Name:

Exam Style Questions

Sample Space Diagrams

Corbettmaths

Equipment needed: Ruler, Calculator, Pencil and Pen

Guidance

1. Read each question carefully before you begin answering it.
2. Check your answers seem right.
3. Always show your workings

Video Tutorial

www.corbettmaths.com/contents

Video 246

Answers and Video Solutions

1. Arthur flips a coin and rolls an ordinary six sided dice.

(a) Complete the table to show all the possible outcomes.

	1	2	3	4	5	6
Tails	T1	T2	T3	T4	T5	T6
Heads	H1	H2	H3 ✓	H4 ✓	H5 ✓	H6 ✓

(2)

(b) Find the probability of a tail and a 6.

1/12

.....

(1)

(c) Find the probability of a head and a number greater than 2.

3, 4, 5, 6

H3, H4, H5, H6

$\frac{4}{12} = \frac{1}{3}$

1/3

.....

(1)

(d) Find the probability of a tail and a square number.

1, 4

T1 or T4

$\frac{2}{12} = \frac{1}{6}$

1/6

.....

(1)

2. Jordan is playing a game with a fair four sectioned spinner and a fair coin.
He flips the coin and spins the spinner.

One possible outcome is (Head, 1), which can be written as (H, 1)

(a) List all the possible outcomes below.

Coin \ Spinner	1	2	3	4
Heads	(H, 1)	(H, 2)	(H, 3)	(H, 4)
Tails	(T, 1)	(T, 2)	(T, 3)	(T, 4)

(2)

(b) Find the probability of a tail and a 3.

$\frac{1}{8}$

(1)

(c) Find the probability of a head and an odd number.

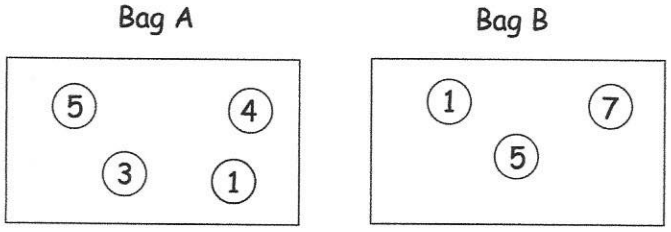
(H, 1) or (H, 3)

$\frac{2}{8} = \frac{1}{4}$

$\frac{1}{4}$

(1)

3. Rebecca has two bags containing counters.
Each counter is labelled with a number.



Rebecca picks a counter at random from bag 1 and then a counter at random from bag 2.

(a) Complete the table to show the possible outcomes of the counters picked.

Bag A \ Bag B	1	5	7
1	1, 1	1, 5	1, 7
3	3, 1	3, 5	3, 7
4	4, 1	4, 5	4, 7
5	5, 1	5, 5	5, 7

(2)

(b) What is the probability that Rebecca picks a 1 from Bag A and a 7 from Bag B?

$\frac{1}{12}$

.....

(1)

(c) What is the probability that Rebecca picks counters with the same number on them from each bag?

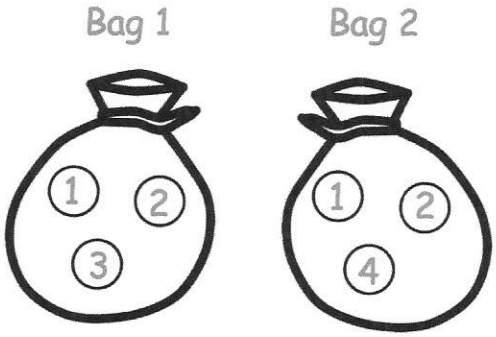
$\frac{2}{12} = \frac{1}{6}$

$\frac{1}{6}$

.....

(1)

4. Two bags, 1 and 2, each contain three counters that are equal size.



In bag 1, the counters are labelled 1, 2 and 3.
In bag 2, the counters are labelled 1, 2 and 4.
A counter is drawn at random from bag 1 and a counter is drawn at random from bag 2.
The two numbers are added together to give a score.

(a) Complete the table to show all possible scores.

Bag 2 \ Bag 1	1	2	3
1	2	3	4
2	3	4	5
4	5	6	7

(1)

(b) Find the probability of scoring a 4

$\frac{2}{9}$

.....

(1)

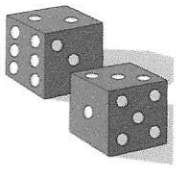
(c) Find the probability of less than 5

$\frac{5}{9}$

.....

(2)

5. Two fair six sided dice are rolled.



The numbers on the two dice are **multiplied** together to give a score.

(a) Complete the table to show all possible scores.

Dice 2 \ Dice 1	1	2	3	4	5	6
1	1	2	3	4	5	6
2	2	4	6	8	10	12
3	3	6	9	12	15	18
4	4	8	12	16	20	24
5	5	10	15	20	25	30
6	6	12	18	24	30	36

(2)

(b) Find the probability of a score of 12

$\frac{4}{36}$ $\frac{1}{9}$

.....

(1)

(c) Find the probability of a score of 10 or more

$\frac{10}{36}$

.....

(2)

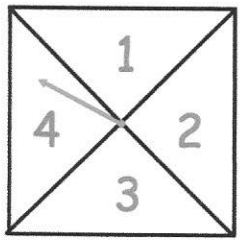
(d) Find the probability of an even number

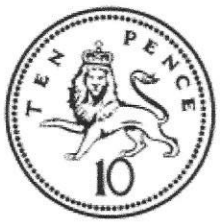
even 27 odd 9 $\frac{27}{36}$ $\frac{3}{4}$

.....

(2)

6. Jordan is playing a game with a fair four sectioned spinner and a fair coin.





He spins the spinner and flips the coin.

If the coin lands on heads, his score is **one more** than the number on the spinner.
If the coin lands on tails, his score is the number on the spinner **doubled**.

(a) Complete the table to show all the possible shows that Jordan can get.

Coin \ Spinner	1	2	3	4
Heads	2	3	4	5
Tails	2	4	6	8

(2)

(b) Write down the probability that Jordan gets a score of

(i) 4

2/8 1/4

.....

(1)

(ii) 5 or more

3/8

.....

(2)

(iii) a prime number

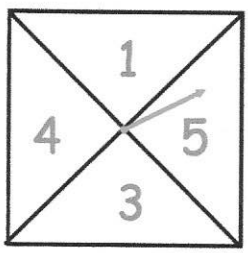
2, 3, 5, 7 4/8 1/2

.....

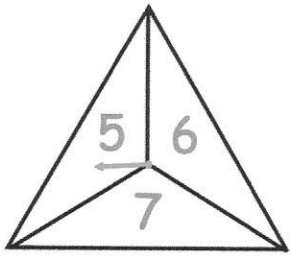
(2)

7. Two fair spinners are spun.

Spinner 1 has four equal sections labelled 1, 3, 4 and 5.
Spinner 2 has three equal sections labelled 5, 6 and 7.



Spinner 1



Spinner 2

Each spinner is spun once.
The numbers are added together to get a score.

(a) Complete the table to show all possible scores.

Spinner 1

+	1	3	4	5
5	6	8	9	10
6	7	9	10	11
7	8	10	11	12

Spinner 2

(2)

(b) Find the probability of scoring a 8

$\frac{2}{12}$ $\frac{1}{6}$

.....

(1)

(c) Find the probability of scoring an odd number

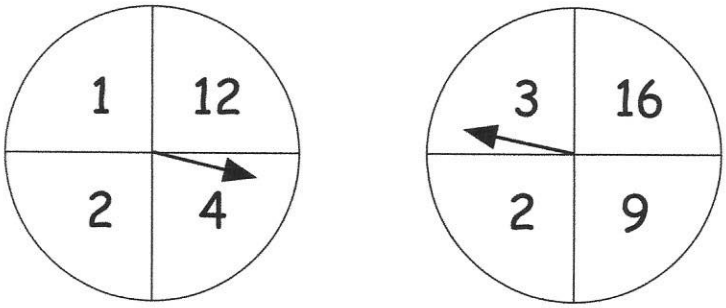
odd / 5 even / 7

$\frac{5}{12}$

.....

(1)

8. Anna has two fair spinners.



She spins both spinners and **multiplies** the numbers to get a score.

(a) Complete the table below to show all possible score.

Spinner B

Spinner A	X	2	3	9	16
	1	(P) 2	(P) 3	(S) 9	(S) 16
	2	(S) 4	6	18	32
	4	8	12	(S) 36	(S) 64
	12	24	(S) 36	108	192

(P) : prime

(S) : square

(2)

Anna says that it is more likely that her score will be a **prime number** than a **square number**.

(b) Is Anna correct?
Explain your answer.

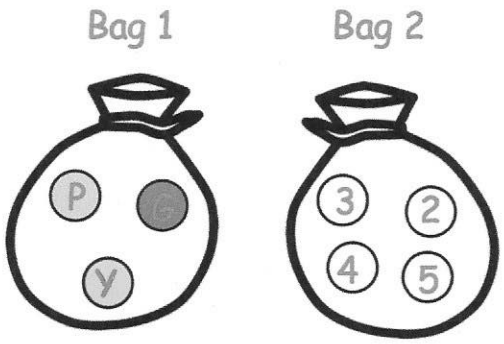
$P(\text{prime}) = \frac{2}{16} = \frac{1}{8}$

$P(\text{square}) = \frac{6}{16} = \frac{3}{8}$

No, the probability of a square number is greater than the probability of a prime number.

(2)

9. Two bags, 1 and 2, each contain counters that are equal size.



Bag 1 contains a pink counter, green counter and yellow counter.
Bag 2 contains counters labelled 2, 3, 4 and 5.
A counter is drawn at random from bag 1 and a counter is drawn at random from bag 2.

If the counter from bag 1 is pink, the number on the counter from bag 2 is doubled.
If the counter from bag 1 is green, one is added to the number on the counter from bag 2
If the counter from Bag 1 is yellow, the number on the counter from bag 2 stays the same.

(a) Complete the table to show all possible scores.

Bag 1

Bag 2	P	G	Y
2	4	3	2
3	6	4	3
4	8	5	4
5	10	6	5

(2)

(b) Find the probability of scoring a multiple of 3

3, 6, 9, 12

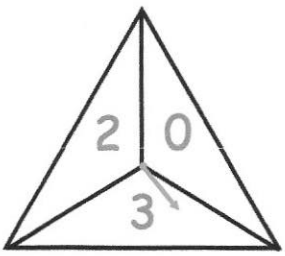
$\frac{4}{12} = \frac{1}{3}$

$\frac{1}{3}$

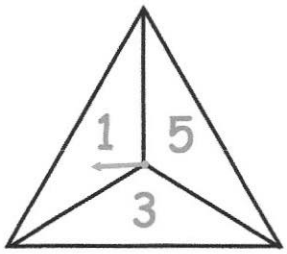
.....

(2)

10. Phil uses two fair spinner in a game.



Spinner 1



Spinner 2

He spins both spinners.
His score is the two numbers multiplied together.

(a) Complete the table to show all possible scores.

		Spinner 1		
	×	0	2	3
Spinner 2	1	0	2	3
	3	0	6	9
	5	0	10	15

(2)

Phil says the probability that he gets an even score is ½

(b) Explain why Phil is incorrect.

The probability of an even is $\frac{6}{9}$ or $\frac{2}{3}$ as zero is even.

(2)

11. Two fair six-sided dice are rolled.
The score is **difference** between the numbers on each dice.

(a) Complete the table to show all possible scores.

Dice 2 \ Dice 1	1	2	3	4	5	6
1	0	1	2	3	4	5
2	1	0	1	2	3	4
3	2	1	0	1	2	3
4	3	2	1	0	1	2
5	4	3	2	1	0	1
6	5	4	3	2	1	0

(b) Find the probability of scoring a 2

$\frac{8}{36} = \frac{4}{18} = \frac{2}{9}$

$\frac{2}{9}$

.....

(1)

(c) Find the probability of scoring a number less than 3

0, 1, 2

$\frac{24}{36} = \frac{2}{3}$

$\frac{2}{3}$

.....

(2)

12. A fair dice is numbered from 1 to 6.
The dice is rolled twice.

(a) Draw a sample space diagram to show the possible outcomes.

Dice 2

Dice 1	1	2	3	4	5	6
1	1,1	1,2	1,3	1,4	1,5	1,6
2	2,1	2,2	2,3	2,4	2,5	2,6
3	3,1 ✓	3,2	3,3	3,4	3,5	3,6
4	4,1 ✓	4,2	4,3	4,4	4,5	4,6
5	5,1 ✓	5,2 ✓	5,3	5,4	5,5	5,6
6	6,1 ✓	6,2 ✓	6,3	6,4	6,5	6,6

(2)

(b) Work out the probability that the number obtained on the first roll is more than double the score on the second roll.

3,1
4,1
5,1
5,2
6,1
6,2

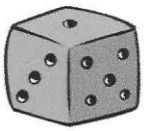
$\frac{6}{36} = \frac{1}{6}$

$\frac{1}{6}$

.....

(2)

13. James has organised a game to raise money for charity at a local fair.
He rolls a fair six sided dice and flips a fair coin.



If the coin lands on heads, the number on the dice is **squared**.
If the coin lands on tails, the number on the dice is **cubed**.

Each person pays 50p to play.
If they score above 30, they win £1
The game is played 450 times.

How much money does James raise for charity?

	1	2	3	4	5	6
H	1	4	9	16	25	~~36~~
T	1	8	27	64	125	216

36

$P(\text{over } 30) = \frac{4}{12} = \frac{1}{3}$

$\frac{1}{3}$ of 450 = 150 $\quad$ 150 × £1 = £150

450 × 50p = £225

225 − 150 = 75

£75

.....

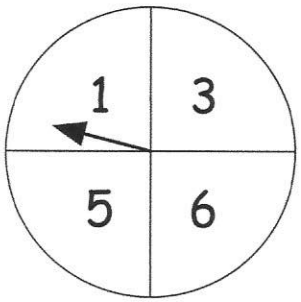
(5)

14. George has three cards, each with an algebraic expression written on it.

$x + 1$	$5x$	x^3

He picks one of the cards at random.

Then he spins the following fair spinner.



George substitutes the number shown on the spinner into the algebraic expression on the card.

(a) Complete the table to show the possible results.

	1	3	5	6
$x + 1$	2	4	6	7
$5x$	5	15	25	30
x^3	1	27	125	216

(2)

George picks a card at random and spins the spinner a total of 300 times.

(b) Estimate how many times George should get an **odd** result.

odd 7 even 5

$P(odd) = \frac{7}{12}$

$\frac{7}{12}$ of $300 = 175$

$300 \div 12 = 25$

$25 \times 7 = 175$

175

.....

(3)