1 In a raffle, 200 tickets are sold.
The tickets are either red or blue.

The winning ticket is picked at random.

1 (a) What is the probability that the winning ticket is green?

[1 mark]

Answer 0 (1)

1 (b) 79 children and 90 women buy one ticket each.
Men buy the rest of the tickets.

Work out the probability that a man buys the winning ticket.

[2 marks]

Men : 200 - 90 - 79 = 31 (1)

Answer $\frac{31}{200}$ (1)

2 An ordinary fair dice is rolled.

$P(A) = \frac{5}{6}$

Which could be a correct statement about event A?

Tick **one** box.

[1 mark]

- ☐ The number rolled is even
- ☑ The number rolled is greater than 1
- ☐ The number rolled is less than 5
- ☐ The number rolled is prime

3 The result of a game is Win, Lose or Draw.

After 80 games

relative frequency of the result Win is 0.4

relative frequency of the result Lose is 0.25

How many of the games had the result Draw?

[3 marks]

$1 - 0.4 - 0.25 = 0.35$ (1)

$0.35 \times 80 = 28$ (1)

(1)

Answer 28

4 In a choir there are 35 men and 48 women.

The probability that a man chosen at random wears glasses is $\frac{2}{5}$

The probability that a woman chosen at random wears glasses is $\frac{3}{8}$

4 (a) A person is chosen at random from the choir.

Work out the probability that the person does **not** wear glasses.

[2 marks]

Total men + women = 35 + 48 = 83

Not wearing glass = 83 − 32 = 51 (1)

P(not wearing glass) = $\frac{51}{83}$ (1)

Answer $\frac{51}{83}$

5 Counters in a bag are red, white or blue.

A counter is picked at random.

Complete the table.

[2 marks]

	Red	**White**	**Blue**
Probability	0.15	0.4	0.45

$1 - 0.4 - 0.15 = 0.45$ (1) (1)

6 16 people were asked to name their favourite fruit juice.

Here are the results.

Favourite juice	Frequency
Apple	6
Grapefruit	1
Orange	4
Mango	5

6 (a) One of the people was picked at random.

Work out the probability that their favourite juice was orange **or** mango.

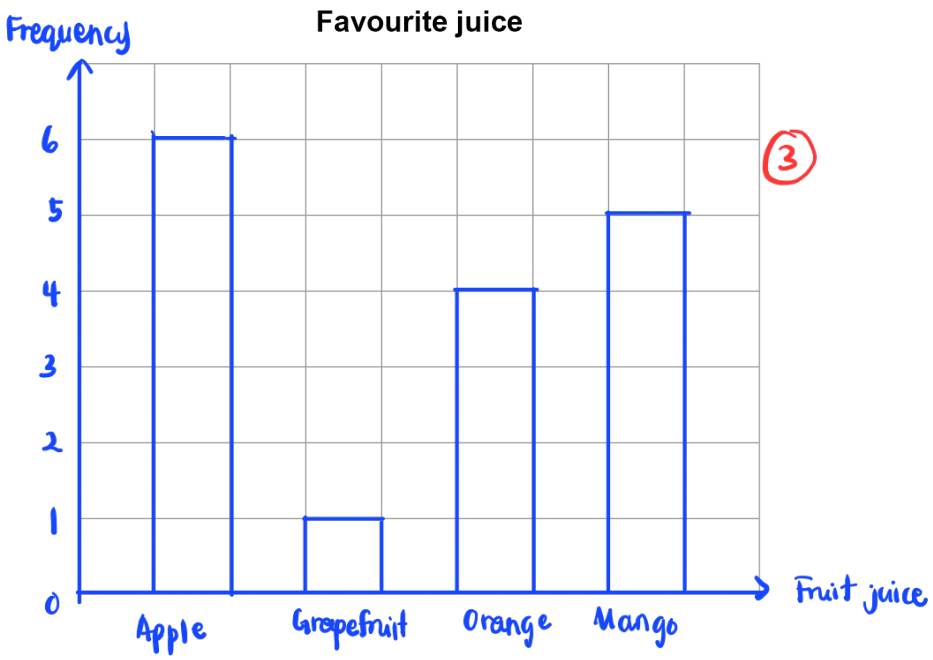
[1 mark]

$\frac{4}{16} + \frac{5}{16} = \frac{9}{16}$

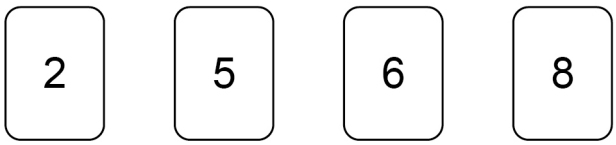
Answer $\frac{9}{16}$ (1)

6 (b) On the grid, draw a bar chart to represent the results.

[3 marks]

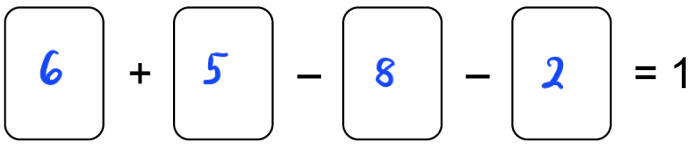


7 Here are four number cards.



7 (a) Use each card once to make this calculation correct.

[1 mark]



(1)

Two of the cards are chosen at random.

7 (b) List all the possible pairs of cards.

Two have been done for you.

[2 marks]

First card	Second card
2	5
5	2
2	6
2	8
5	6
5	8
6	2
6	5
6	8
8	2
8	5
8	6

(2)

7 (c) Write down the probability that the first card is an even number.

[1 mark]

Answer $\frac{3}{4}$ (1)

8 In a game, the player going first uses crosses and the player going second uses circles.
To win the game, a player must get three crosses or three circles together in a line.
The line must be horizontal, vertical or diagonal.

8 **(a)** Here is the position in a game.

	A	B	C	D	E	F
1					O	
2				O		
3			X	X		
4				X		
5		O			O	
6		X				

It is Amy's turn to put a cross on the grid.
She wins if she puts a cross in B3

Write down **all** the other squares where she could put a cross to win the game.

[2 marks]

Answer B2 , C5 , D5 , E3

(2)

Amy goes first in the next game.

	A	B	C	D	E	F
1						
2						
3						
4						
5						
6						

8 (b) Assume that she will choose a square at random.

Write down the probability that she will put her first cross in square F6

[1 mark]

Answer $\frac{1}{36}$ (1)

8 (c) In fact, Amy decides to put her first cross into a corner square.

What does this mean about the probability that she will put her first cross in square F6?

Tick a box.

- ☐ It is smaller than the answer to part (b)
- ☑ It is greater than the answer to part (b)
- ☐ It is the same as the answer to part (b)

Give a reason for your answer.

[1 mark]

The probability is now $\frac{1}{4}$. (1)

9 In a bag there are only red discs, blue discs and green discs.

There are 10 red discs.

When one disc is picked at random

$$P(\text{red}) = \frac{1}{8}$$

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

How many **green** discs are in the bag?

[4 marks]

Total discs $= \frac{10}{\frac{1}{8}} = 80$ (1)

Total blue $= \frac{2}{5} \times 80 = 32$ (1)

Total green $= 80 - 10 - 32$ (1)

$= 38$ (1)

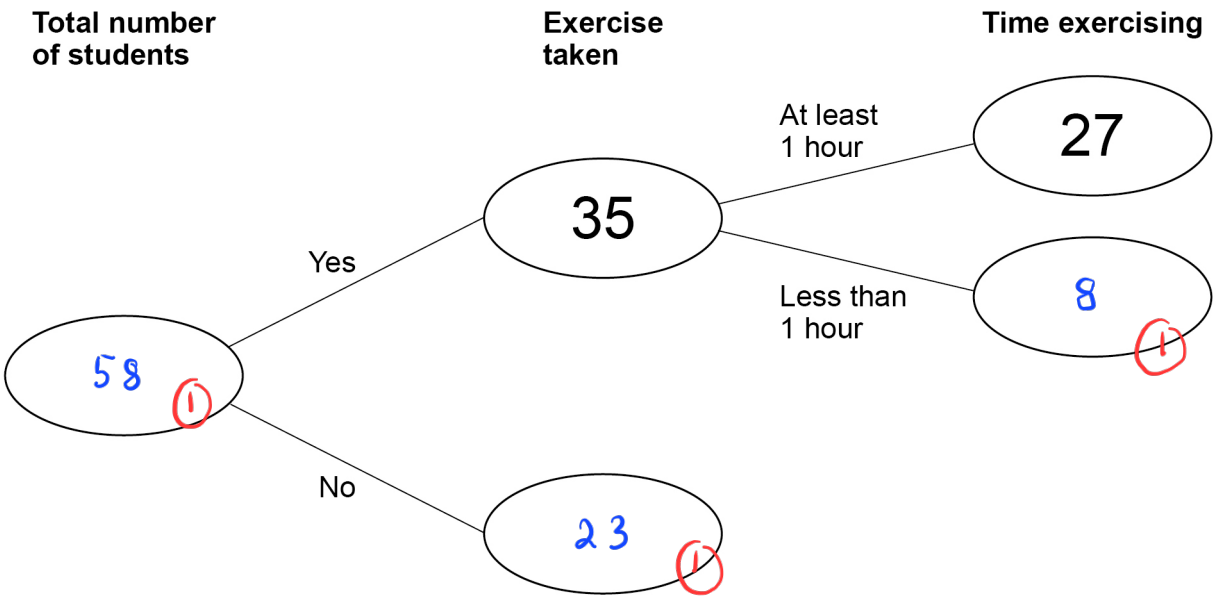
Answer 38

10 Some students were asked about their daily exercise.

10 (a) 12 **more** students answered Yes than answered No.

Complete the frequency tree.

[3 marks]



10 (b) One of the 35 students who answered Yes is chosen at random.

What is the probability that they exercise for at least 1 hour?

[1 mark]

Answer $\frac{27}{35}$

11 Adam and Bianca each throw the same biased coin.

Here is some information about their throws.

	Number of throws	Number of Heads
Adam	40	14
Bianca	60	20

Bianca says,

"My results give a better estimate of the probability of Heads than Adam's results."

Is she correct?

Tick a box.

Yes ✓ No

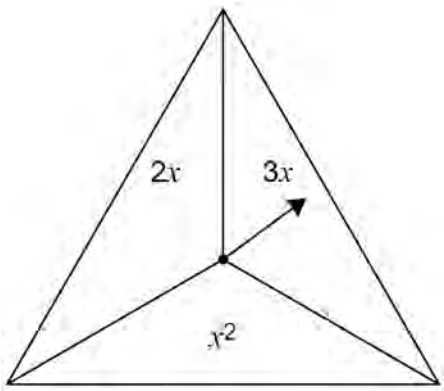
Give a reason for your answer. (1)

[1 mark]

She throws more than Adam.

12 In a game,

- an ordinary fair six-sided dice is rolled
- the fair spinner shown is spun.



The score is the dice number **substituted** into the spinner expression.

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

[2 marks]

	1	2	3	4	5	6
2x	2	4	6	8	10	12
3x	3	6	9	12	15	18
x^2	1	4	9	16	25	36

2

12 (b) A player wins the game if their score is 10 or more.

Work out the probability that they win the game.

[1 mark]

$\frac{8}{18}$

Answer $\frac{8}{18}$ (1)

12 (c) The game is played 711 times.

Estimate the number of games that are won.

[2 marks]

$\frac{8}{18} \times 711 = 316$ (1) (1)

Answer 316

13 Bag A and bag B each contain only red discs and green discs.

Bag A	Contains 28 red discs There are twice as many red discs as green discs
Bag B	Contains 20 green discs There are 3 red discs for every 5 green discs

13 (a) Work out the **total** number of discs.

[3 marks]

Bag A : Red = 28

Green = $\frac{28}{2}$ = 14 (1)

Bag B : Red = $\frac{20}{5} \times 3 = 12$ (1)

Green = 20

Total : 28 + 14 + 12 + 20 = 74 (1)

Answer 74

13 (b) A different bag, C, is empty.

The 28 red discs from A are put into C.

The 20 green discs from B are also put into C.

One disc is now picked at random from each bag.

Complete each statement.

[3 marks]

The probability of red from A is 0 (1)

The probability of red from B is 1 (1)

The probability of red from C is $\frac{28}{48}$ (1)

14 (a) In group C there are 25 people.

17 of these people have passed a test.

One person is picked at random from C.

Work out the probability that the person has **not** passed a test.

[2 marks]

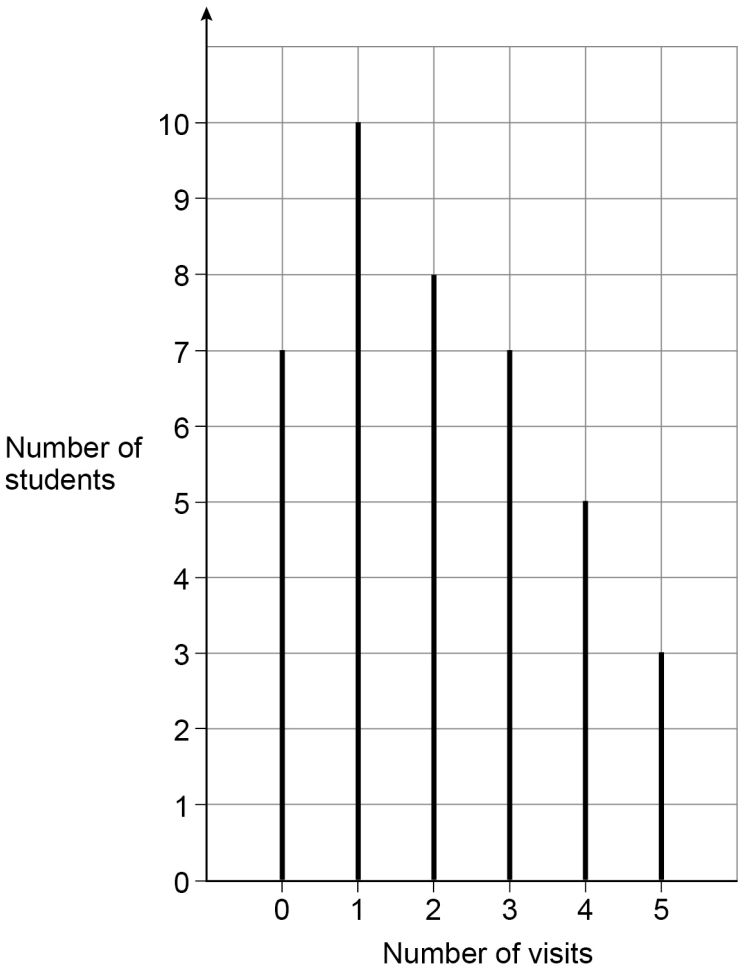
People not passed a test = 25 − 17 = 8 (1)

$\frac{8}{25}$

Answer $\frac{8}{25}$ (1)

15 40 students were asked the number of visits they made to a gym one week.

The chart shows information about the results.



15 (a) One of the 40 students is chosen at random.

Work out the probability that the student visited the gym **at least** once.

[2 marks]

visit at least once : $10 + 8 + 7 + 5 + 3 = 33$ (1)

$\frac{33}{40}$

Answer $\frac{33}{40}$ (1)

16 There are 56 cubes in a box.

The cubes are green, red, blue or white.

17 cubes are green.

There are an **equal** number of red, blue and white cubes.

16 (a) 24 **more** cubes are added to the box.

A cube is picked at random.

The probability that the cube is green is 0.4

How many of the 24 cubes added to the box are green?

[3 marks]

Total cubes : 56 + 24 = 80 ✓1

number of green cubes : 0.4 × 80

= 32 ✓1

Newly added green cubes = 32 − 17

= 15 ✓1

Answer 15

17 (a) A fair spinner has six equal sections, each with the number 5, 6, 7 or 8

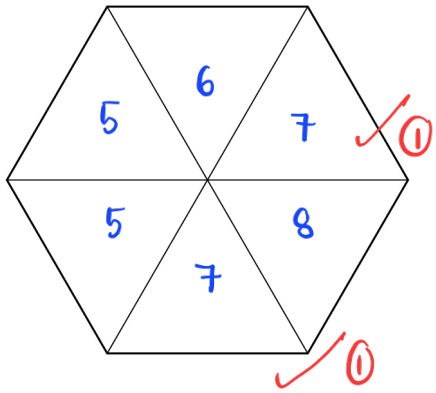
Each number appears at least once.

P(even number) = P(7) — there are two even numbers (6 and 8) there should be two 7 also. Hence, the last number should be 5.

Work out P(5)

You may use the blank spinner to help you.

[3 marks]



Answer $\frac{2}{6}$ ✓ 0

17 (b) A different spinner has ten sections, each labelled A, B, C or D.

	A	B	C	D
Probability	0.1	0.5	0.2	0.3

Give **one** reason why there **must** be a mistake in the table.

[1 mark]

The total probability adds up to 1.1. ✓ 0