



Aberdare Community School
Mathematics Department

WJEC GCSE
Foundation – Non Calculator
Data

Probability games

Name:

Set:

Date:

Teacher:

9. A red box contains four discs numbered 3, 6, 9 and 12 respectively.
A green box contains four discs numbered 4, 7, 10 and 13 respectively.

In a game, a player takes one disc at random from each of the two boxes.
The score for the game is the smaller of the two numbers on the discs.

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

	13	3	.....	.....	.....
	10	3	.....	.....	.....
Green box	7	3	6	7	7
	4	3	4	4	4
		3	6	9	12
		Red box			

[2]

- (b) Find the probability that the score is **less than 6**.

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[2]

- (c) A player wins if the score is **less than 6**.
If 80 people each play the game once, how many would you expect to win?

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[2]

- (d) It costs 50p to play the game once.
The prize for winning the game is £1.
If 80 people play the game once, how much profit would you expect to be made?

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[2]

12. In a game, a player throws two fair dice, one coloured white and the other coloured red. The score for the throw is the greater of the two numbers showing on the dice.

For example, if the white dice shows 4 and the red dice shows 2, the score for the throw is 4; if both the white and red dice show 2, the score for the throw is 2.

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

	6	6	6	6	6	6
	5	5	5	5	5	6
Red	4	4	4	4	4	6
dice	3	3	3	3	3	6
	2	2	2	3	3	6
	1	1	2	3	3	6
		1	2	3	4	5
						6

- (d) (i) 360 people each play the game once.
Approximately how many people would you expect to win a prize?

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- (ii) It costs £1 to play the game once. The prize for winning is £5. If the 360 people each play the game once, approximately how much profit do you expect the game to make?

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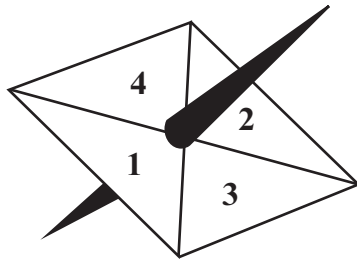
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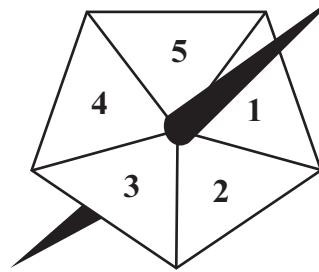
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[4]

10. A square shaped spinner has the numbers 1, 2, 3 and 4 written on it. Another spinner, in the shape of a regular pentagon, has the numbers 1, 2, 3, 4 and 5 written on it.



Square spinner



Pentagon spinner

In a game, a player spins both spinners and multiplies the two numbers showing on the spinners to get the score for the game.

For example, if the number on the square spinner is 3 and the number on the pentagon spinner is 2, the player works out $3 \times 2 = 6$ and the player scores 6.

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

Pentagon spinner	5	5	.....	.....	.....
	4	4	.....	.....	.....
	3	3	.....	.....	.....
	2	2	4	6	8
	1	1	2	3	4
		1	2	3	4
		Square spinner			

[2]

- (b) (i) What is the probability that a player scores 4?

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- (ii) What is the probability that a player does not score 4?

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[3]

A player wins a prize by getting a score of 3 or less.

(c) Toby plays the game once. What is the probability that he wins a prize?

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[1]

(d) (i) 800 people each play the game once.
Approximately how many would you expect to win a prize?

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[2]

(ii) It costs 50p to play the game once. The prize for getting a score of 3 or less is £1.50. If the 800 people each play the game once, approximately how much profit do you expect the game to make?

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[2]

14. A box contains four discs numbered 1, 3, 5 and 6 respectively.
A bag contains four cards coloured red, yellow, blue and green respectively.
In a game, a player takes one disc at random from the box and takes one coloured card at random from the bag.

The score for the game is calculated as follows:

If the card is coloured red or yellow, the score is the number on the chosen disc.

If the card is coloured blue, the score is double the number on the chosen disc.

If the card is coloured green, the score is 3 times the number on the chosen disc.

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

Bag	green	3	.....	.....	18
	blue	2	.....	10	.....
	yellow	1	3	5	6
	red	1	3	5	6
		1	3	5	6
		Box			

[2]

- (b) Find the probability that the score is **less than 5**.

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[2]

- (c) A player wins if the score is **less than 5**.
If 160 people each play the game once, how many would you expect to win?

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[2]

- (d) It costs 50p to play the game once.
The prize for winning the game is £1.
If 160 people play the game once, how much profit would you expect to be made?

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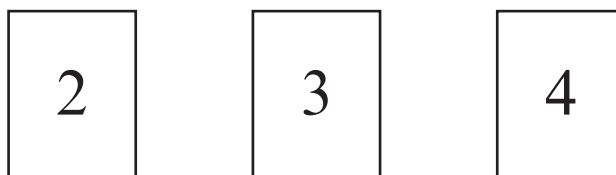
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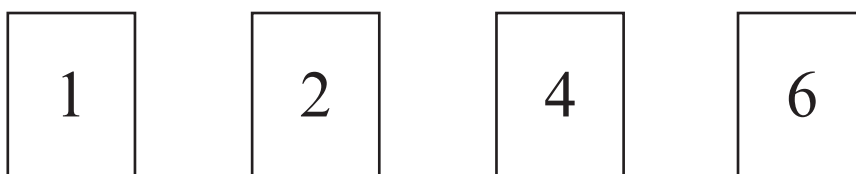
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[2]

9. There are two packs of cards. One pack is coloured red and the other pack is coloured yellow. The red pack has three cards numbered



The yellow pack has four cards numbered



In a game, a player chooses one card at random from the red pack and one card at random from the yellow pack. The player's score is the product of the two numbers.

For example, if the number on the red card is 3 and the number on the yellow card is 2, the player works out $3 \times 2 = 6$ and the player scores 6.

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

Yellow pack	6	.....	.....	.....
	4	.....	.....	.....
	2	4	6	8
	1	2	3	4
		2	3	4
		Red pack		

[2]

- (b) A player wins a prize by getting a score of 4 or less.

What is the probability of a player winning a prize?

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[2]



(c) 180 people each play the game once.
Approximately how many would you expect to win a prize?

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(d) It costs 50p to play the game once. The prize for getting a score of 4 or less is £1.
If each of the 180 people play the game once, approximately how much profit do you expect the game to make?

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[2]



7. A box contains five balls numbered 1, 3, 5, 7 and 9 respectively.
 A bag contains four balls numbered 1, 2, 3 and 4 respectively.
 In a game, a player takes one ball at random from the box and one ball at random from the bag.
 The score for the game is found by using the number on the ball from the bag as the tens digit and the number on the ball from the box as the units.

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

4	41	43	.....	.....	49
3	31	33	.....	.....	39
2	21	23	.....	.....	29
1	11	13	15	17	19
	1	3	5	7	9
		box			

[2]

- (b) A player wins if the score obtained is between 25 and 35 inclusive.
 Find the probability that a player wins.

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[2]

- (c) How many times should a player expect to win in 100 plays of the game?

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[2]

13. A red bag contains three discs numbered 3, 4 and 5 respectively.
 A blue bag contains four discs numbered 2, 3, 5 and 7 respectively.
 In a game, a player takes one disc at random from each of the two bags.
 The score for the game is the sum of the two numbers on the discs.

- (a) Complete the following table, by writing in the missing disc numbers and all the possible scores.
 Some have been done for you.

Blue bag	7			
	5		9	
		4		
		Red bag		

[3]

- (b) Find the probability that the score for one game is **less than 9**.

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[2]

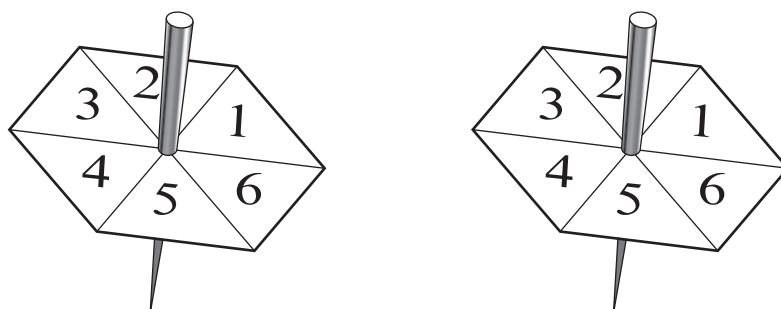
- (c) In a game, a player wins if he or she scores less than 9.
 240 people each play the game once.
 Approximately how many would you expect to win a prize?

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[2]

14.

9. The following two spinners are spun.



Kevin adds together the two numbers obtained to get a total score. The table below shows some of the possible total scores.

Second spinner	6	7	.....	.....	.....	.....	.....
	5	6	.....	.....	.....	.....	.....
	4	5	6	.....	.....	.....	.....
	3	4	5	.....	.....	.....	.....
	2	3	4	5	6	7	.....
	1	2	3	4	5	6	7
		1	2	3	4	5	6
	First spinner						

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

[2]

(b) What is the probability of getting a total score of 9?

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[2]

(c) If Kevin spins the two spinners 180 times, how many times would he expect to get a total score of 9?

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[2]

- 9. There are four balls numbered 1, 3, 5 and 7 respectively in machine A and four balls numbered 2, 4, 6 and 8 respectively in machine B. In a game, both machines A and B select one ball at random.

The score for the game is the product of these two numbers.

For example, if the number on the ball from machine A is 3 and the number on the ball from machine B is 4, the score is 3×4 which is 12.

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

Machine A	7	14	28	.....	.....
	5	10	20	.....	.....
	3	6	12	.....	.....
	1	2	4	6	8
		2	4	6	8
		Machine B			

[2]

- (b) A player wins a prize by getting a score of 12 or less.
It costs 80p to play the game once.
The prize for winning the game is £1.50.
If 160 people play the game once, find the expected profit.

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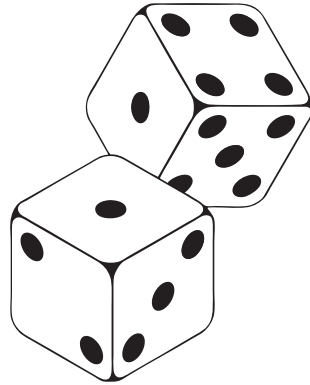
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[6]



8. Two fair dice are thrown.



The two numbers obtained are multiplied together to get the total score. The table below shows some of the possible total scores.

Second dice	6	6	.....	.....	.....	.....	.....
	5	5	.....	.....	.....	.....	.....
	4	4	8	.....	.....	.....	.....
	3	3	6	.....	.....	.....	.....
	2	2	4	6	8	10	.....
	1	1	2	3	4	5	6
			1	2	3	4	5	6
		First dice					

(a) Complete the table to show all the possible total scores. [2]

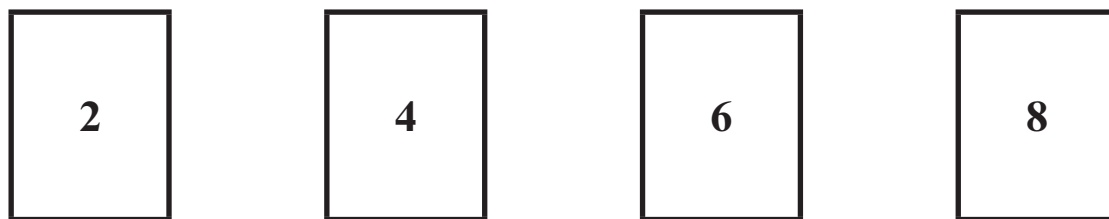
(b) What is the probability of getting a total score of 20 or more?

[2]

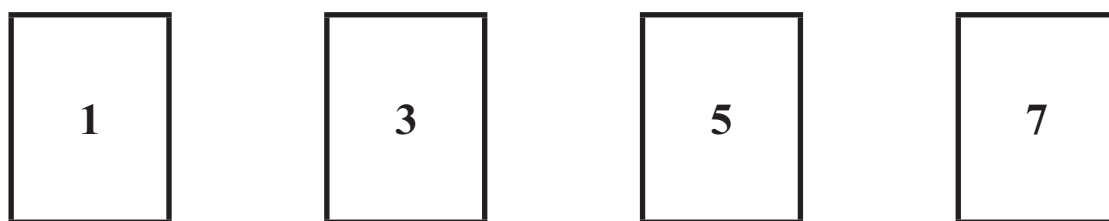
(c) If the two dice are thrown 720 times, how many times would you expect to get a total score of 20 or more?

[2]

9. There are two packs of cards. One pack is coloured red and the other pack is coloured blue. The red pack has four cards numbered



The blue pack has four cards numbered



In a game, a player chooses one card at random from the red pack and one card at random from the blue pack. The player's score is the difference between the two numbers.

For example, if the number on the red card is 8 and the number on the blue card is 5, the player works out $8 - 5 = 3$ and the player scores 3.

Similarly, if the number on the red card is 2 and the number on the blue card is 3, the player works out $3 - 2 = 1$ and the player scores 1.

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

Blue pack	7	1	1
	5	1	3
	3	1	1
	1	1	3
		2	4	6	8
		Red pack			

[2]

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- (b) A player wins a prize by getting a score of 1.
It costs 50p to play the game once.
The prize for winning the game is 80p.
When 320 people play the game once, find the expected profit.

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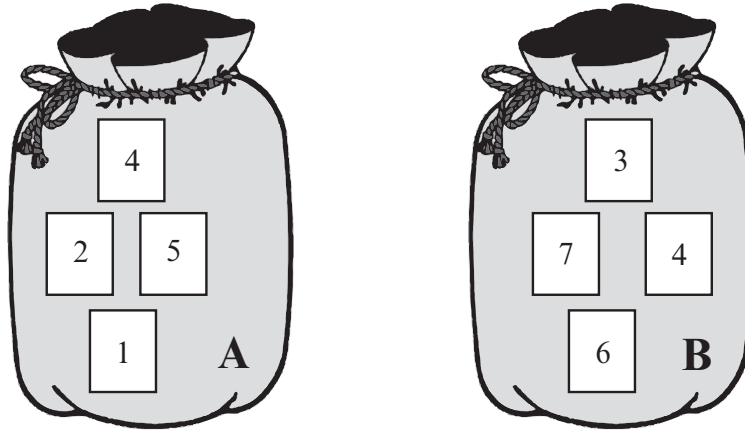
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[6]

11. In bag A, there are four cards numbered 1, 2, 4 and 5 respectively. In bag B, there are four cards numbered 3, 4, 6 and 7 respectively.



In a game, one card is chosen at random from bag A and one from bag B. The score for the game is the positive difference between these two numbers. For example, if the number on the card from bag A is 1 and the number on the card from bag B is 3, the score is $3 - 1 = 2$.

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

Bag A	5	2	.....	1	.....
	4	1	.....	2	.....
	2	1	.....	4	.....
	1	2	.....	5	.....
		3	4	6	7
		Bag B			

[2]



(b) A player wins a prize by getting a score of 2 or less.

(i) What is the probability of a player winning a prize?

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..... [2]

(ii) 80 people each play the game once.
Approximately how many would you expect to win a prize?

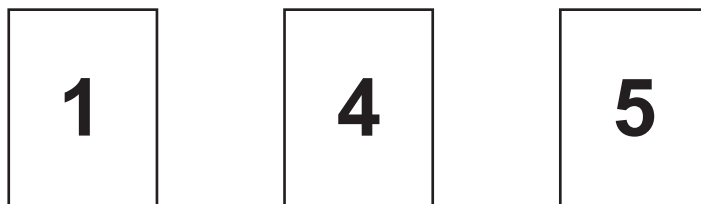
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(iii) It costs 90p to play the game once. The prize for getting a score of 2 or less is £1.20.
If the 80 people each play the game once, approximately how much profit do you expect the game to make?

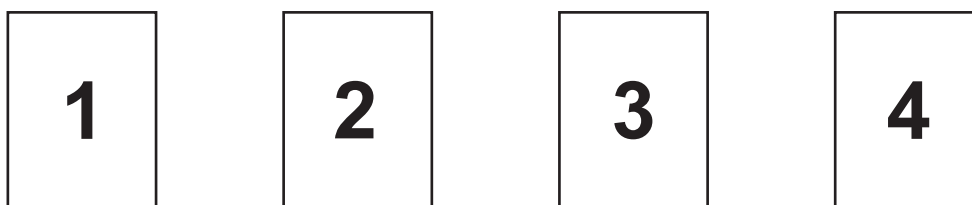
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10. There are two packs of cards. One pack is coloured blue and the other pack is coloured red. The blue pack has three cards numbered



The red pack has four cards numbered



In a game, a player chooses one card from the blue pack and one card from the red pack. The player's score is the product of the two numbers.

For example, if the number on the blue card is 1 and the number on the red card is 3, the player works out $1 \times 3 = 3$ and the player scores 3.

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

[2]

Red pack	4	4	.....	.....
	3	3	.....	.....
	2	2	.....	.....
	1	1	.....	.....
		1	4	5
		Blue pack		

(b) A player wins a prize by getting a score of 10 or more.

(i) What is the probability of a player winning a prize? [2]

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(ii) 60 people each play the game once.
Approximately how many would you expect to win a prize? [2]

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(iii) It costs 80p to play the game once. The prize for getting a score of 10 or more is £1.50.
If the 60 people each play the game once, approximately how much profit do you expect the game to make? [2]

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11. Catrin is playing a game using two boxes with cards in them.

The first box has three cards numbered 4, 7 and 9.

The second box has three cards numbered 3, 6 and 8.

Catrin chooses a card at random from the first box and then a card at random from the second box.

The score for the game is found by doubling the number on the card from the first box and adding that answer to the number on the card from the second box.

- (a) Complete the following table showing all the possible scores. [2]

		Second box		
		3	6	8
First box	4	11		
	7			
	9			26

- (b) (i) Find the probability that the score is more than 20. [2]

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- (ii) Catrin wins the game if her score is more than 20.

How many times will Catrin be expected to win if she plays the game 54 times?

[2]

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- 13.** There are four balls numbered 2, 2, 3 and 4 respectively in machine A and four balls numbered 3, 4, 5 and 6 respectively in machine B.
In a game, both machines A and B select one ball at random.
The score for the game is the 2-digit number whose units digit is the number from machine A and whose tens digit is the number from machine B.

For example, if the number on the ball from machine A is 4 and the number on the ball from machine B is 3, the score is 34.

- (a) Complete the following table to show all the possible scores. [2]

Machine B	6	62	.....	63	.....
	5	52	.....	.....	54
	4	42	42	.....	44
	3	32	32	33	.....
		2	2	3	4
		Machine A			

A player wins a prize by getting a score of 42 or less.

- (b) (i) Matthew plays the game once. What is the probability that he wins a prize? [2]

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- (ii) One day 400 people play this game once. Approximately how many would you expect to win a prize? [2]

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