PROBABILITY (SINGLE EVENTS)

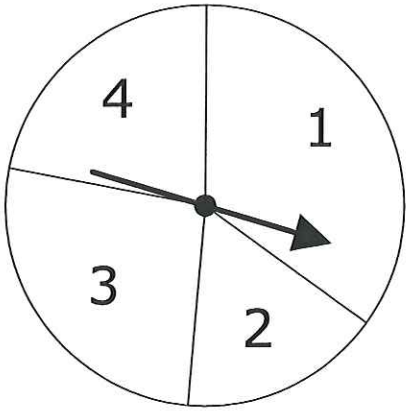
DATE OF SOLUTIONS: 15/05/2018
MAXIMUM MARK: 66

SOLUTIONS

GCSE (+ IGCSE) EXAM QUESTION PRACTICE

1. [Edexcel, 2004] Probability (Single Events) **[6 Marks]**

The diagram shows a pointer which spins about the centre of a fixed disc.



When the pointer is spun, it stops on one of the numbers 1, 2, 3 or 4.
The probability that it will stop on one of the numbers 1 to 3 is given in the table.

Number	1	2	3	4
Probability	0.35	0.16	0.27	0.22

Magda is going to spin the pointer once.

(a) Work out the probability that the pointer will stop on 4.

$1 - (0.35 + 0.16 + 0.27)$ M1

0.22 A1

(2)

(b) Work out the probability that the pointer will stop on 1 or 3.

$0.35 + 0.27$ M1

0.62 A1

(2)

Omar is going to spin the pointer 75 times.

(c) Work out an estimate for the number of times the pointer will stop on 2.

75×0.16 M1

12 A1

(2)

2. [Edexcel, 2008] Probability (Single Events) **[2 Marks]**

A bag contains red discs, black discs and white discs.
The number of black discs is equal to the number of white discs.
Selina is going to take a disc at random from the bag.
The probability that she will take a red disc is 0.6

Work out the probability that she will take a black disc.

RED 0·6

BLACK
WHITE } EQUAL, ∴ 0·2 EACH.

0·2 (A2)

3. [Edexcel, 2013] Probability (Single Events) **[4 Marks]**

A box contains some coloured cards.
Each card is red or blue or yellow or green.
The table shows the probability of taking a red card or a blue card or a yellow card.

Card	Probability
Red	0.3
Blue	0.35
Yellow	0.15
Green	

George takes at random a card from the box.

(a) Work out the probability that George takes a green card.

B1

0·3
+0·35
+0·15
0·8

1 − 0·8 = 0·2

0·2 A1

(2)

George replaces his card in the box.
Anish takes a card from the box and then replaces the card.
Anish does this 40 times.

(b) Work out an estimate for the number of times Anish takes a yellow card.

0·15 × 40

M1

6 A1

(2)

4. [Edexcel, 2013] Probability (Single Events) **[4 Marks]**

A box contains four different kinds of chocolates.
Debbie takes at random a chocolate from the box.
The table shows the probability of Debbie taking an Orange or a Coffee or a Caramel chocolate.

Chocolate	Probability
Orange	0.15
Coffee	0.40
Caramel	0.35
Strawberry	

0.9
B1

(a) Work out the probability that Debbie takes a Strawberry chocolate.

$1 - 0.9 = 0.1$

A1
0.1
(2)

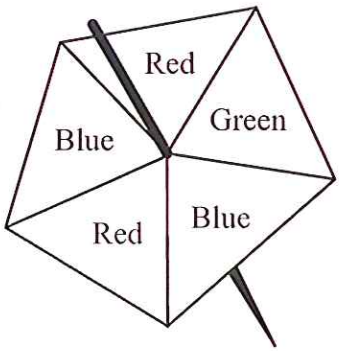
(b) Work out the probability that Debbie takes an Orange chocolate or a Coffee chocolate.

$0.15 + 0.40$
M1

A1
0.55
(2)

5. [Edexcel, 2012] Probability (Single Events) **[2 Marks]**

Here is a fair 5-sided spinner.



Hans spins the spinner 30 times.

Work out an estimate for the number of times the spinner lands on Red.

$P(\text{RED}) = \frac{2}{5}$ (B1)

$E(\text{RED}) = \frac{2}{5} \times 30$

$= \underline{12}$ (A1)

6. [Edexcel, 2015] Probability (Single Events) **[3 Marks]**

A bag contains only red bricks and blue bricks.
There is a total of 20 bricks in the bag.

The probability that a brick taken at random from the bag will be red is $\frac{2}{5}$

How many blue bricks are there in the bag?

$P(\text{RED}) = \frac{2}{5}$ (A1)

$= \frac{8}{20}$ (M1) $\therefore$ 8 RED $\Rightarrow$ 12 BLUE (A1)

7. [Edexcel, 2011] Probability (Single Events) **[4 Marks]**

John throws a biased coin 120 times.

It shows heads 90 times.

(a) John throws the coin once more.
Work out an estimate for the probability that the coin shows **tails**.

$P(H) = \frac{90}{120}$ (M1)

$= \frac{3}{4}$

$P(T) = \frac{1}{4}$

$\frac{1}{4}$ (A1)

(2)

Carly throws the same coin 200 times.

(b) Work out an estimate for the number of times the coin shows **tails**.

$200 \times \frac{1}{4}$ (M1)

50 (A1)

(2)

8. [Edexcel, 2016] Probability (Single Events) **[2 Marks]**

There are 50 marbles in a bag.
35 of the marbles are brown.

Otti takes at random a marble from the bag.
He records the colour of the marble and puts the marble back in the bag.

He does this 300 times.

Work out an estimate for the number of brown marbles he takes.

$300 \times \frac{35}{50}$ M1

210 A1

9. [Edexcel, 2009] Probability (Single Events) **[4 Marks]**

A bag contains some beads.
The colour of each bead is red or green or blue.
Binita is going to take a bead at random from the bag.
The probability that she will take a red bead is 0.4
The probability that she will take a green bead is 0.5

(a) Work out the probability that she will take a blue bead.

$P(B) = 1 - (0.4 + 0.5)$ M1

0.1 A1

.....

(2)

(b) There are 80 beads in the bag.
Work out the number of red beads in the bag.

80×0.4 M1

32 A1

.....

(2)

10. [Edexcel, 2015] Probability (Single Events) **[3 Marks]**

A bag contains only red counters, blue counters and yellow counters.
The number of red counters in the bag is the same as the number of blue counters. → P(R) = P(B)

Mikhail takes at random a counter from the bag.
The probability that the counter is yellow is 0.3

Work out the probability that the counter Mikhail takes is red.

$1 - 0.3 = 0.7$ (M1)

(M1) $\frac{0.7}{2} = 0.35$ (A1)

11. [Edexcel, 2009] Probability (Single Events) **[2 Marks]**

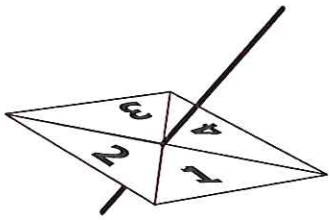
A bag contains 10 coloured beads.
Ella is going to take at random a bead from the bag.
She says, "The probability that I will take a red bead is 0.35"

Explain why Ella is wrong.
You must show working to justify your answer.

IF BAG CONTAINS 10 BEADS THE ONLY POSSIBLE PROBABILITIES ARE 0.1, 0.2, 0.3, 0.4 ETC (A2)

12. [Edexcel, 2004] Probability (Single Events) **[3 Marks]**

Here is a 4-sided spinner.



The sides of the spinner are labelled 1, 2, 3 and 4.
The spinner is biased.
The probability that the spinner will land on each of the numbers 1, 2 and 3 is given in the table.

Number	1	2	3	4
Probability	0.2	0.1	0.4	

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

$1 - (0.2 + 0.1 + 0.4)$ M1

A1

0.3

(2)

Tom spun the spinner a number of times.
The number of times it landed on 1 was 85

(b) Work out an estimate for the number of times the spinner landed on 3

85×2

A1

170

(1)

13. [Edexcel, 2016] Probability (Single Events) **[7 Marks]**

Maisie plays a game.
Each time she plays, she can win a prize of $1 or $5 or $10
When she does not win one of these prizes, she loses.
The table gives the probability of winning each of the prizes.

Prize	Probability
$1	0.50
$5	0.15
$10	0.05

Maisie plays the game once.

(a) Work out the probability that Maisie loses.

$1 - (0.5 + 0.15 + 0.05)$ M1

$= 1 - 0.7$

0.3 A1

(2)

(b) Maisie plays the game 40 times.

(i) Work out an estimate for the number of $5 prizes she wins.

40×0.15 M1

6 A1

(2)

(ii) Work out an estimate for the total value of the prizes she wins.

$40 \times 0.5 \times \$1 = \$20$

$40 \times 0.15 \times \$5 = \$30$ } $70

$40 \times 0.05 \times \$10 = \$20$

M1 [ALL THREE] M1 [ATTEMPT TO ADD]

$ 70 A1

(3)

14. [Edexcel, 2008] Probability (Single Events) **[4 Marks]**

The table shows information about the number of letters delivered to Manjit's house each day.

Number of letters delivered	Probability
0	0.2
1 to 5	0.5
6 to 10	0.2
More than 10	0.1

(a) There are 30 days in June.
Calculate an estimate of the number of days in June on which the number of letters delivered is 0

30×0.2 M1

6 A1

.....

(2)

(b) Find the probability that on a particular day the number of letters delivered is 6 or more.

$0.2 + 0.1$ M1

0.3 A1

.....

(2)

15. [Edexcel, 2005] Probability (Single Events) **[2 Marks]**

In a club, $\frac{1}{2}$ of the members are left-handed and $\frac{1}{4}$ of the members wear glasses.
A member is chosen at random.

Stavros says "The probability that this member is left-handed **or** wears glasses is $\frac{3}{4}$"

Is he correct?

NO

Explain your answer.

STAVROS HAS JUST ADDED THE TWO SINGLE PROBABILITIES. HE NEEDS TO SUBTRACT THE PROBABILITY THAT A MEMBER WHO IS LEFT HANDED, ALSO WEARS GLASSES.

LEFT-HANDED AND WEARING CLASSES ARE NOT MUTUALLY EXCLUSIVE

[THE ANSWER 'NO' AND ANY MENTION THAT A MEMBER MIGHT BE LEFT HANDED AND ALSO WEAR GLASSES] (A2)

There are 48 beads in a bag.
Some of the beads are red and the rest of the beads are blue.
Shan is going to take a bead at random from the bag.
The probability that she will take a red bead is $\frac{3}{8}$

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

$\frac{3}{8} = \frac{18}{48}$ ∴ 18 OF THE 48 ARE RED (M1)

18 (A1)

(2)

Shan adds some **red** beads to the 48 beads in the bag.
The probability that she will take a red bead is now $\frac{1}{2}$

(b) Work out the number of red beads she adds.

$\frac{18+x}{48+x} = \frac{1}{2}$ (M1)

$\Rightarrow 2(18+x) = 48+x$

$\Rightarrow 36+2x = 48+x$

$\Rightarrow 2x - x = 48 - 36$

$\Rightarrow x = 12$

12 (A1)

(2)

[NON-ALGEBRAIC METHODS ARE FINE]

17. [Edexcel, 2016] Probability (Single Events) **[4 Marks]**

A box contains toy cars.
Each car is red or blue or black or silver.

Emily takes at random a car from the box.
The table shows the probabilities that Emily takes a red car or a blue car or a black car.

Colour of car	Probability
red	0.20
blue	0.05
black	0.15
silver	

(a) Work out the probability that Emily takes a silver car.

$1 - (0.20 + 0.05 + 0.15)$ M1

A1 0.6

(2)

Emily puts the car back into the box.
There are 6 blue cars in the box.

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

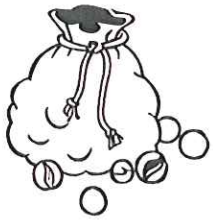
$\frac{6}{\text{TOTAL}} = 0.05$

$\Rightarrow \text{TOTAL} = \frac{6}{0.05}$ M1

A1 120

(2)

A bag contains some marbles.
The colour of each marble is red or blue or green or yellow.



A marble is taken at random from the bag.
The table shows the probability that the marble is red or blue or green.

Colour	Probability
Red	0.1
Blue	0.2
Green	0.1
Yellow	

(a) Work out the probability that the marble is yellow.

$1 - (0.1 + 0.2 + 0.1)$

$= 1 - 0.4$ M1

0.6 A1

(2)

(b) Work out the probability that the marble is blue or green.

$0.2 + 0.1$ M1

0.3 A1

(2)

The probability that the marble is made of glass is 0.8

(c) Beryl says "The probability that the marble is green or made of glass is 0.1 + 0.8 = 0.9"

Is Beryl correct? NO A1

Give a reason for your answer.

BECAUSE THE MARBLE COULD BE MADE OF GREEN GLASS (I.E. BOTH GREEN AND MADE OF GLASS) A1

[2]

STATING "NOT MUTUALLY EXCLUSIVE" WOULD BE GOOD.

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