

8300

GCSE MATHEMATICS

Foundation and Higher tier – Questions by Topic

Probability

Sample space diagrams (non-calculator)

v1.0

Name _____

Materials

For this paper you must have:

- Mathematical instruments
- You must not use a calculator



Information

- The marks for questions are shown in brackets

Advice

- In all calculations, show clearly how you work out your answer

Questions 1 to 7 are **foundation** tier only

Q1.

A number is picked at random from the first three positive odd numbers.

A number is picked at random from the first four prime numbers.

The two numbers are **multiplied** to get a score.

(a) Complete the table.

		prime			
		2	3		7
odd	×	1			
	5		15		

(4)

(b) What is the probability that the score is a square number?

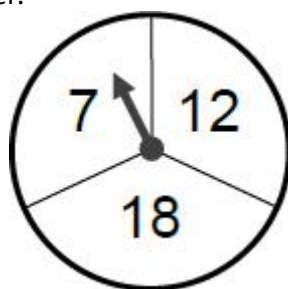
Give your answer as a fraction.

(2)

(Total 6 marks)

Q2.

A game is played with a fair spinner.



The player spins the spinner twice.

The score is the two outcomes **added**.

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

		First spin		
		7	12	18
Second spin	7			
	12			
	18			

(2)

(b) Work out the probability that the score is a **square** number.

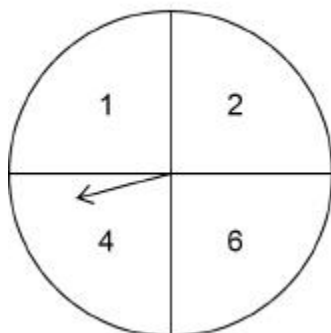
(2)

(Total 4 marks)

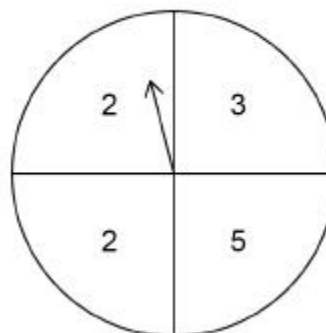
Q3.

In a game, two fair spinners are spun.

Spinner A



Spinner B



If the numbers the arrows land on are different, the score is the **higher** number.

If the numbers the arrows land on are the same, the score is 0.

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

		Spinner B			
		2	2	3	5
Spinner A	1	2			
	2		0		
	4				
	6				

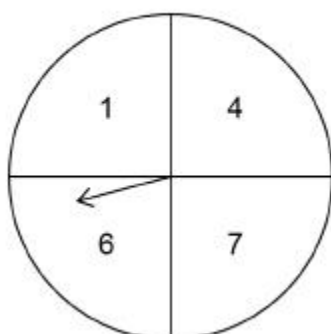
(2)

(b) Write down the probability that the score is an **odd** number.

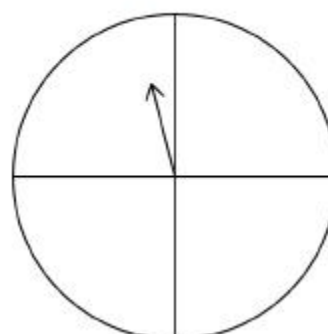
(1)

(c) The same game is played using spinners C and D.
The numbers on C are shown.

Spinner C



Spinner D



The table shows some of the possible scores.

		Spinner D			
Spinner C	1	4			
	4		0		
	6				
	7			0	8

Write the missing numbers on spinner D.

(2)

(Total 5 marks)

Q4.

Here are five number cards.



Two of the five cards are picked at random.

Work out the probability that the total of the two numbers is **more than 30**

(Total 3 marks)

Q5.

A number is picked at random from the first four **prime** numbers.

A number is picked at random from the first four **square** numbers.

The two numbers are added to get a score.

(a) Complete the table.

		Square numbers			
		1	4	9	
Prime numbers	2				
	3			12	
	7				

(4)

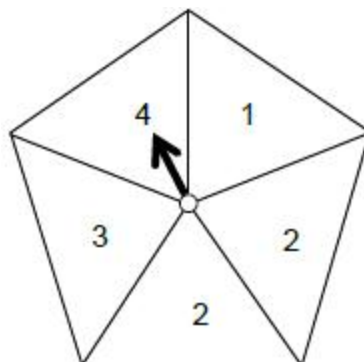
(b) What is the probability that the score is a **prime** number?

(1)

(Total 5 marks)

Q6.

Joanne has a fair five-sided spinner.



(a) Write down the probability of scoring a 4 with one spin.

(1)

(b) Work out the probability of scoring a **total** of 4 with two spins.

(3)

(Total 4 marks)

Q7.

A game is played with a fair spinner.



The player spins the spinner twice.

The player adds the two numbers to get the score.

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

		First spin		
		8	17	32
Second spin	8			
	17			
	32			

(2)

(b) Work out the probability that the score is a **square** number.

(2)

(Total 4 marks)

Questions 8 to 9 are **higher** tier only

Q8.

In a box there are some buttons.
45 are large and the rest are small.
Some are yellow and the rest are green.

The number of small is $\frac{5}{3}$ of the number of large.
The number of green is 300% of the number of yellow.
There are 12 small yellow buttons.

How many large green buttons are there?
You may use the two-way table to help you.

	Large	Small	
Yellow		12	
Green			
	45		

(Total 4 marks)

Q9.

A prime number between 300 and 450 is chosen at random.
The table shows the probability that the number lies in different ranges.

Prime number, n	Probability
$300 \leq n < 330$	0.16
$330 \leq n < 360$	0.24
$360 \leq n < 390$	x
$390 \leq n < 420$	0.16
$420 \leq n < 450$	0.24

- (a) Work out the value of x . (2)
- (b) Work out the probability that the prime number is greater than 390 (1)
- (c) There are four prime numbers between 300 and 330
How many prime numbers are there between 300 and 450? (2)

(Total 5 marks)