

PROBABILITY

Pearson Edexcel - Tuesday 19 May 2020 - Paper 1 (Non-Calculator) Higher Tier

1.

- 14** Sally plays two games against Martin.
In each game, Sally could win, draw or lose.

In each game they play,
the probability that Sally will win against Martin is 0.3
the probability that Sally will draw against Martin is 0.1

Work out the probability that Sally will win **exactly** one of the two games against Martin.

(Total for Question 14 is 3 marks)

Pearson Edexcel – Thursday 4 June 2020 - Paper 2 (Calculator) Higher Tier

2.

11 Jack is in a restaurant.
There are 5 starters, 8 main courses and some desserts on the menu.

Jack is going to choose one starter, one main course and one dessert.
He says there are 240 ways that he can choose his starter, his main course and his dessert.

Could Jack be correct?
You must show how you get your answer.

(Total for Question 11 is 2 marks)

Pearson Edexcel – Thursday 4 June 2020 - Paper 2 (Calculator) Higher Tier

3.

20 There are only red sweets and yellow sweets in a bag.

There are n red sweets in the bag.

There are 8 yellow sweets in the bag.

Sajid is going to take at random a sweet from the bag and eat it.

He says that the probability that the sweet will be red is $\frac{7}{10}$

(a) Show why the probability cannot be $\frac{7}{10}$

(3)

After Sajid has taken the first sweet from the bag and eaten it, he is going to take at random a second sweet from the bag.

Given that the probability that both the sweets he takes will be red is $\frac{3}{5}$

(b) work out the number of red sweets in the bag.
You must show all your working.

(5)

(Total for Question 20 is 8 marks)

-
- 8 There are some counters in a bag.
The counters are blue or green or red or yellow.

The table shows the probabilities that a counter taken at random from the bag will be blue or will be green.

| | | | | |
|--------------------|------|-------|-----|--------|
| Colour | blue | green | red | yellow |
| Probability | 0.32 | 0.20 | | |

The probability that a counter taken at random from the bag will be red is five times the probability that the counter will be yellow.

There are 300 counters in the bag.

Work out the number of yellow counters in the bag.

(Total for Question 8 is 3 marks)

1 There are only blue cubes, red cubes and yellow cubes in a box.

The table shows the probability of taking at random a blue cube from the box.

| | | | |
|--------------------|------|-----|--------|
| Colour | blue | red | yellow |
| Probability | 0.2 | | |

The number of red cubes in the box is the same as the number of yellow cubes in the box.

(a) Complete the table.

(2)

There are 12 blue cubes in the box.

(b) Work out the total number of cubes in the box.

(2)

(Total for Question 1 is 4 marks)

22 There are only r red counters and g green counters in a bag.

A counter is taken at random from the bag.

The probability that the counter is green is $\frac{3}{7}$

The counter is put back in the bag.

2 more red counters and 3 more green counters are put in the bag.

A counter is taken at random from the bag.

The probability that the counter is green is $\frac{6}{13}$

Find the number of red counters and the number of green counters that were in the bag originally.

red counters.....

green counters.....

(Total for Question 22 is 5 marks)

Pearson Edexcel - Thursday 6 June 2019 - Paper 2 (Calculator) Higher Tier

7.

17 There are some small cubes and some large cubes in a bag.
The cubes are red or the cubes are yellow.

The ratio of the number of small cubes to the number of large cubes is 4:7

The ratio of the number of red cubes to the number of yellow cubes is 3:5

(a) Explain why the least possible number of cubes in the bag is 88

(1)

All the small cubes are yellow.

(b) Work out the least possible number of large yellow cubes in the bag.

(3)

(Total for Question 17 is 4 marks)

22 There are only green pens and blue pens in a box.

There are three more blue pens than green pens in the box.
There are more than 12 pens in the box.

Simon is going to take at random two pens from the box.

The probability that Simon will take two pens of the same colour is $\frac{27}{55}$

Work out the number of green pens in the box.

(Total for Question 22 is 6 marks)

Pearson Edexcel - Thursday 8 November 2018 - Paper 2 (Calculator) Higher Tier

9.

16 There are only red counters and blue counters in a bag.

Joe takes at random a counter from the bag.
The probability that the counter is red is 0.65
Joe puts the counter back into the bag.

Mary takes at random a counter from the bag.
She puts the counter back into the bag.

(a) What is the probability that Joe and Mary take counters of different colours?

(2)

There are 78 red counters in the bag.

(b) How many blue counters are there in the bag?

(2)

(Total for Question 16 is 4 marks)

- 16** There are only red counters, blue counters and purple counters in a bag.
The ratio of the number of red counters to the number of blue counters is 3 : 17
- Sam takes at random a counter from the bag.
The probability that the counter is purple is 0.2
- Work out the probability that Sam takes a red counter.

(Total for Question 16 is 3 marks)

Pearson Edexcel - Thursday 7 June 2018 - Paper 2 (Calculator) Higher Tier

11.

- 8** 60 people were asked if they prefer to go on holiday in Britain or in Spain or in Italy.
- 38 of the people were male.
11 of the 32 people who said Britain were female.
8 males said Italy.
12 people said Spain.
- One of the females is chosen at random.
- What is the probability that this female said Spain?

(Total for Question 8 is 4 marks)

12.

- 6 There are some counters in a bag.
The counters are red or white or blue or yellow.

Bob is going to take at random a counter from the bag.

The table shows each of the probabilities that the counter will be blue or will be yellow.

| | | | | |
|--------------------|-----|-------|------|--------|
| Colour | red | white | blue | yellow |
| Probability | | | 0.45 | 0.25 |

There are 18 blue counters in the bag.

The probability that the counter Bob takes will be red is twice the probability that the counter will be white.

- (a) Work out the number of red counters in the bag.

(4)

A marble is going to be taken at random from a box of marbles.
The probability that the marble will be silver is 0.5

There must be an even number of marbles in the box.

- (b) Explain why.

(1)

(Total for Question 6 is 5 marks)

13.

20 50 people were asked if they speak French or German or Spanish.

Of these people,

31 speak French

2 speak French, German and Spanish

4 speak French and Spanish but not German

7 speak German and Spanish

8 do not speak any of the languages

all 10 people who speak German speak at least one other language

Two of the 50 people are chosen at random.

Work out the probability that they both only speak Spanish.

14.

- 4 There are only blue cubes, yellow cubes and green cubes in a bag.

There are

twice as many blue cubes as yellow cubes
and four times as many green cubes as blue cubes.

Hannah takes at random a cube from the bag.

Work out the probability that Hannah takes a yellow cube.

(Total for Question 4 is 3 marks)

15.

- 15 Tracey is going to choose a main course and a dessert in a cafe.
She can choose from 8 main courses and 7 desserts.

Tracey says that to work out the number of different ways of choosing a main course and a dessert you add 8 and 7

- (a) Is Tracey correct?
You must give a reason for your answer.

(1)

12 teams play in a competition.
Each team plays each other team exactly once.

- (b) Work out the total number of games played.

(2)

(Total for Question 15 is 3 marks)

Pearson Edexcel - Monday 6 November 2017 - Paper 2 (Calculator) Higher Tier

16.

- 21 There are 12 counters in a bag.
There is an equal number of red counters, blue counters and yellow counters in the bag.
There are no other counters in the bag.
3 counters are taken at random from the bag.
(a) Work out the probability of taking 3 red counters.

(2)

- The 3 counters are put back into the bag.
Some more counters are now put into the bag.
There is still an equal number of red counters, blue counters and yellow counters in the bag.
There are no counters of any other colour in the bag.
3 counters are taken at random from the bag.
(b) Is it now less likely or equally likely or more likely that the 3 counters will be red?
You must show how you get your answer.

(2)

(Total for Question 21 is 4 marks)

- 10 There are only blue counters, yellow counters, green counters and red counters in a bag. A counter is taken at random from the bag.

The table shows the probabilities of getting a blue counter or a yellow counter or a green counter.

| | | | | |
|--------------------|------|--------|-------|-----|
| Colour | blue | yellow | green | red |
| Probability | 0.2 | 0.35 | 0.4 | |

- (a) Work out the probability of getting a red counter.

(1)

- (b) What is the least possible number of counters in the bag?
You must give a reason for your answer.

(2)

(Total for Question 10 is 3 marks)

17 There are 9 counters in a bag.

7 of the counters are green.

2 of the counters are blue.

Ria takes at random two counters from the bag.

Work out the probability that Ria takes one counter of each colour.

You must show your working.

(Total for Question 17 is 4 marks)

Pearson Edexcel - Thursday 8 June 2017 - Paper 2 (Calculator) Higher Tier

19.

1 The table shows the probabilities that a biased dice will land on 2, on 3, on 4, on 5 and on 6

| Number on dice | 1 | 2 | 3 | 4 | 5 | 6 |
|----------------|---|------|------|------|------|-----|
| Probability | | 0.17 | 0.18 | 0.09 | 0.15 | 0.1 |

Neymar rolls the biased dice 200 times.

Work out an estimate for the total number of times the dice will land on 1 or on 3

(Total for Question 1 is 3 marks)

Pearson Edexcel - Specimen Papers Set 2 - Paper 1 (Non-Calculator) Higher Tier

20.

16 The probability that Sanay is late for school tomorrow is 0.05
The probability that Jaden is late for school tomorrow is 0.15

Alfie says that the probability that Sanay and Jaden will both be late for school tomorrow is 0.0075 because $0.05 \times 0.15 = 0.0075$

What assumption has Alfie made?

(Total for Question 16 is 1 mark)

Pearson Edexcel - Specimen Papers Set 2 - Paper 3 (Calculator) Higher Tier

21.

22 There are y black socks and 5 white socks in a drawer.

Joshua takes at random two socks from the drawer.

The probability that Joshua takes one white sock and one black sock is $\frac{6}{11}$

(a) Show that $3y^2 - 28y + 60 = 0$

(4)

(b) Find the probability that Joshua takes two black socks.

(3)

(Total for Question 22 is 7 marks)

Pearson Edexcel - Specimen Papers Set 1 - Paper 1 (Non-Calculator) Higher Tier

22.

3 There are only red counters, blue counters, green counters and yellow counters in a bag.

The table shows the probabilities of picking at random a red counter and picking at random a yellow counter.

| | | | | |
|--------------------|------|------|-------|--------|
| Colour | red | blue | green | yellow |
| Probability | 0.24 | | | 0.32 |

The probability of picking a blue counter is the same as the probability of picking a green counter.

Complete the table.

(Total for Question 3 is 2 marks)

Pearson Edexcel - Specimen Papers Set 1 - Paper 1 (Non-Calculator) Higher Tier

23.

- 6 Four friends each throw a biased coin a number of times.
The table shows the number of heads and the number of tails each friend got.

| | Ben | Helen | Paul | Sharif |
|-------|-----|-------|------|--------|
| heads | 34 | 66 | 80 | 120 |
| tails | 8 | 12 | 40 | 40 |

The coin is to be thrown one more time.

- (a) Which of the four friends' results will give the best estimate for the probability that the coin will land heads?

Justify your answer.

.....
.....
.....

(1)

Paul says,

“With this coin you are twice as likely to get heads as to get tails.”

- (b) Is Paul correct?

Justify your answer.

.....
.....
.....

(2)

The coin is to be thrown twice.

- (c) Use all the results in the table to work out an estimate for the probability that the coin will land heads both times.

(2)

(Total for Question 6 is 5 marks)

21 There are 10 pens in a box.

There are x red pens in the box.

All the other pens are blue.

Jack takes at random two pens from the box.

Find an expression, in terms of x , for the probability that Jack takes one pen of each colour.

Give your answer in its simplest form.

(Total for Question 21 is 5 marks)

- 18** Thelma spins a biased coin twice.
The probability that it will come down heads both times is 0.09
Calculate the probability that it will come down tails both times.

(Total for Question 18 is 3 marks)

Pearson Edexcel - Sample Paper 1 - (Non-Calculator) Higher Tier

26.

24 John has an empty box.

He puts some red counters and some blue counters into the box.

The ratio of the number of red counters to the number of blue counters is 1 : 4

Linda takes at random 2 counters from the box.

The probability that she takes 2 red counters is $\frac{6}{155}$

How many red counters did John put into the box?

(Total for Question 24 is 4 marks)

Pearson Edexcel - Sample Paper 3 - (Calculator) Higher Tier

27.

12 Sami asked 50 people which drinks they liked from tea, coffee and milk.

All 50 people like at least one of the drinks

19 people like all three drinks.

16 people like tea and coffee but do **not** like milk.

21 people like coffee and milk.

24 people like tea and milk.

40 people like coffee.

1 person likes only milk.

Sami selects at random one of the 50 people.

(a) Work out the probability that this person likes tea.

.....
(4)

(b) Given that the person selected at random from the 50 people likes tea,
find the probability that this person also likes exactly one other drink.

.....
(2)

.....
(Total for Question 12 is 6 marks)
.....

6 One of the teachers at a school is chosen at random.

The probability that this teacher is female is $\frac{3}{5}$

There are 36 male teachers at the school.

Work out the total number of teachers at the school.

(Total for Question 6 is 3 marks)

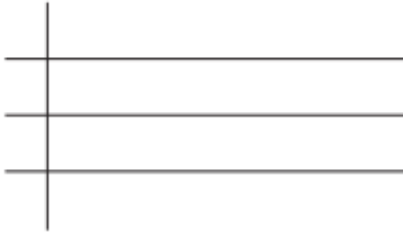
Pearson Edexcel - Thursday 9 June 2016 - Paper 2 (Calculator) Higher Tier

29.

1 Chloe recorded the test marks of 20 students.

22 29 38 16 36 18 30 21 27 43
14 41 25 38 46 19 48 34 23 46

(a) Show this information in an ordered stem and leaf diagram.



(3)

One of these students is going to be chosen at random.

(b) Find the probability that this student has a test mark less than 28

(2)

(Total for Question 1 is 5 marks)

- 5 There are only blue counters, green counters, red counters and yellow counters in a bag. Olga is going to take at random a counter from the bag.

The table shows the probability that Olga will take a blue counter and the probability that she will take a yellow counter.

| | | | | |
|--------------------|------|-------|-----|--------|
| Colour | blue | green | red | yellow |
| Probability | 0.4 | | | 0.15 |

The number of red counters in the bag is 4 times the number of green counters in the bag.

Complete the table.

(Total for Question 5 is 3 marks)

- 4 There are some black pens, some blue pens, some red pens and some green pens in a box.

The table shows the probabilities that a pen taken at random from the box will be black or will be blue or will be red.

| | | | | |
|--------------------|-------|------|-----|-------|
| colour | black | blue | red | green |
| probability | 0.3 | 0.2 | 0.4 | |

There are 200 pens in the box.

- (a) Work out the number of black pens in the box.

.....
(2)

A pen is taken at random from the box.

- (b) Work out the probability that the pen will be green.

.....
(2)

.....
(Total for Question 4 is 4 marks)
.....

25 Nomusa has 30 sweets.

She has

18 fruit sweets

7 aniseed sweets

5 mint sweets

Nomusa is going to take at random two sweets.

Work out the probability that the two sweets will **not** be the same type of sweet.

You must show all your working.

(Total for Question 25 is 4 marks)

Pearson Edexcel - Monday 8 June 2015 - Paper 2 (Calculator) Higher Tier

33.

1 Udit has a bag of chocolate sweets.

There are 30 sweets in the bag.

This table shows the types of sweets in the bag.

| | Strawberry | Caramel | Nut |
|-----------------|------------|---------|-----|
| Dark chocolate | 3 | 1 | 6 |
| Milk chocolate | 4 | 5 | 2 |
| White chocolate | 1 | 4 | 4 |

Udit takes at random a sweet from the bag.

(a) Write down the probability that the sweet is a dark chocolate caramel.

.....
(1)

(b) Work out the probability that the sweet is a white chocolate.

.....
(2)

There are some dark chocolates, some milk chocolates and some white chocolates in a box.

The table below shows the probabilities that a chocolate taken at random from the box is a dark chocolate or is a milk chocolate.

| | Dark chocolate | Milk chocolate | White chocolate |
|-------------|----------------|----------------|-----------------|
| Probability | 0.35 | 0.17 | |

A chocolate is taken at random from the box.

(c) Work out the probability that the chocolate is a white chocolate.

.....
(2)

(Total for Question 1 is 5 marks)

- 23 Paul has 8 cards.
There is a number on each card.



Paul takes at random 3 of the cards.
He adds together the 3 numbers on the cards to get a total T .

Work out the probability that T is an odd number.

(Total for Question 23 is 4 marks)

- 5 There are some green counters, some yellow counters, some blue counters and some red counters in a bag.

The table shows the probabilities that a counter taken at random from the bag will be green or yellow or red.

| | | | | |
|-------------|-------|--------|------|------|
| Colour | Green | Yellow | Blue | Red |
| Probability | 0.16 | 0.4 | | 0.24 |

Mary takes at random a counter from the bag.

- (a) Work out the probability that the counter will be blue.

.....
(2)

Mary puts the counter back into the bag.
There are 125 counters in the bag.

- (b) Work out the number of green counters in the bag.

.....
(2)

(Total for Question 5 is 4 marks)

- *22 Shabeen has a biased coin.
The probability that the coin will land on heads is 0.6
Shabeen is going to throw the coin 3 times.
She says the probability that the coin will land on tails 3 times is less than 0.1
Is Shabeen correct?
You must show all your working.

(Total for Question 22 is 3 marks)

- 5 Jane has a packet of seeds.
The probability that a seed will grow is 0.75
- (a) What is the probability that a seed will **not** grow?

(1)

Jane plants 200 of these seeds.

- (b) Estimate the number of the seeds that will grow.

(2)

(Total for Question 5 is 3 marks)

Pearson Edexcel - Wednesday 6 November 2013 - Paper 1 (Non-Calculator) Higher Tier

38.

- 19 In a supermarket, the probability that John buys fruit is 0.7
In the same supermarket, the probability that John independently buys vegetables is 0.4
Work out the probability that John buys fruit or buys vegetables or buys both.

(Total for Question 19 is 3 marks)

39.

3 Bill has some counters in a bag.

3 of the counters are red.

7 of the counters are blue.

The rest of the counters are yellow.

Bill takes at random a counter from the bag.

The probability that he takes a yellow counter is $\frac{2}{7}$

How many yellow counters are in the bag before Bill takes a counter?

(Total for Question 3 is 2 marks)

40.

- 26** Fiza has 10 coins in a bag.
There are three £1 coins and seven 50 pence coins.
Fiza takes at random, 3 coins from the bag.
Work out the probability that she takes exactly £2.50

(Total for Question 26 is 4 marks)

Pearson Edexcel - Friday 14 June 2013 - Paper 2 (Calculator) Higher Tier

41.

4 Rhiana plays a game.

The probability that she will lose the game is 0.32

The probability that she will draw the game is 0.05

Rhiana is going to play the game 200 times.

Work out an estimate for the number of times Rhiana will win the game.

(Total for Question 4 is 3 marks)

Pearson Edexcel - Thursday 28 February 2013 - Paper 1 (Non-Calculator) Higher Tier

42.

24 There are three different types of sandwiches on a shelf.

There are

- 4 egg sandwiches,
- 5 cheese sandwiches
- and 2 ham sandwiches.

Erin takes at random 2 of these sandwiches.

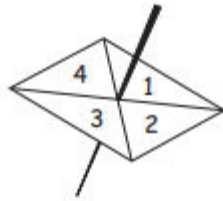
Work out the probability that she takes 2 different types of sandwiches.

(Total for Question 24 is 5 marks)

Pearson Edexcel - Monday 4 March 2013 - Paper 2 (Calculator) Higher Tier

43.

- 4 Here is a four sided spinner.
The spinner is biased.



The table shows the probabilities that the spinner will land on 1 or on 3

| | | | | |
|--------------------|-----|---|-----|---|
| Number | 1 | 2 | 3 | 4 |
| Probability | 0.2 | | 0.1 | |

The probability that the spinner will land on 2 is the same as the probability that the spinner will land on 4

- (a) Work out the probability that the spinner will land on 4

(3)

Shunya is going to spin the spinner 200 times.

- (b) Work out an estimate for the number of times the spinner will land on 3

(2)

(Total for Question 4 is 5 marks)

8 There are only red counters, blue counters, white counters and black counters in a bag.

The table shows the probability that a counter taken at random from the bag will be red or blue.

| | | | | |
|--------------------|-----|------|-------|-------|
| Colour | red | blue | white | black |
| Probability | 0.2 | 0.5 | | |

The number of white counters in the bag is the same as the number of black counters in the bag.

Tania takes at random a counter from the bag.

(a) Work out the probability that Tania takes a white counter.

.....
(2)

There are 240 counters in the bag.

(b) Work out the number of red counters in the bag.

.....
(2)

.....
(Total for Question 8 is 4 marks)

21 Here are seven tiles.



Jim takes at random a tile.
He does **not** replace the tile.

Jim then takes at random a second tile.

(a) Calculate the probability that both the tiles Jim takes have the number 1 on them.

.....
(2)

(b) Calculate the probability that the number on the second tile Jim takes is greater than the number on the first tile he takes.

.....
(3)

.....
(Total for Question 21 is 5 marks)
.....

12 The probability that a biased dice will land on a five is 0.3

Megan is going to roll the dice 400 times.

Work out an estimate for the number of times the dice will land on a five.

(Total for Question 12 is 2 marks)

Pearson Edexcel - Wednesday 13 June 2012 - Paper 2 (Calculator) Higher Tier

47.

25 Carolyn has 20 biscuits in a tin.

She has

- 12 plain biscuits
- 5 chocolate biscuits
- 3 ginger biscuits

Carolyn takes at random two biscuits from the tin.

Work out the probability that the two biscuits were **not** the same type.

(Total for Question 25 is 4 marks)

Pearson Edexcel - Friday 2 March 2012 - Paper 3 (Non-Calculator) Higher Tier

48.

5. There are only red counters, blue counters and green counters in a bag.
There are 5 red counters.
There are 6 blue counters.
There is 1 green counter.

Jim takes at random a counter from the bag.

- (a) Work out the probability that Jim takes a counter that is **not** red.

.....
(2)

Jim puts the counter back in the bag.
He then puts some more green counters into the bag.

The probability of taking at random a red counter is now $\frac{1}{3}$

- (b) Work out the number of green counters that are now in the bag.

.....
(2)

(Total 4 marks)

Pearson Edexcel - Monday 5 March 2012 - Paper 4 (Calculator) Higher Tier

49.

9. Riki has a packet of flower seeds.

The table shows each of the probabilities that a seed taken at random will grow into a flower that is pink or red or blue or yellow.

| Colour | pink | red | blue | yellow | white |
|-------------|------|------|------|--------|-------|
| Probability | 0.15 | 0.25 | 0.20 | 0.16 | |

(a) Work out the probability that a seed taken at random will grow into a white flower.

.....
(2)

There are 300 seeds in the packet.

All of the seeds grow into flowers.

(b) Work out an estimate for the number of red flowers.

.....
(2)

.....
(Total 4 marks)

1. Each student at a college studies one of four languages.

The table shows the probability a student chosen at random studies German or Russian or French.

| | | | | |
|--------------------|--------|---------|---------|--------|
| Language | German | Spanish | Russian | French |
| Probability | 0.2 | | 0.1 | 0.5 |

A student is chosen at random.

(a) Work out the probability that the student studies Spanish.

.....
(2)

There are 800 students at the college.

(b) Work out the number of students who study German.

.....
(2)

(Total 4 marks)

24. There are 5 red pens, 3 blue pens and 2 green pens in a box.

Gary takes at random a pen from the box and gives the pen to his friend.
Gary then takes at random another pen from the box.

Work out the probability that both pens are the same colour.

.....
(Total 4 marks)

Pearson Edexcel - Tuesday 9 November 2010 - Paper 3 (Non-Calculator) Higher Tier

52.

3. Louise spins a four-sided spinner and a five-sided spinner.



The four-sided spinner is labelled 2, 4, 6, 8
 The five-sided spinner is labelled 1, 3, 5, 7, 9

Louise adds the score on the four-sided spinner to the score on the five-sided spinner.
 She records the possible total scores in a table.

| | | 4-sided spinner | | | | |
|-----------------|---|-----------------|----|----|----|---|
| | | + | 2 | 4 | 6 | 8 |
| 5-sided spinner | 1 | 3 | 5 | 7 | 9 | |
| | 3 | 5 | 7 | 9 | 11 | |
| | 5 | 7 | 9 | 11 | 13 | |
| | 7 | 9 | 11 | | | |
| | 9 | 11 | 13 | | | |

- (a) Complete the table of possible total scores. (1)

- (b) Write down all the ways in which Louise can get a total score of 11
 One way has been done for you.

(2, 9)

Both spinners are fair.

- (c) Find the probability that Louise's total score is less than 6

.....
(2)

(Total 5 marks)

2. A spinner can land on red or blue or pink.
The table shows the probabilities that the spinner will land on red or on blue.

| | | | |
|--------------------|------|------|------|
| Colour | red | blue | pink |
| Probability | 0.58 | 0.30 | |

Work out the probability that the spinner will land on pink.

.....
(Total 2 marks)

Pearson Edexcel - Friday 12 November 2010 - Paper 4 (Calculator) Higher Tier

54.

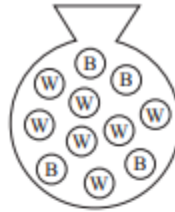
26. There are 11 buttons in a bag.

7 buttons are white.
4 buttons are black.

Harley takes a button at random from the bag, and keeps it.

She now takes another button at random from the bag.

Work out the probability that Harley takes a button of each colour.



.....
(Total 3 marks)

Pearson Edexcel - Monday 7 June 2010 - Paper 3 (Non-Calculator) Higher Tier

55.

26. There are 3 orange sweets, 2 red sweets and 5 yellow sweets in a bag.

Sarah takes a sweet at random.

She eats the sweet.

She then takes another sweet at random.

Work out the probability that both the sweets are the same colour.

.....

(Total 4 marks)

Pearson Edexcel - Friday 11 June 2010 - Paper 4 (Calculator) Higher Tier

56.

10. There are some ribbons in a box.
The ribbons are green or red or yellow or white.

The table shows each of the probabilities that a ribbon chosen at random will be green or red or white.

| Colour | Green | Red | Yellow | White |
|-------------|-------|------|--------|-------|
| Probability | 0.15 | 0.30 | | 0.35 |

- (a) Work out the probability that a ribbon chosen at random will be yellow.

.....
(2)

There are 500 ribbons in the box.

- (b) Work out the number of red ribbons.

.....
(2)

(Total 4 marks)

OCR GSCE – Thursday 5 November 2020 – Paper 5 (Non-Calculator) Higher Tier

57.

4 Dora has the following number cards.



She takes a card at random, replaces the card and then takes a second card. She adds the numbers on the two cards she has taken and records the total.

(a) Complete the following table to show all of her possible totals.

| | | First card | | | | |
|-------------|---|------------|---|---|----|----|
| | | Total | 2 | 2 | 3 | 5 |
| Second card | 2 | 4 | 4 | 5 | 7 | 8 |
| | 2 | 4 | 4 | 5 | | 8 |
| | 3 | 5 | 5 | | 8 | 9 |
| | 5 | 7 | | 8 | 10 | 11 |
| | 6 | 8 | 8 | 9 | 11 | 12 |

[1]

(b) Find the probability that her total is

(i) an even number,

(b)(i) [2]

(ii) a multiple of 3 or 4.

(ii) [2]

58.

- 8 Li has t toy bricks.
She only has red bricks and blue bricks.

Li picks two bricks, one after the other.

If the first brick she picks is red, the probability that the second brick is red is $\frac{2}{3}$.

If the first brick she picks is blue, the probability that the second brick is red is $\frac{7}{10}$.

Calculate the value of t .

$t = \dots\dots\dots$ [4]

OCR GSCE – Monday 9 November 2020 – Paper 6 (Calculator) Higher Tier

59.

12 Students are asked to choose one subject from Option A and one subject from Option B.

| Option A |
|---------------|
| Economics |
| Geography |
| History |
| Media Studies |

| Option B |
|-------------|
| Art |
| Drama |
| Engineering |
| German |
| Graphics |
| Music |
| PE |

If a student chooses their subjects at random, what is the probability that both subjects have the same first letter?

..... [3]

60.

- 15 A bus company has a large number of buses.
25% of the buses are more than 10 years old.

If a bus is more than 10 years old, the probability that it will start first time is 0.3.
If a bus is less than 10 years old, the probability that it will start first time is 0.65.

Amir is asked to drive one of the company's buses, chosen at random.

Calculate the probability that the bus starts first time.

61.

- 11 A bag contains 100 pencils that are either red or green.

Describe a method you could use to estimate the number of red pencils in the bag without looking into the bag or having more than one of the pencils out of the bag at any one time.

.....

.....

.....

..... [4]

62.

16 50 people attended an outdoor activity day.

- 40 took part in walking.
- 18 took part in sailing.
- 3 did neither activity.

One of the people who walked is chosen at random.

Find the probability that this person also sailed.

..... [5]

OCR GSCE – Monday 11 November 2019 – Paper 6 (Calculator) Higher Tier

63.

- 3 Jacob, Amelie and Reuben each roll a fair six-sided dice.
What is the probability that all three roll a number less than 3?

Give your answer as a fraction in its simplest form.

..... [3]

OCR GSCE – Monday 11 November 2019 – Paper 6 (Calculator) Higher Tier

64.

- 13 Dani has a pack of 45 cards.
Each card is either red or black.

One-third of the cards in the pack are **red**.

She picks two cards from the pack, without replacement.

Calculate the probability that Dani picks two **black** cards.

..... [5]

65.

6 120 students in Year 10 and Year 11 sit a test.

- 61 of the students are in Year 10.
- 83 of the students are right-handed.
- 20 of the students in Year 11 are left-handed.

One of the students in Year 10 and one of the students in Year 11 are chosen at random.

Which one is more likely to be left-handed?

Show your working. You may use the table if you wish.

| | | | |
|--|--|--|--|
| | | | |
| | | | |
| | | | |

66.

18 21 people travelled to a meeting.

- 12 used a train.
- 6 used a car.
- 7 did not use a train or a car.
- Some used a train and a car.

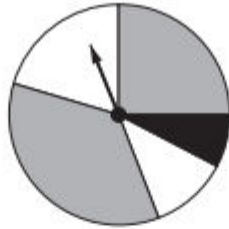
Two people are chosen at random from those who used a train.

Find the probability that both these people also used a car.

..... [6]

67.

- 3 (a) This spinner has two grey sections, two white sections and one black section.



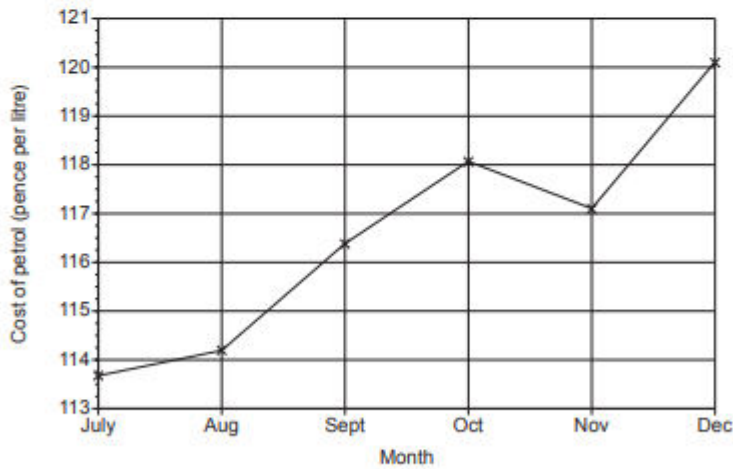
Vlad says

The probability of the spinner landing on black is $\frac{1}{5}$.

Explain why Vlad is not correct.

.....
.....
..... [1]

- (b) The graph shows the cost of a litre of petrol for the last six months of 2017.



Explain why this graph is misleading.

.....
.....
..... [1]

OCR GSCE – Tuesday 11 June 2019 – Paper 6 (Calculator) Higher Tier

68.

4 Sophie is organising a raffle.

- Each raffle ticket costs 50p.
- She sells 400 tickets.
- The probability that a ticket, chosen at random, wins a prize is 0.1.
- Each winning ticket receives a prize worth £3.

Sophie says

I expect the raffle to make over £100 profit.

Show that Sophie is wrong.

.....
..... [4]

OCR GSCE – Tuesday 11 June 2019 – Paper 6 (Calculator) Higher Tier

69.

- 12 Antonio rolls two fair six-sided dice and calculates the **difference** between the scores.
For example, if the two scores are 2 and 5 or 5 and 2 then the difference is 3.

(a) Complete the sample space diagram to show the possible outcomes from Antonio's dice.

| | | Dice 2 | | | | | |
|--------|---|--------|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 |
| Dice 1 | 1 | 0 | | | | | |
| | 2 | | | | | 3 | |
| | 3 | | 1 | | | | |
| | 4 | | | | | | |
| | 5 | | 3 | | | | |
| | 6 | | | | | | |

[2]

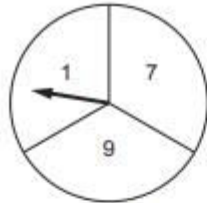
(b) Antonio rolls the two dice three times.

Calculate the probability that he gets a difference of 1 on all three rolls.
Give your answer as a fraction in its lowest terms.

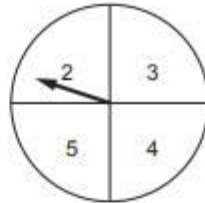
(b) [4]

70.

3 Geoff has two fair spinners.



Spinner A



Spinner B

He spins both spinners and **multiplies** the numbers on each spinner.

(a) Complete the table.

| | | Spinner A | | |
|-----------|---|-----------|----|----|
| | | 1 | 7 | 9 |
| Spinner B | 2 | 2 | 14 | 18 |
| | 3 | 3 | 21 | 27 |
| | 4 | 4 | 28 | |
| | 5 | 5 | 35 | |
| | | | | |

[1]

(b) Geoff wants to work out the probability that the outcome of the multiplication is an even number or a prime number. Here is his working.

The probability the outcome is an even number is $\frac{6}{12}$.

The probability the outcome is a prime number is $\frac{3}{12}$.

The probability the outcome is an even number or a prime number is $\frac{6}{12} + \frac{3}{12} = \frac{9}{12}$.

Geoff is wrong.
Explain his error and give the correct answer.

.....

..... [2]

OCR GSCE – Thursday 7 June 2018 – Paper 5 (Non - Calculator) Higher Tier

71.

8 Hannah wants to display all the possible outcomes when rolling two fair 6-sided dice.

(a) Give a reason why a tree diagram is not the best method to use.

..... [1]

(b) (i) Draw a sample space to display all the possible outcomes. [2]

(ii) Show that the probability of the scores on the two dice adding to 11 is $\frac{1}{18}$.

..... [2]

72.

- 14 Adam has 10 sweets in a bag.
5 are cherry sweets, 4 are lemon sweets and 1 is an orange sweet.

Adam chooses a sweet at random from the bag and eats it.
He then takes another sweet at random from the bag and eats it.

- (a) Adam says

The probability that I choose two cherry sweets is $\frac{25}{100}$.

He is incorrect. Explain his error.

.....
..... [2]

- (b) Find the probability that the two sweets he chooses have different flavours.

(b) [4]

73.

- 4 Jeat is growing carrots from seed in his garden.
He plants 28 carrot seeds but only 12 grow.

Jeat says

The probability of one of my carrot seeds growing is $\frac{3}{7}$.

- (a) Use Jeat's result to show that he is correct. [1]

- (b) A farmer uses this probability to calculate how many carrot seeds he should plant to grow 10 000 carrots.

How many seeds should he plant?

- (b) seeds [2]

- (c) Explain why it may not be sensible for the farmer to use Jeat's experimental probability to calculate the number of seeds he should plant.

.....

.....

..... [1]

OCR GSCE – Thursday 8 June 2017 – Paper 5 (Non - Calculator) Higher Tier

74.

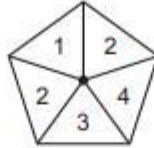
18 In a group of 120 adults, 85 watch football, 78 play a sport and 20 do neither.

Find the probability that an adult chosen at random from those who watch football does not play a sport.

..... **[5]**

75.

- 6 (a) This is a fair 5-sided spinner.



Ciara spins the spinner twice and records the product of the two scores.

- (i) Complete the table.

| | | First spin | | | | |
|-------------|---|------------|---|---|----|---|
| x | | 1 | 2 | 2 | 3 | 4 |
| Second spin | 1 | 1 | | | | |
| | 2 | | | 4 | | |
| | 2 | | | | | |
| | 3 | | | | | |
| | 4 | | | | 12 | |

[2]

- (ii) Find the probability that the product is a multiple of 3.

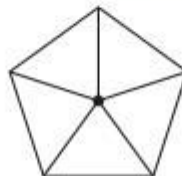
(a)(ii) [2]

- (b) Ciara makes a different fair 5-sided spinner. She spins the spinner twice and records the product of the two scores.

Ciara says

The probability that the product is negative is 0.48.

Write numbers on the spinner below so that Ciara's statement is correct.



[3]

OCR GCSE – Sample Papers – Paper 4 (Calculator) Higher Tier

76.

- 7 Dan believes he knows what his brother Ethan is thinking.
He carries out an experiment to test this.

Dan and Ethan sit back-to-back.

Ethan rolls an ordinary fair dice.

Ethan then thinks about the number on the dice while Dan tries to predict this number.

- (a) In 300 attempts, how many correct predictions would you expect Dan to make if he was just guessing?

(a) [2]

- (b) The results of the first 15 attempts are shown in the table.

| | | | | | | | | | | | | | | | |
|------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ethan's number | 2 | 6 | 5 | 3 | 2 | 1 | 5 | 1 | 3 | 4 | 4 | 6 | 1 | 6 | 5 |
| Dan's prediction | 2 | 4 | 3 | 1 | 2 | 6 | 1 | 6 | 4 | 3 | 2 | 6 | 5 | 2 | 3 |
| Matching pair | ✓ | | | | ✓ | | | | | | | ✓ | | | |

Estimate the probability of getting a matching pair using the results of

- (i) the first five attempts,

(b)(i) [1]

- (ii) all 15 attempts.

(ii) [1]

- (c) Use answers from (a) and (b) to comment on Dan's belief that he knows what Ethan is thinking.

.....

 [2]

OCR GCSE – Sample Papers – Paper 5 (Non - Calculator) Higher Tier

77.

- 3 Abi, Ben and Carl each drop a number of identical drawing pins, and count how many land with the pin upwards. The table shows some of their results.

| | Number of pins dropped | Number landing 'pin up' |
|------|------------------------|-------------------------|
| Abi | 10 | 4 |
| Ben | 30 | 9 |
| Carl | 100 | 35 |

- (a) Abi says

As a drawing pin can only land with its pin up or with its pin down, the probability of a drawing pin landing 'pin up' is $\frac{1}{2}$.

Criticise her statement.

.....
..... [1]

- (b) Carl's results give the best estimate of the probability of a drawing pin landing 'pin up'. Explain why.

.....
..... [1]

- (c) Two pins are dropped.

Estimate the probability that both pins land 'pin up'.

(c) [2]

OCR GSCE – Sample Papers – Paper 5 (Non - Calculator) Higher Tier

78.

6 A bag contains only red and blue marbles.

Yasmine takes one marble at random from the bag.

The probability that she takes a red marble is $\frac{1}{5}$.

Yasmine returns the marble to the bag and adds five more red marbles to the bag.

The probability that she takes one red marble at random is now $\frac{1}{3}$.

How many marbles of each colour were originally in the bag?

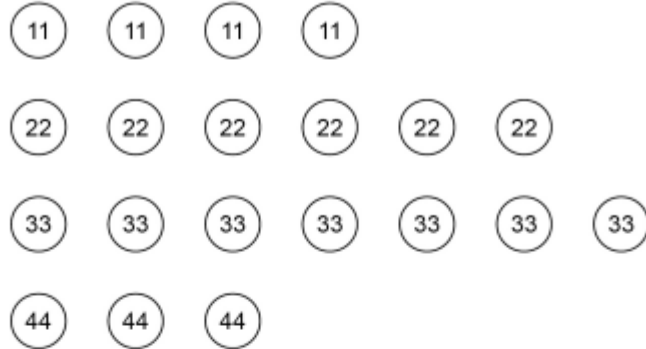
..... red marbles

..... blue marbles

[3]

79.

27 These 20 discs are in a bag.



Two of the discs are taken at random from the bag.

Work out the probability that the first disc has a **smaller** number than the second disc.

[4 marks]

Answer _____

AQA GCSE – Thursday 8 June 2020 – Paper 3 (Calculator) Higher Tier

80.

4 A fair coin is spun four times.

Circle the probability of getting four Heads.

[1 mark]

$\frac{1}{2}$

2

$\frac{1}{8}$

$\frac{1}{16}$

AQA GCSE – Thursday 8 June 2020 – Paper 3 (Calculator) Higher Tier

81.

11 A spinner can land on red, blue or green.

After 350 spins

relative frequency of red = 0.18

relative frequency of blue = 0.62

Work out the number of times the spinner landed on green.

[3 marks]

Answer _____

82.

- 22 Visitors to a museum buy a child ticket or an adult ticket.
Here is some information about two groups of visitors.

| | |
|----------------|---|
| Group X | 250 visitors, including 120 children |
| Group Y | number of children : number of adults = 17 : 15 |

One visitor from each group is picked at random.

Is this statement correct?

Probability of picking two children > probability of picking two adults

You **must** show your working.

[4 marks]

AQA GCSE – Thursday 6 June 2019 – Paper 2 (Calculator) Higher Tier

83.

18 In a bag there are blue discs, green discs and white discs.

There are four times as many blue discs as green discs.

number of blue discs : number of white discs = 3 : 5

One disc is selected at random.

Work out the probability that the disc is either blue or white.

[3 marks]

Answer _____

AQA GCSE – Tuesday 11 June 2019 – Paper 3 (Calculator) Higher Tier

84.

2 For a biased dice, $P(6) = \frac{3}{5}$

Circle the probability of two sixes when the dice is rolled twice.

[1 mark]

$$\frac{6}{25}$$

$$\frac{6}{10}$$

$$\frac{9}{25}$$

$$\frac{9}{5}$$

AQA GCSE – Thursday 8 November 2018 – Paper 2 (Calculator) Higher Tier

85.

- 1 What does $(A \cap B)$ represent in $P(A \cap B)$?
Circle your answer.

[1 mark]

A or B or both

A but not B

not A and not B

A and B

AQA GCSE – Thursday 8 November 2018 – Paper 2 (Calculator) Higher Tier

86.

- 18 A bag contains 20 discs.
10 are red, 7 are blue and 3 are green.
- 18 (a) Marnie takes a disc at random before putting it back in the bag.
Nick then takes a disc at random before putting it back in the bag.
Oly then takes a disc at random.
Work out the probability that they all take a red disc.

[2 marks]

Answer _____

- 18 (b)** All 20 discs are in the bag.
Reggie takes three discs at random, one after the other.
After he takes a disc he does **not** put it back in the bag.
Reggie's first disc is blue.
Work out the probability that all three discs are different colours.

[3 marks]

AQA GCSE – Monday 12 November 2018 – Paper 3 (Calculator) Higher Tier

87.

- 13** The probability of Heads when a biased coin is thrown is 0.6
The coin is thrown 500 times.
Circle the expected number of Tails.

[1 mark]

20

200

250

300

AQA GCSE – Monday 12 November 2018 – Paper 3 (Calculator) Higher Tier

88.

16

In a running club there are 50 females and 80 males.

If a female is chosen at random, the probability she has blue eyes is 0.38

If a male is chosen at random, the probability he has blue eyes is 0.6

One person is chosen at random.

Show that the probability the person has blue eyes is **more than 0.5**

[4 marks]

15

A biased dice is thrown.

Here are the probabilities of each score.

| | | | | | | |
|--------------------|------|------|------|------|-----|-----|
| Score | 1 | 2 | 3 | 4 | 5 | 6 |
| Probability | 0.25 | 0.05 | 0.15 | 0.05 | 0.3 | 0.2 |

The dice is thrown 200 times.

Work out the expected number of times the score will be odd.

[3 marks]

Answer _____

- 7 On three days, Ali throws darts at a target.
Here are his results.

| | Number of throws | Number of hits | Number of misses |
|-----------|------------------|----------------|------------------|
| Monday | 20 | 15 | 5 |
| Tuesday | 30 | 22 | 8 |
| Wednesday | 40 | 17 | 23 |
| Total | 90 | 54 | 36 |

- 7 (a) Work out **two** different estimates for the probability of Ali hitting the target.

[2 marks]

Answer _____ and _____

- 7 (b) Which of your two answers is the better estimate for the probability of Ali hitting the target?

Give a reason for your answer.

[1 mark]

Answer _____

Reason _____

AQA GCSE – Tuesday 12 June 2018 – Paper 3 (Calculator) Higher Tier

91.

27 A bag contains 30 discs.
10 are red and 20 are blue.

One disc is taken out at random and replaced by **two** of the other colour.

Another disc is then taken out at random and replaced by **two** of the other colour.

Another disc is then taken out at random.

Work out the probability that all three discs taken out are **red**.

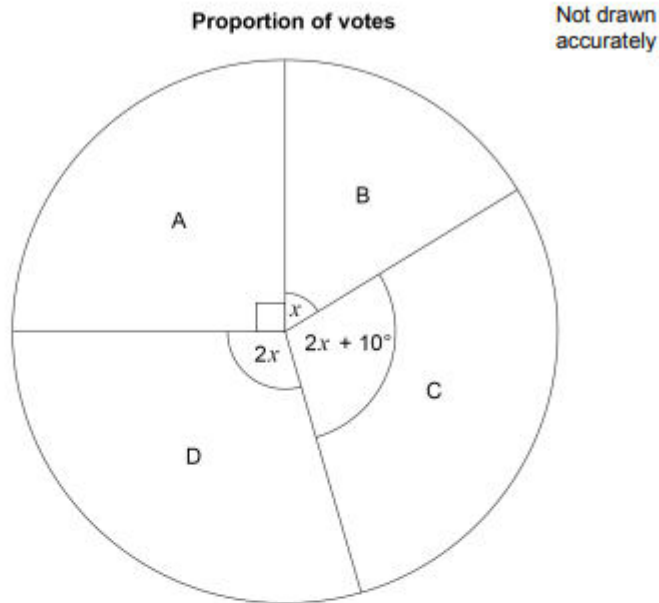
[3 marks]

Answer _____

AQA GCSE – Thursday 2 November 2017 – Paper 1 (Non - Calculator) Higher Tier

92.

- 11 The four candidates in an election were A, B, C and D.
The pie chart shows the proportion of votes for each candidate.



Work out the probability that a person who voted, chosen at random, voted for C. **[4 marks]**

Answer _____

AQA GCSE – Thursday 2 November 2017 – Paper 1 (Non - Calculator) Higher Tier

93.

27

There are 11 pens in a box.

8 are black and 3 are red.

Two pens are taken out at random **without** replacement.

Work out the probability that the two pens are the **same** colour.

[4 marks]

AQA GCSE – Thursday 8 June 2017 – Paper 2 (Calculator) Higher Tier

94.

- 5** A code has 4 digits.
Each digit is a number from 0 to 9
Digits may be repeated.

The code starts 5 4 1

| | | | |
|---|---|---|--|
| 5 | 4 | 1 | |
|---|---|---|--|

- 5 (a)** Amy knows the last digit is odd but **not** 7
She chooses a different odd number at random.
What is the probability that she chooses the correct number?

[1 mark]

Answer _____

- 5 (b)** The 4-digit code is changed to an even number.
The first digit is 3
How many possible codes are there?

[2 marks]

Answer _____

95.

9 The table shows information about some CDs.

| | | | |
|---------------|------|-----|----------|
| Type | Rock | Pop | Jazz |
| Number of CDs | 2 | x | $2x + 5$ |

A CD is chosen at random.

The probability it is **rock** is $\frac{1}{20}$

Work out the probability it is jazz.

[4 marks]

Answer _____

96.

- 5 A coin lands on Tails 200 times.
The relative frequency of Tails is 0.4

Work out the number of times the coin was thrown.

[2 marks]

Answer _____

97.

9 There are 720 boys and 700 girls in a school.

The probability that a boy chosen at random studies French is $\frac{2}{3}$

The probability that a girl chosen at random studies French is $\frac{3}{5}$

9 (a) Work out the number of students in the school who study French.

[3 marks]

Answer _____

9 (b) Work out the probability that a student chosen at random from the whole school does **not** study French.

[2 marks]

Answer _____

AQA GCSE – Sample Paper 1 (Non - Calculator) Higher Tier

98.

- 14 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 |

- 14 (a) Work out the value of x .

[2 marks]

Answer _____

- 14 (b) Work out the probability that the prime number is greater than 390

[1 mark]

Answer _____

14 (c) There are four prime numbers between 300 and 330

How many prime numbers are there between 300 and 450?

[2 marks]

Answer _____

AQA GCSE – Sample Paper 2 (Calculator) Higher Tier

99.

- 7 A coin is rolled onto a grid of squares.
It lands randomly on the grid.
To win, the coin must land completely within one of the squares.

Meera and John each roll the coin a number of times and record their results.

| | Number of wins | Number of losses |
|-------|----------------|------------------|
| Meera | 6 | 44 |
| John | 28 | 72 |

- 7 (a) Work out **two** different estimates for the probability of winning.

[2 marks]

Answer _____ and _____

- 7 (b) Which of your estimates is the better estimate for the probability of winning?
Give a reason for your answer.

[1 mark]

Answer _____

Reason _____

AQA GCSE – Sample Paper 3 (Calculator) Higher Tier

100.

- 6 A bag contains counters that are red, blue, green or yellow.

| | red | blue | green | yellow |
|--------------------|-----|------|---------|--------|
| Number of counters | 9 | $3x$ | $x - 5$ | $2x$ |

A counter is chosen at random.

The probability it is **red** is $\frac{9}{100}$

Work out the probability it is green.

[4 marks]

Answer _____

