 8**
- (b) **M1** identifies the 6 outcomes summing to 7, oe
- (b) **A1** $\frac{1}{6}$ oe cao
- (b) **Answer: $\frac{1}{6}$**
- (c) **M1** identifies the 10 outcomes with sum 9, 10, 11 or 12, oe
- (c) **A1** $\frac{5}{18}$ oe cao
- (c) **Answer: $\frac{5}{18}$**

Question 2

- (a) **B1** at least 2 of the 4 missing products correct
- (a) **B1** at least 3 of the 4 missing products correct
- (a) **B1** all 4 missing products correct: 3 (B:1,A:3), 2 (B:2,A:1), 6 (B:3,A:2), 12 (B:3,A:4)
- (a) **Answer: 3, 2, 6, 12**
- (b) **M1** identifies 8 even products out of the 12 outcomes, oe
- (b) **A1** $\frac{2}{3}$ oe cao
- (b) **Answer: $\frac{2}{3}$**
- (c) **M1** identifies the 3 outcomes with product 8, 9 or 12, oe
- (c) **A1** $\frac{1}{4}$ oe cao
- (c) **Answer: $\frac{1}{4}$**

Question 3

- (a) **B1** 12 cao
- (a) **Answer: 12**
- (b) **B1** identifies 6 points where the Spinner A score is greater than the Spinner B score
- (b) **M1** $\frac{6}{12}$ oe
- (b) **A1** $\frac{1}{2}$ cao
- (b) **Answer: $\frac{1}{2}$**
- (c) **B1** $\frac{1}{4}$ oe cao
- (c) **Answer: $\frac{1}{4}$**

Question 4

- (a) **B1** at least 4 correct prime-sum ordered pairs listed, no more than 1 incorrect pair included
- (a) **B1** at least 7 correct prime-sum ordered pairs listed, no incorrect pairs included
- (a) **B1** all 9 correct ordered pairs listed: (2,1), (4,1), (6,1), (2,3), (4,3), (2,5), (6,5), (4,7), (6,7)
- (a) **Answer: (2,1), (4,1), (6,1), (2,3), (4,3), (2,5), (6,5), (4,7), (6,7)**
- (b) **B1** $\frac{3}{4}$ oe cao (ft from part (a))
- (b) **Answer: $\frac{3}{4}$**
- (c) **M1** $96 \times \frac{3}{4}$, oe
- (c) **A1** 72 cao
- (c) **Answer: 72**

Question 5

- (a) **B1** recognises spinner G has 5 equal physical sections and spinner H has 3, giving $5 \times 3 = 15$ outcomes
- (a) **B1** explains the two sections both labelled 2 must be counted as separate, equally likely outcomes rather than merged into one, oe
- (a) **Answer: 15 outcomes because spinner G has 5 equal sections, not 4.**
- (b) **B1** at least 2 of the 5 missing sums correct
- (b) **B1** at least 4 of the 5 missing sums correct
- (b) **B1** all 5 missing sums correct: 3 (H:1,c), 5 (H:1,e), 4 (H:3,a), 6 (H:3,d), 7 (H:5,b)
- (b) **Answer: 3, 5, 4, 6, 7**
- (c) **M1** identifies the 7 outcomes with sum at least 6, oe
- (c) **A1** $7/15$ oe cao
- (c) **Answer: $7/15$**
- (d) **M1** $150 \times 7/15$, oe
- (d) **A1** 70 cao
- (d) **Answer: 70**