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EDEXCEL INTERNATIONAL GCSE MATHS: QUESTIONS BY TOPIC

Probability (P1)

International GCSE Mathematics A (4MA1) · Foundation tier

93 questions · 363 marks · Mark schemes included

Past papers June 2018 - June 2025 · 4 sub-topics

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HOW TO USE THIS BOOKLET

Questions are grouped by sub-topic and run from the lowest to the highest mark tariff, then oldest paper first.

Click any row below to jump straight to that sub-topic or question.

On every question page, click ANSWER in the top-right corner to jump to its mark scheme; < QUESTION brings you back.

A gold bar in the left margin marks exactly where the question sits on the original page.

Diagrams, graphs, grids and tables are printed exactly as they appear in the original papers.

Each question is filed under its main topic; longer questions may also test skills from other topics.

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P1d	TREE DIAGRAMS, COMBINED & CONDITIONAL PROBABILITY		

No questions on this sub-topic in the available past papers.



QUESTIONS

93 questions · 363 marks · 3 sub-topics

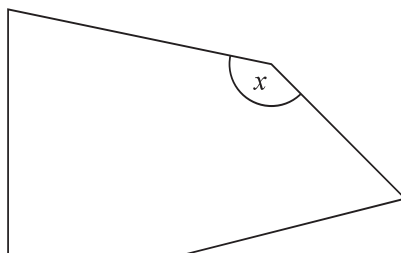
SUB-TOPIC P1a

BASIC PROBABILITY & EXPECTED OUTCOMES

Sub-topic P1a · 53 questions · 194 marks · lowest tariff first



3 Here is a pentagon.



acute

obtuse

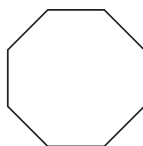
reflex

right

(a) Write down the word from the box that describes the angle marked x .

..... angle
(1)

(b) Write down the mathematical name of the following polygon.

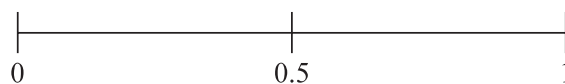


.....
(1)

(Total for Question 3 is 2 marks)

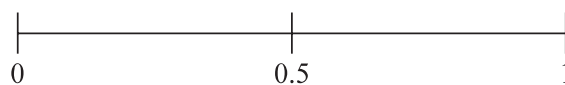
4 Imran throws an ordinary fair dice.

(a) On the probability scale, mark with a cross (×) the probability that the dice will land on 10



(1)

(b) On the probability scale, mark with a cross (×) the probability that the dice will land on an odd number.



(1)

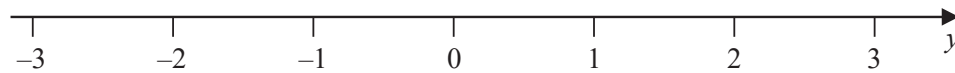
(Total for Question 4 is 2 marks)

15 n is an integer.

(a) Write down all the values of n such that $-2 \leq n < 3$

(2)

(b) On the number line, represent the inequality $y \leq 1$



(1)

(Total for Question 15 is 3 marks)

16 Each time John plays a game, the probability that he wins the game is 0.65

John is going to play the game 300 times.

Work out an estimate for the number of games that John wins.

(Total for Question 16 is 2 marks)



21 Each time Evie plays a game against her computer, she will win or lose.

For each game, the probability that Evie will win is 0.74

Evie is going to play 300 games against her computer.

Work out an estimate for the number of games that Evie will lose.

.....
(Total for Question 21 is 2 marks)

22 (a) Simplify $m^{10} \div m^3$

.....
(1)

$$k^n \times k^4 = k^{12}$$

(b) Write down the value of n

$n =$
(1)

(c) Simplify $(3x^6y^8)^2$

.....
(2)

(Total for Question 22 is 4 marks)



- 4 Barney went for 4 walks on Tuesday.

The lengths of the walks were

800 metres
2 kilometres
1.7 kilometres
 x metres

The total length of the 4 walks was 6250 metres.

Work out the value of x

$x = \dots\dots\dots$

(Total for Question 4 is 3 marks)

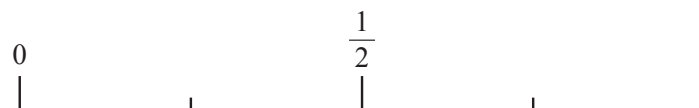
- 5 There are 8 counters in a bag.

6 of these counters are orange.

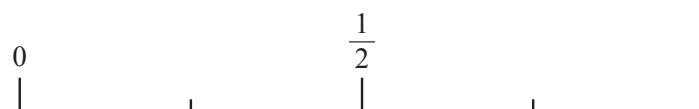
The rest of the counters are purple.

Delilah takes at random a counter from the bag.

- (i) On the probability scale below, mark with a cross ($\times$) the probability that the counter is orange.



- (ii) On the probability scale below, mark with a cross ($\times$) the probability that the counter is yellow.



(Total for Question 5 is 2 marks)



- 2 Daniel has five bags of coloured sweets.
He picks at random a sweet from each bag.
The table shows the probability that the sweet he picks from each bag is red.

Bag	A	B	C	D	E
Probability of red	0.7	0.9	0.5	1	0.2

- (a) From which bag is Daniel least likely to pick a red sweet?

.....
(1)

- (b) Which bag contains only red sweets?

.....
(1)

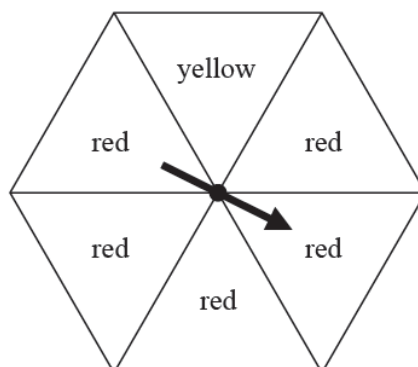
- (c) From which bag is Daniel equally likely to pick a red sweet as a sweet of another colour?

.....
(1)

(Total for Question 2 is 3 marks)



- 2 The diagram shows a fair spinner.



Mikail spins the arrow on the spinner once.

impossible

unlikely

evens

likely

certain

- (a) Write down the word from the box that best describes the likelihood that the arrow will land on

(i) red,

(ii) blue.

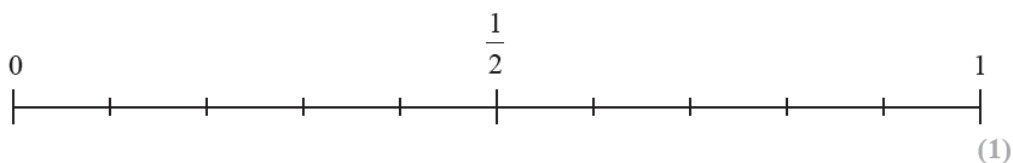
(2)

10 balls are in a bag.

3 of these balls are green.

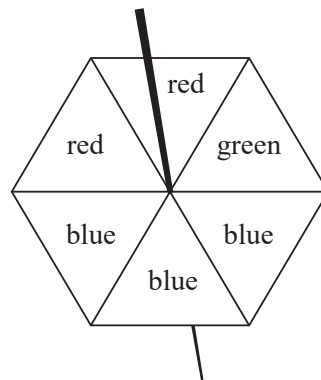
Jill takes at random a ball from the bag.

- (b) On the probability scale below, mark with a cross (×) the probability that the ball is green.



(Total for Question 2 is 3 marks)

- 4 The diagram shows a fair 6-sided spinner.



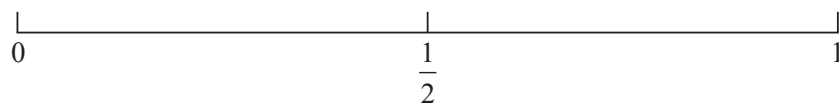
Rami is going to spin the spinner once.

- (a) Circle the word in the box below that best describes the likelihood that the spinner will land on green.

impossible unlikely evens likely certain

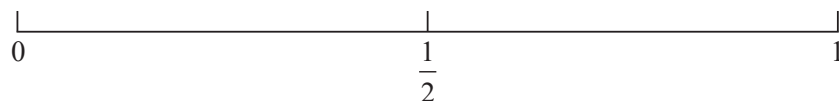
(1)

- (b) On the probability scale below, mark with a cross (X) the probability that the spinner will land on blue.



(1)

- (c) On the probability scale below, mark with a cross (X) the probability that the spinner will land on yellow.



(1)

(Total for Question 4 is 3 marks)



- 21 There are some ice lollies in a freezer.

The flavour of each ice lolly is banana or strawberry or mint or chocolate.

Julius takes at random an ice lolly from the freezer.

The table shows the probabilities that the flavour of the ice lolly that Julius takes is banana or strawberry or chocolate.

Flavour	banana	strawberry	mint	chocolate
Probability	0.35	0.32		0.12

Work out the probability that the flavour of the ice lolly that Julius takes is either strawberry or mint.

(Total for Question 21 is 3 marks)

- 22 A football team played 55 games.

Each game was won, drawn or lost.

number of games won : number of games drawn : number of games lost = 6 : 3 : 2

Work out how many more games the team won than the team lost.

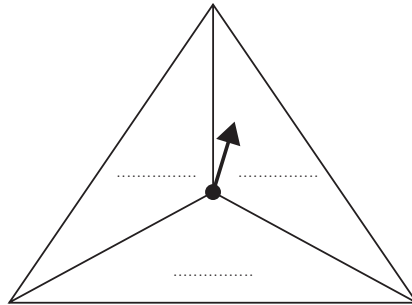
(Total for Question 22 is 3 marks)



2 Sandeep is designing some 3-sided spinners.

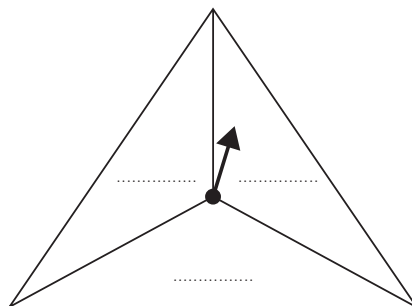
He is going to spin each spinner once.

- (a) (i) Write a different number on each dotted line so that when the spinner is spun it is **impossible** that the spinner will land on a number greater than 9



(1)

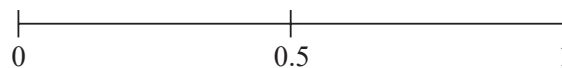
- (ii) Write a different number on each dotted line so that when the spinner is spun it is **certain** that the spinner will land on a multiple of 10



(1)

The likelihood of an outcome is **evens**.

- (b) On the probability scale, mark with a cross (X) the probability of this outcome.



(1)

(Total for Question 2 is 3 marks)

- 15 A bag contains 30 coloured counters.
The table gives the number of counters of each colour.

Colour	Red	Green	Yellow	Blue
Number of counters	7	13	4	6

One of the counters is taken at random from the bag.

- (a) Write down the probability that this counter is green.

.....
(1)

- (b) Write down the probability that this counter is **not** red.

.....
(2)

(Total for Question 15 is 3 marks)

- 16 Show that $\frac{5}{6} - \frac{3}{8} = \frac{11}{24}$

(Total for Question 16 is 2 marks)



13 There are some counters in a bag.

7 of the counters are blue.

5 of the counters are green.

The rest of the counters are yellow.

One counter is going to be taken at random from the bag.

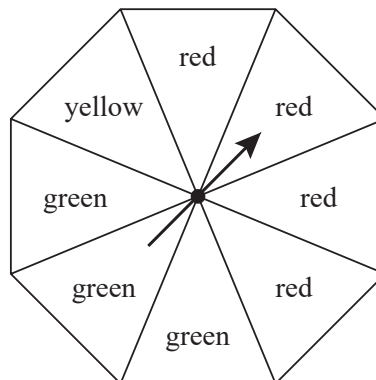
The probability that the counter is blue or is green is $\frac{6}{13}$

Work out how many yellow counters there are in the bag.

(Total for Question 13 is 3 marks)



- 3 The diagram shows a fair 8-sided spinner.



Hollie is going to spin the spinner once.

impossible unlikely evens likely certain

- (a) Write down the word from the box above that best describes the likelihood that the spinner will land on

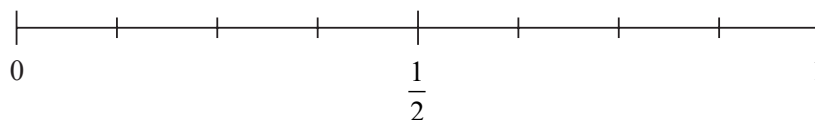
(i) yellow

.....
(1)

(ii) red.

.....
(1)

- (b) On the probability scale below, mark with a cross (×) the probability that the spinner will land on blue.



(1)

(Total for Question 3 is 3 marks)

- 2 (a) Simplify $12a + 3a - 7a$

.....
(1)

- (b) Simplify $8 \times 3b$

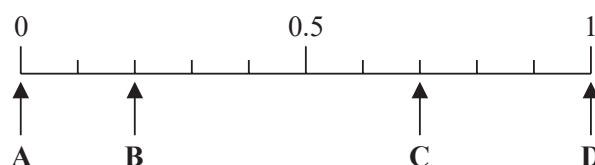
.....
(1)

- (c) Solve $\frac{c}{3} = 9$

$c =$
(1)

(Total for Question 2 is 3 marks)

- 3 Here is a probability scale.



In a fruit bowl, there are only

3 bananas

7 pears

Shimon is going to take at random one of the fruits from the bowl.

- (a) Write down the letter of the arrow that points to the probability that Shimon takes

- (i) a pear,

.....
(1)

- (ii) a grape.

.....
(1)

Emma has some carrots, some potatoes and some onions in a bag.

She says that the probability of taking at random a carrot from the bag is 1.4

Emma is not correct.

- (b) Explain why.

.....
.....
(1)

(Total for Question 3 is 3 marks)



10 Anjali wants to go on a boat at the seaside.

At the seaside there are 20 boats.

Of these boats

2 are white

5 are blue

7 are green

6 are yellow

Anjali selects at random one of these boats.

Write down the probability that she selects

(i) a green boat,

.....
(1)

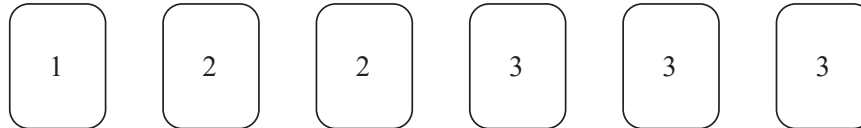
(ii) a white boat or a yellow boat.

.....
(2)

(Total for Question 10 is 3 marks)



- 2 Here are 6 counters.
Each counter has a number on it.



Finn takes at random one of these counters.

- (i) Select with a tick (✓) the word that best describes the likelihood that Finn takes a counter with the number 2 on it.

impossible	unlikely	evens	likely	certain

- (ii) Select with a tick (✓) the word that best describes the likelihood that Finn takes a counter with the number 3 on it.

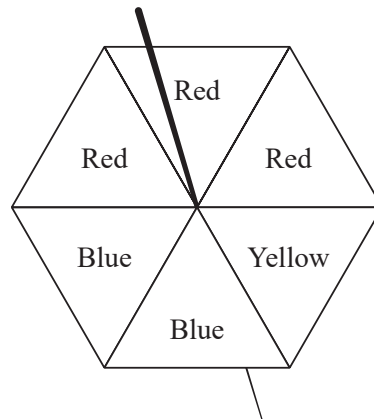
impossible	unlikely	evens	likely	certain

- (iii) Select with a tick (✓) the word that best describes the likelihood that Finn takes a counter with a number greater than 4 on it.

impossible	unlikely	evens	likely	certain

(Total for Question 2 is 3 marks)

- 2 The diagram shows a fair spinner with six sections.



Three sections are red, two sections are blue and one section is yellow.

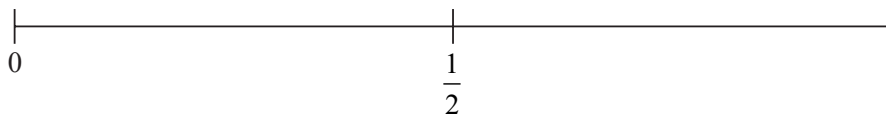
impossible unlikely evens likely certain

The spinner is spun once.

- (a) Write down a word from the box to describe the likelihood that the spinner lands on yellow.

(1)

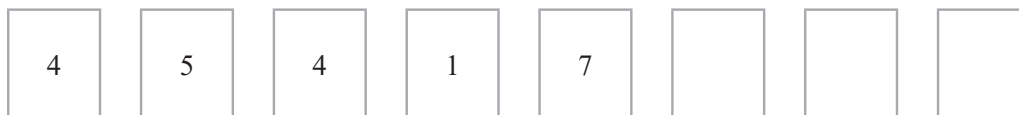
- (b) On the probability scale, mark with a cross (×) the probability that the spinner lands on green.



(1)

Here are 8 number cards.

3 of the number cards are blank.



Hugo is going to take at random one of these cards.

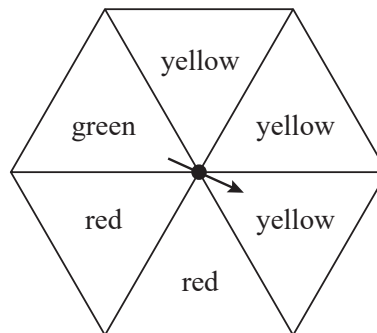
- (c) Write a number on each of the 3 blank cards so that the probability that Hugo picks a card with an odd number is $\frac{1}{2}$

(1)

(Total for Question 2 is 3 marks)



- 7 The diagram shows a fair 6-sided spinner.



Mario spins the arrow on the spinner once.

impossible unlikely evens likely certain

Write down the word from the box that best describes the likelihood that the arrow will land on

- (i) green

.....
(1)

- (ii) yellow

.....
(1)

- (iii) blue

.....
(1)

(Total for Question 7 is 3 marks)

18 A biased spinner can land on green or on yellow or on brown or on pink.

The table gives the probabilities that, when the spinner is spun, it will land on green or on yellow or on brown.

Colour	green	yellow	brown	pink
Probability	0.32	0.13	0.28	

Timucin spins the spinner 200 times.

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

(Total for Question 18 is 3 marks)

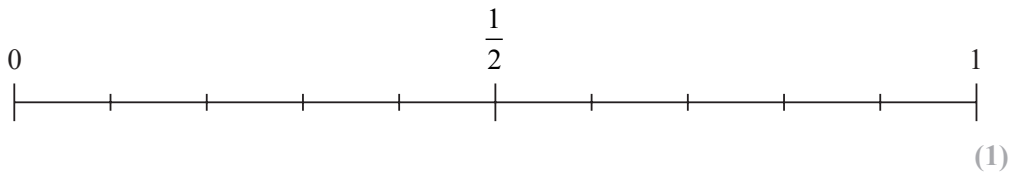


3 A box contains 10 balls.

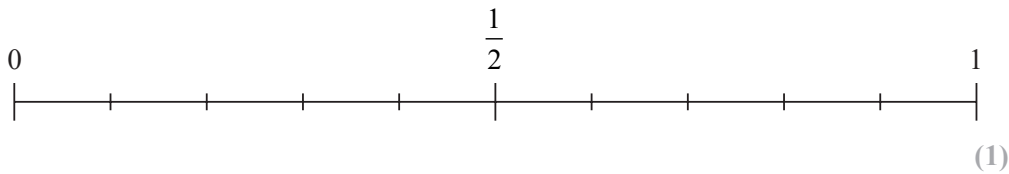
- 5 balls are black
- 3 balls are green
- 2 balls are red

Rema is going to take at random a ball from the box.

(a) On the probability scale, mark with a cross (×) the probability that the ball is black.



(b) On the probability scale, mark with a cross (×) the probability that the ball is orange.



Johan has three bags of counters, **A**, **B** and **C**
He tries to find the probability of taking at random a white counter from each bag.
He writes his probabilities in a table.

Bag	A	B	C
Probability	0.7	0.45	1.2

The probability that Johan writes for bag **C** is incorrect.

(c) Explain how you know that it is incorrect.

.....

.....

(1)

(Total for Question 3 is 3 marks)

10 There are 29 cars in a car park.

10 of the cars are red.

The rest of the cars are white or blue.

Sasha selects at random one of these cars.

(a) Write down the probability that she selects a red car.

.....
(1)

The probability that Sasha selects a white car is $\frac{7}{29}$

(b) Work out the probability that she selects a blue car.

.....
(2)

.....
(Total for Question 10 is 3 marks)



8 There are 80 cars in a car park.

27 of the cars are red

10 of the cars are blue

the rest of the cars are white

One of the cars in the car park is chosen at random.

(a) Write down the probability that this car is red.

.....
(1)

(b) Find the probability that this car is white.

.....
(2)

(Total for Question 8 is 3 marks)

9 15 identical pencil cases cost 41.25 Swiss francs.

Work out the cost of 52 of these pencil cases.

..... Swiss francs

(Total for Question 9 is 2 marks)



- 2 Freya has four cards.
There is a number on each card.



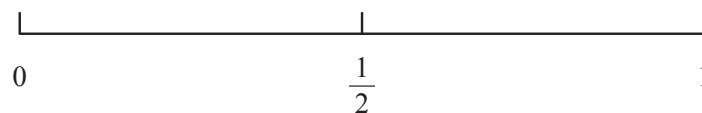
Freya is going to pick at random one of these cards.

- (a) Circle the word in the box below that best describes the likelihood that Freya will pick a card with the number 5 on it.

impossible unlikely evens likely certain

(1)

- (b) On the probability scale below, mark with a cross (×) the probability that Freya will pick a card with a number less than 6 on it.

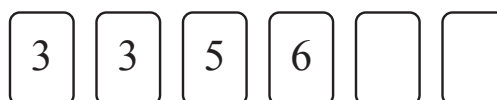


(1)

Ishani has six cards each with a number on it.
Four of these numbers are shown below.

When she picks at random one of the six cards, the probability that she picks a card with an even number on it is $\frac{1}{2}$

- (c) Write a number on each of the blank cards to show one possible set of six cards that Ishani could have.



(1)

(Total for Question 2 is 3 marks)

28 Khalid has a box of counters.

17 of the counters are red

28 of the counters are blue

the rest of the counters are orange

Khalid is going to take at random a counter from the box.

The probability that Khalid will take an orange counter is $\frac{4}{9}$

Work out the number of orange counters that are in the box.

(Total for Question 28 is 3 marks)

TOTAL FOR PAPER IS 100 MARKS



15 Joseph has some counters in a bag.

7 of the counters are red

5 of the counters are blue

The rest of the counters are green

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

The probability that the counter is green is $\frac{2}{5}$

Work out the number of green counters in the bag.

(Total for Question 15 is 3 marks)



- 10 Last Thursday, 135 students each bought one item of fruit.
The table shows information about the 135 items of fruit they bought.

Fruit	apple	pear	orange	banana	peach
Number of students	36	15	27	33	24

One of the 135 students is chosen at random.

- (a) Find the probability that this student bought an apple or a banana.

.....
(2)

A pie chart is drawn for the information in the table.

- (b) Work out the size of the angle in the pie chart for oranges.

.....
(2)

(Total for Question 10 is 4 marks)

- 11 (a) Work out the value of $\frac{10.4}{5.1 - 2.7} + \frac{6.8 - 3.2}{9.5}$

Give your answer as a decimal.

Write down all the figures on your calculator display.

.....
(2)

- (b) Give your answer to part (a) correct to 3 significant figures.

.....
(1)

(Total for Question 11 is 3 marks)



14 Javier has two sets of cards.

Each set contains 4 cards, one marked **A**, one marked **B**, one marked **C** and one marked **D**.

Javier is going to take at random one card from each set.

The table shows all possible pairs of cards that Javier could take.

		Set 2			
		A	B	C	D
Set 1	A	AA	AB	AC	AD
	B	BA	BB	BC	BD
	C	CA	CB	CC	CD
	D	DA	DB	DC	DD

(a) Find the probability that Javier will take at least one card marked **C**.

.....
(2)

Javier is going to take at random one card from each set, note the letter on each card and replace the cards.

He is going to do this a total of 80 times.

(b) Work out an estimate for the number of times that Javier will take at least one card marked **C**.

.....
(2)

(Total for Question 14 is 4 marks)



17 There are 90 counters in a bag.

Each counter in the bag is either red or blue so that

the number of red counters : the number of blue counters = 2 : 13

Li is going to put some more red counters in the bag so that

the probability of taking at random a red counter from the bag is $\frac{1}{3}$

Work out the number of red counters that Li is going to put in the bag.

(Total for Question 17 is 4 marks)



19 Becky has a biased 6-sided dice.

The table gives information about the probability that, when the dice is thrown, it will land on each number.

Number	1	2	3	4	5	6
Probability	$2x$	0.18	$2x$	$3x$	0.26	x

Becky is going to throw the dice 200 times.

Work out an estimate for the number of times that the dice will land on an even number.

(Total for Question 19 is 4 marks)



22 A bag contains only red beads, blue beads, green beads and yellow beads.

The table gives the probabilities that, when a bead is taken at random from the bag, the bead will be blue or the bead will be yellow.

Colour	red	blue	green	yellow
Probability		0.24		0.31

The probability that the bead will be green is twice the probability that the bead will be red.

Sofia takes at random a bead from the bag.

She writes down the colour of the bead and puts the bead back into the bag.

She does this 180 times.

Work out an estimate for the number of times she takes a red bead from the bag.

(Total for Question 22 is 4 marks)



- 15** Toy cars are made in a factory.
The toy cars are made for 15 hours each day.
5 toy cars are made every 12 seconds.

For the toy cars made each day, the probability of a toy car being faulty is 0.002

Work out an estimate of the number of faulty toy cars that are made each day.

.....
(Total for Question 15 is 4 marks)



4 There are 12 beads in a bag.

6 of the beads are green

4 of the beads are blue

2 of the beads are pink

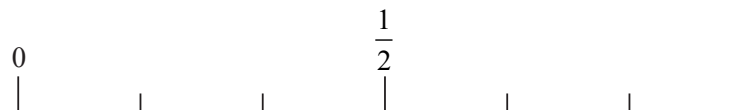
Peter takes at random a bead from the bag.

(a) Circle the word in the list below that best describes the likelihood that the bead is green.

impossible unlikely evens likely certain

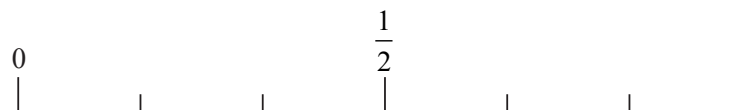
(1)

(b) On the probability scale, mark with a cross (X) the probability that the bead is orange.



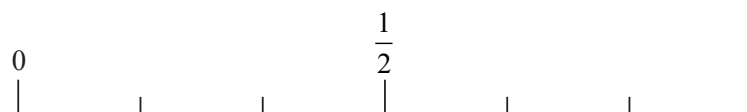
(1)

(c) On the probability scale, mark with a cross (X) the probability that the bead is blue.



(1)

(d) On the probability scale, mark with a cross (X) the probability that the bead is green or pink.



(1)

(Total for Question 4 is 4 marks)



- 2 Caroline has a bag containing 10 counters.

In the bag there are

7 red counters
2 blue counters
1 green counter

Caroline is going to choose at random a counter from the bag.

impossible	unlikely	evens	likely	certain
------------	----------	-------	--------	---------

- (a) Write down the word from the box that best describes the likelihood that Caroline will take

(i) a red counter,

.....

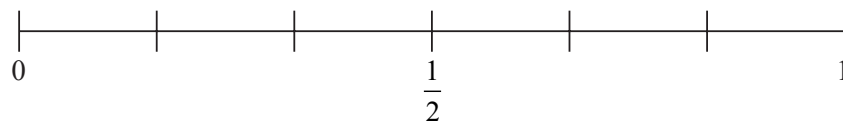
(ii) a yellow counter.

.....

(2)

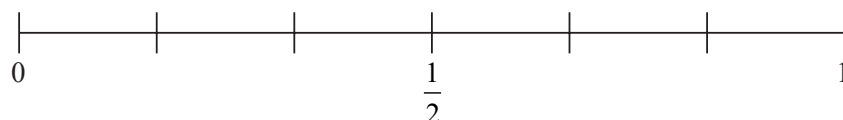
Jamil is going to roll a fair six-sided dice.

- (b) On the probability scale, mark with a cross (X) the probability that the dice will land on an odd number.



(1)

- (c) On the probability scale, mark with a cross (X) the probability that the dice will land on 2



(1)

(Total for Question 2 is 4 marks)



- 15 There are 54 fish in a tank.
Some of the fish are white and the rest of the fish are red.

Jeevan takes at random a fish from the tank.

The probability that he takes a white fish is $\frac{4}{9}$

- (a) Work out the number of white fish originally in the tank.

.....
(2)

Jeevan puts the fish he took out, back into the tank.
He puts some more white fish into the tank.

Jeevan takes at random a fish from the tank.

The probability that he takes a white fish is now $\frac{1}{2}$

- (b) Work out the number of white fish Jeevan put into the tank.

.....
(2)

(Total for Question 15 is 4 marks)



- 18** A tin contains tea bags with a choice of four different flavours of tea.
The four flavours of tea are Assam or Darjeeling or Nilgiri or Rize.

Sara takes at random a tea bag from the tin.

The table shows each of the probabilities that the flavour of the tea Sara takes is Assam or Darjeeling or Rize.

Flavour of tea	Assam	Darjeeling	Nilgiri	Rize
Probability	0.38	0.24		0.16

- (a) Work out the probability that the flavour of the tea Sara takes is Nilgiri.

.....
(2)

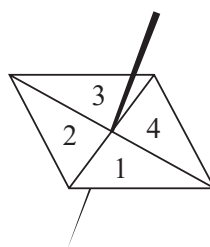
- (b) Work out the probability that the flavour of the tea Sara takes is either Darjeeling or Rize.

.....
(2)

(Total for Question 18 is 4 marks)



17 Here is a biased 4-sided spinner.



The table gives the probabilities that, when the spinner is spun once, it will land on 1 or it will land on 3

Number	1	2	3	4
Probability	0.26		0.18	

The probability that the spinner will land on 2 is equal to the probability that the spinner will land on 4

Ravina is going to spin the spinner a number of times.

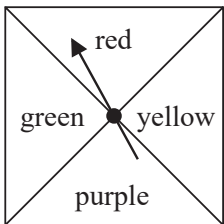
Ravina works out that an estimate for the number of times the spinner will land on 3 is 45

Work out an estimate for the number of times the spinner will land on 4

(Total for Question 17 is 4 marks)



17 Here is a biased spinner.



When the spinner is spun once, the probabilities that it lands on red or on yellow or on green are given in the table.

Colour	red	yellow	purple	green
Probability	0.25	0.2		0.2

(a) Work out the probability that the spinner lands on red or on yellow.

.....
(1)

Yang is going to spin the spinner 300 times.

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

.....
(3)

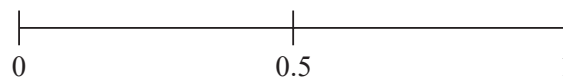
(Total for Question 17 is 4 marks)

- 5 Adam has 8 packets of noodles.
Here is the flavour of noodles in each packet.

Hot and Spicy	Curry	Vegetarian	Hot and Spicy
Curry	Hot and Spicy	Curry	Hot and Spicy

Adam takes at random a packet of noodles.

- (a) (i) On the probability scale, mark with a cross (×) the probability that Adam takes a packet of Hot and Spicy noodles.



(1)

- (ii) Circle the word that best describes the likelihood that Adam takes a packet of Vegetarian noodles.

impossible	unlikely	even	likely	certain
------------	----------	------	--------	---------

(1)

Belinda asks 20 people to name the type of rice that they each like the best.

Here are her results.

arborio	jasmine	basmati	jasmine	basmati
basmati	arborio	wild	jasmine	jasmine
jasmine	jasmine	arborio	basmati	basmati
wild	basmati	jasmine	wild	arborio

- (b) Complete the frequency table for Belinda's results.

Type of rice	Tally	Frequency
arborio		
basmati		
jasmine		
wild		

(2)

(Total for Question 5 is 4 marks)

- 22 Some members of a library were asked to name the type of book that they each liked to read the best.

One of the members is chosen at random.

The table shows information about the probability of the type of book that this member answered.

Type of book	comedy	romance	mystery	thriller
Probability	0.24	0.40	$3x$	x

48 members answered comedy books.

Work out how many of the members answered mystery books.

(Total for Question 22 is 4 marks)



20 In a bag, there are only red counters, blue counters, green counters and yellow counters.

The total number of counters in the bag is 80

In the bag

the number of red counters is $x + 7$

the number of blue counters is $x - 11$

the number of green counters is $3x$

Jude takes at random a counter from the bag.

The probability that he takes a red counter is $\frac{1}{4}$

Work out the probability that Jude takes a yellow counter.

(Total for Question 20 is 4 marks)



10 There are 30 counters in a bag.

13 of the counters are purple.

11 of the counters are white.

The rest of the counters are red.

Suha takes at random a counter from the bag.

(a) Write down the probability that the counter is purple.

.....
(1)

(b) Work out the probability that the counter is red.

.....
(1)

The counter is put back into the bag.

Clive now puts 10 more counters into the bag.

When a counter is taken at random from the bag,

the probability that it is white is now $\frac{2}{5}$

(c) How many of the 10 counters that Clive puts into the bag are white?

.....
(2)

(Total for Question 10 is 4 marks)



18 A biased spinner has three sections each of a different colour.

The table shows the probability that, when the spinner is spun once, it will land on blue or on orange or on white.

Colour	blue	orange	white
Probability	0.58	$2x$	x

(a) Work out the value of x

$$x = \dots\dots\dots (2)$$

The spinner is spun 250 times.

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

$$\dots\dots\dots (2)$$

(Total for Question 18 is 4 marks)



17 450 students were asked how they travelled to school on Monday.
Each student walked or travelled by bus or travelled by car or travelled by bicycle.
Each student used just one method of travel.

One of these students is chosen at random.
The table shows information about the probability of each method of travel.

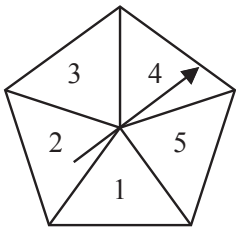
Method of travel	walk	bus	car	bicycle
Probability	0.20	x	$2x$	0.26

Work out how many of the 450 students travelled by car.

(Total for Question 17 is 4 marks)



17 Here is a biased spinner.



The table gives information about the probability that, when the spinner is spun once, it will land on each number.

Number	1	2	3	4	5
Probability	$2x$	0.27	0.04	x	0.12

Alexis is going to spin the spinner 400 times.

Work out an estimate for the number of times the spinner will land on an odd number.

(Total for Question 17 is 4 marks)



21 Cody has a biased 5-sided spinner, numbered 1, 2, 3, 4, 5

The table gives the probabilities that when the spinner is spun it will land on 2 or on 3 or on 5

Number	1	2	3	4	5
Probability		0.14	0.17		0.21

The probability that the spinner will land on 1 is the same as the probability that the spinner will land on 4

Cody is going to spin the spinner 400 times.

Work out an estimate for the number of times the spinner will land on 4

(Total for Question 21 is 4 marks)



10 There are 20 counters in bag X.

7 of the counters are green.

10 of the counters are red.

The rest of the counters are blue.

Ruth takes at random a counter from bag X.

(a) Write down the probability that the counter is red.

.....
(1)

(b) Work out the probability that the counter is blue.

.....
(1)

Ruth puts the counter back into bag X.

Bag Y only contains green counters, red counters and blue counters.

In bag Y there are,

2 more green counters than in bag X

1 more red counter than in bag X

2 more blue counters than in bag X

Adam takes at random a counter from bag Y.

Ruth takes at random a counter from bag X.

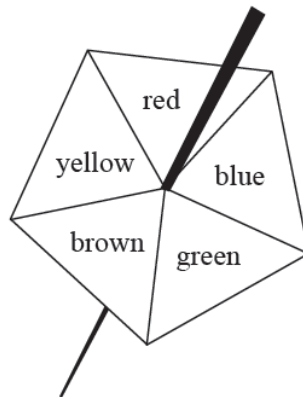
(c) Who has the greater probability of taking a green counter, Adam or Ruth?
Show your working clearly.

(3)

(Total for Question 10 is 5 marks)



15 Here is a biased 5-sided spinner.



Kenny spins the spinner once.

The table gives the probabilities that the spinner lands on red or on blue or on green.

Colour	red	blue	green	brown	yellow
Probability	0.15	0.26	0.33		

(a) Work out the probability that the spinner lands on red or blue.

(1)

When the spinner is spun once, the probability that the spinner lands on brown is 0.06 more than the probability that the spinner lands on yellow.

Jenine spins the spinner 150 times.

(b) Work out an estimate for the number of times the spinner lands on yellow.

(4)

(Total for Question 15 is 5 marks)



9 A bag of 11 counters contains

3 purple counters
2 orange counters
6 white counters

A counter is going to be taken at random from the bag.

(a) Find the probability that the counter will be

(i) orange

.....

(ii) not white

.....

(iii) green

.....

(3)

A box of 12 toy cars contains

3 red cars
4 blue cars
5 yellow cars

Some extra **red** cars are put in the box.

When a car is taken at random from the box, the probability that the car is yellow is $\frac{1}{6}$

(b) Work out the number of extra red cars that are put in the box.

.....

(2)

(Total for Question 9 is 5 marks)



9 There are 25 pens in a packet.

7 of the pens are green.

10 of the pens are black.

The rest of the pens are red.

Jurgen takes at random a pen from the packet.

(a) Find the probability that

(i) the pen is black,

.....
(1)

(ii) the pen is red.

.....
(1)

Heidi records the number of packets of pens sold in her shop to each customer last Friday.

The table shows information about her results.

Number of packets	Frequency
1	14
2	17
3	15
4	12
5	9

(b) Write down the mode of the number of packets.

.....
(1)

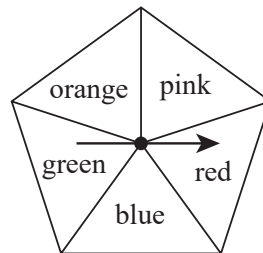
(c) Work out the total number of packets of pens sold last Friday.

.....
(2)

(Total for Question 9 is 5 marks)



21 Grace has a biased 5-sided spinner.



Grace is going to spin the arrow on the spinner once.

The table below gives the probabilities that the spinner will land on red or on blue or on green.

Colour	Red	Blue	Green	Orange	Pink
Probability	0.20	0.12	0.08		

The probability that the spinner will land on orange is 3 times the probability that the spinner will land on pink.

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

.....
(3)

Grace spins the arrow on the spinner 150 times.

(b) Work out an estimate for the number of times the spinner lands on blue.

.....
(2)

(Total for Question 21 is 5 marks)



21 A bag contains only pink sweets, white sweets, green sweets and red sweets.

The table gives each of the probabilities that, when a sweet is taken at random from the bag, the sweet will be green or the sweet will be red.

Sweet	pink	white	green	red
Probability			0.2	0.35

The ratio

number of pink sweets : number of white sweets = 2 : 1

There are 28 red sweets in the bag.

Work out the number of white sweets in the bag.

(Total for Question 21 is 5 marks)



28 Moeen has a biased 6-sided dice.

The table gives information about the probability that, when the dice is thrown, it will land on each number.

Number	1	2	3	4	5	6
Probability	x	0.15	0.5	y	0.13	0.03

(a) Show that $x + y = 0.19$

(2)

Given that $3x - y = 0.09$

and $x + y = 0.19$

(b) work out the value of x and the value of y
Show clear algebraic working.

$x = \dots\dots\dots$

$y = \dots\dots\dots$

(3)

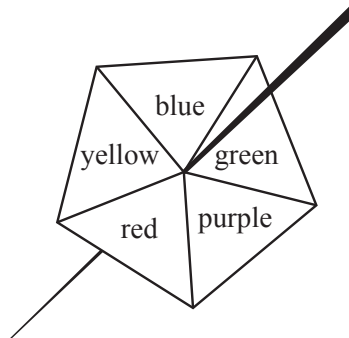
(Total for Question 28 is 5 marks)

TOTAL FOR PAPER IS 100 MARKS



19 Here is a biased 5-sided spinner.

When the spinner is spun, it can land on blue or on green or on purple or on red or on yellow.



The table gives information about the probability of the spinner landing on each colour.

Colour	blue	green	purple	red	yellow
Probability	0.12	0.20	0.38	$4x$	x

Sophie spins the spinner once.

(a) Work out the probability that the spinner lands on blue or on green or on purple.

.....
(1)

Max spins the spinner 350 times.

(b) Work out an estimate for the number of times the spinner lands on red.

.....
(4)

(Total for Question 19 is 5 marks)



10 There are 20 beads in a box.

7 of the beads are red.

11 of the beads are green.

The rest of the beads are yellow.

Jan takes at random a bead from the box.

(a) Write down the probability that she takes a red bead.

(1)

(b) Find the probability that she takes a red bead or a yellow bead.

(2)

There are 26 counters in a bag.

5 of the counters are pink.

10 of the counters are blue.

The rest of the counters are white.

Jan puts some more pink counters into the bag.

She then takes some blue counters out of the bag.

After she has done this there are still 26 counters in the bag.

Jan then takes at random a counter from the bag.

The probability that she takes a pink counter is $\frac{1}{2}$

(c) What is the probability that she takes a blue counter?

(3)

(Total for Question 10 is 6 marks)



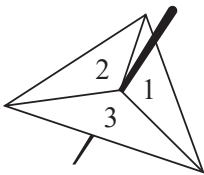
SUB-TOPIC P1b

SAMPLE SPACES, TWO-WAY TABLES & LISTING

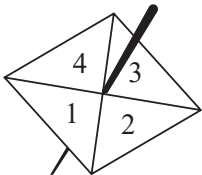
Sub-topic P1b · 21 questions · 100 marks · lowest tariff first



9 Avner has two fair spinners.



Spinner A



Spinner B

Spinner A can land on 1, 2 or 3
Spinner B can land on 1, 2, 3 or 4

Avner **multiplies** the number on which spinner A lands by the number on which spinner B lands to find his score.

- (a) Complete the table to show all possible scores.
Seven of the scores have been completed for you.

		Spinner A		
		1	2	3
Spinner B	1	1	2	3
	2	2	4	
	3	3		
	4	4		

(2)

Avner spins spinner A once and spinner B once.

- (b) Find the probability that his score is an odd number.

(1)

(Total for Question 9 is 3 marks)



- 11 180 passengers travelled either to Seoul or to Tokyo.
They travelled either business class or economy class.

Of these 180 passengers

51 travelled business class to Seoul
69 travelled economy class to Tokyo
86 in total travelled business class

Use this information to complete the two-way table.

	Seoul	Tokyo	Total
Business class			
Economy class			
Total			

(Total for Question 11 is 3 marks)



- 8 Pavel asked 60 people at an airport where they came from.
All of the 60 people came from Europe or Africa or Asia.

9 people came from Africa.

14 females came from Europe.

3 males came from Africa.

16 of the 29 males came from Asia.

Using this information, complete the two-way table.

	Europe	Africa	Asia	Total
Male				
Female				
Total				

(Total for Question 8 is 4 marks)



- 8 There are 150 people at an international conference.
These 150 people were each asked to say what their main method of transport was to get to the conference.
The two-way table shows some information about these people and their answers.

	bus	train	plane	total
men		15		80
women	17			
total	29	43		150

- (a) Complete the two-way table.

(3)

One of the men from these 150 people is selected at random.

- (b) Write down the probability that this man's main method of transport was train.

(1)

(Total for Question 8 is 4 marks)



- 8 The two-way table shows some information about the 60 noodle meals eaten in a noodle bar by each of 60 people last Friday.

		Type of noodle		
		Ramen	Soba	Udon
Type of meal	Boiled	18		
	Fried		12	7
Total				15
				60

- (a) Complete the two-way table.

(3)

One of the 60 people is selected at random.

- (b) Write down the probability that this person ate Fried Udon noodles.

(1)

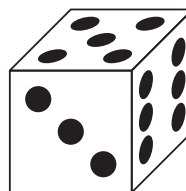
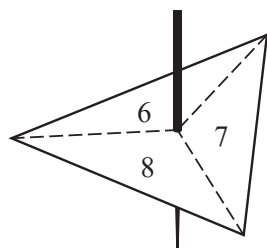
(Total for Question 8 is 4 marks)



- 9 Grace has a fair spinner and a fair dice.

The spinner is 3-sided and can land on 6, 7 or 8

The dice can land on 1, 2, 3, 4, 5 or 6



Grace spins the spinner once and throws the dice once.

Grace subtracts the number that the dice lands on from the number that the spinner lands on to get her score.

- (a) Complete the table to show all possible scores.
Eight of the scores have been done for you.

		Number on dice					
		1	2	3	4	5	6
Number on spinner	6	5	4	3	2	1	0
	7			4			
	8		6				

(2)

Grace spins the spinner once and throws the dice once.

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

.....
(1)

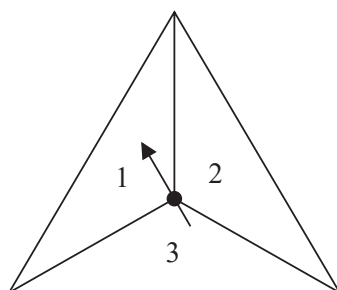
- (c) Find the probability that her score is an odd number.

.....
(1)

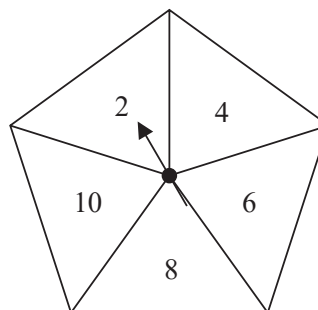
(Total for Question 9 is 4 marks)



- 5 Jian has two fair spinners.
 Spinner A is 3-sided and can land on 1, 2 or 3
 Spinner B is 5-sided and can land on 2, 4, 6, 8 or 10



Spinner A



Spinner B

Jian spins each spinner once.

He adds together the number that spinner A lands on and the number that spinner B lands on to get his total score.

- (a) Complete the table to show all possible total scores.
 Five of the total scores have been done for you.

Spinner A

		1	2	3
Spinner B	2	3		
	4			7
	6	7		
	8		10	
	10		12	

(2)

- (b) Find the probability that

- (i) Jian's total score is an odd number

.....
 (1)

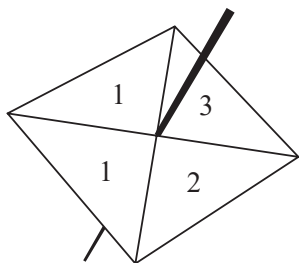
- (ii) Jian's total score is less than 9

.....
 (1)

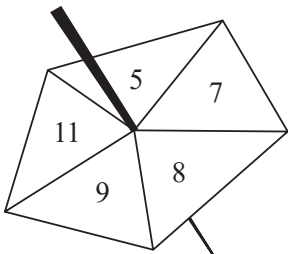
(Total for Question 5 is 4 marks)



- 5 Percy has two fair spinners.
- Spinner A is 4-sided and can land on 1, 1, 2 or 3
- Spinner B is 5-sided and can land on 5, 7, 8, 9 or 11



Spinner A



Spinner B

Percy spins each spinner once.

He subtracts the number that spinner A lands on from the number that spinner B lands on to get his score.

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

Spinner A					
		1	1	2	3
Spinner B	5	4	4		
	7			5	4
	8		7		5
	9		8		
	11		10	9	8

(2)

- (b) Find the probability that
- (i) Percy’s score is an even number

(1)

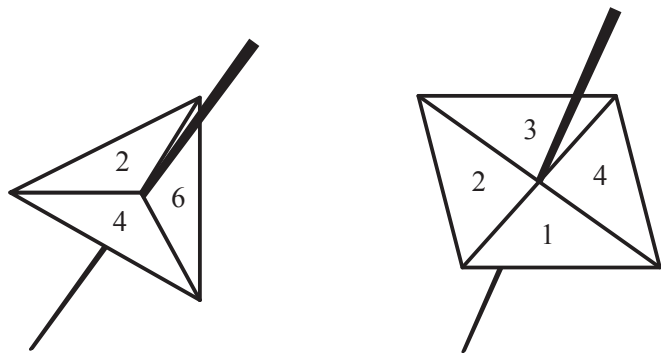
- (ii) Percy’s score is greater than 7

(1)

(Total for Question 5 is 4 marks)



14 Kate has a fair triangular spinner and a fair square spinner.



The triangular spinner can land on 2 or 4 or 6
The square spinner can land on 1 or 2 or 3 or 4

Kate spins each spinner once.
She adds the number the triangular spinner lands on to the number the square spinner lands on to get her score.

- (a) Complete the table to show all possible scores.
Four of the scores have been done for you.

		Square spinner			
		1	2	3	4
Triangular spinner	2	3	4		
	4			7	
	6				10

(2)

Kate spins each spinner once.

- (b) Find the probability that her score is 9 or less.

(2)

(Total for Question 14 is 4 marks)



11 The children at a holiday club play sport either on Monday or on Tuesday. They each choose one sport from tennis or athletics or cricket. The two-way table shows some information about their choices.

	tennis	athletics	cricket	Total
Monday	29		58	110
Tuesday				
Total	62		105	240

(a) Complete the two-way table.

(3)

One of the children who plays cricket is chosen at random.

(b) Write down the probability that this child plays cricket on Monday.

(1)

(Total for Question 11 is 4 marks)



- 5 Valentino sells ice cream cones and ice cream tubs.
The ice cream flavours are chocolate, strawberry and vanilla.

On Sunday, 120 people each bought one ice cream from Valentino.
The two-way table shows some information about these ice creams.

	chocolate	strawberry	vanilla	Total
cone	16		22	78
tub		14		
Total	23			120

- (a) Complete the two-way table.

(3)

One of the 120 people is picked at random.

- (b) Find the probability that this person bought a vanilla ice cream cone.

(2)

(Total for Question 5 is 5 marks)



- 7 Mohsen is going to a party.

He will choose at random one shirt from the three shirts and one pair of trousers from the three pairs of trousers in the list below.

Shirts	Trousers
Blue (B)	Green (G)
Red (R)	Orange (O)
Yellow (Y)	Purple (P)

- (a) Write down all the possible combinations that Mohsen can choose.

.....

.....

..... (2)

- (b) Find the probability that Mohsen chooses the red shirt to wear to the party.

..... (1)

There are 20 counters in a bag.

4 of the counters are pink.

9 of the counters are white.

The rest of the counters are black.

Jean takes at random one counter from the bag.

- (c) Work out the probability that Jean takes a black counter.

..... (2)

(Total for Question 7 is 5 marks)



- 11 Triangle ABC is an equilateral triangle of side 6 cm.

Using a ruler and compasses only, construct triangle ABC
You must show all your construction lines.

Side AB has been drawn for you.

A ————— B

(Total for Question 11 is 2 marks)

- 12 Mario is going to play two games on Saturday.

He will play one game on Saturday morning and one game on Saturday afternoon.

The following table shows the games from which he is going to choose.

Morning	Afternoon
Bridge (B)	Ludo (L)
Chess (C)	Mahjong (M)
Draughts (D)	Snakes and ladders (S)

- (a) Write down all the possible combinations of games that Mario can play on Saturday.

.....

.....

.....

(2)



Question 12 continued

Mario asked 100 students in his school to name their favourite card game.

His results are shown in the two-way table below.

	Solitaire	Rummy	Whist	Total
Year 10	30	19	4	53
Year 11	17	18	12	47
Total	47	37	16	100

One of the students Mario asked is picked at random.

(b) Write down the probability that this student is in Year 11

.....
(1)

One of the Year 10 students is picked at random.

(c) Work out the probability that this student did **not** answer Whist.

.....
(2)

(Total for Question 12 is 5 marks)



- 8 The two-way table shows some information about the desserts chosen at lunch yesterday by the 80 students from Year 5 and Year 6.
Each student chose one dessert from apple pie or fruit or ice cream.

	apple pie	fruit	ice cream	Total
Year 5	22	6		
Year 6			2	44
Total	56			80

- (a) Complete the two-way table.

(3)

- (b) What fraction of these 80 students were in Year 5 **and** chose apple pie?
Give your answer in its simplest form.

(2)

(Total for Question 8 is 5 marks)



11 A café sells 4 different types of cake.

carrot (C) fruit (F) lemon (L) madeira (M)

Nala is going to choose 2 **different** types of cake.

(a) Write down all the possible combinations she can choose.

(2)

The two-way table gives some information about the flavours of ice creams sold by the café on Saturday and on Sunday.

	Chocolate	Mint	Vanilla	Total
Saturday		11	28	
Sunday		20	13	49
Total	48	31	41	

(b) Complete the two-way table.

(2)

Nala asks 100 students whether they prefer cake or ice cream.

33 of the students prefer cake.

One of the 100 students is chosen at random.

(c) Find the probability that this student **does not** prefer cake.

(1)

(Total for Question 11 is 5 marks)



- 6 80 students studying sciences were asked which science subject they liked the best.

Some information about the results is shown in the two-way table.

	Biology	Chemistry	Physics	Total
Boys	25		7	
Girls		4		43
Total	31			80

- (a) Complete the two-way table.

(3)

One of the students is picked at random.

- (b) Write down the probability that this student is a girl.

(1)

One of the girls is picked at random.

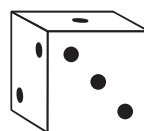
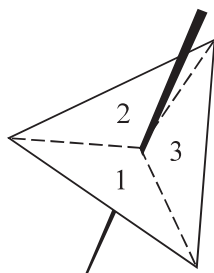
- (c) Write down the probability that this girl likes Chemistry the best.

(2)

(Total for Question 6 is 6 marks)



- 7 In a game, a fair 3-sided spinner is spun once and a fair dice is rolled once.



The spinner can land on 1, 2 or 3

The dice can land on 1, 2, 3, 4, 5 or 6

In the game, the score is found by multiplying the number the spinner lands on by the number the dice lands on.

- (a) Complete the table to show all possible scores.
Eleven of the scores have been done for you.

		Dice					
		1	2	3	4	5	6
Spinner	1	1	2	3	4		
	2		4		8	10	
	3	3	6		12		18

(2)

Steven plays the game once.

- (b) Work out the probability that his score is greater than 10

(2)



Adam plays the game and Carmen plays the game.

Adam gets a prize if his score is 5 or less.

Carmen gets a prize if her score is a multiple of 6

Carmen says the game is unfair because Adam is more likely to get a prize.

(c) Is the game unfair?

You must give a reason for your answer.

(2)

(Total for Question 7 is 6 marks)

8 Nina buys 8 pencils and 13 identical rulers.

Each pencil costs \$0.58

The total cost is \$23.62

(a) Work out the cost of each ruler.

\$.....
(3)

Bjorn has \$15 to spend on pens.

Each pen costs \$0.62

He buys as many pens as he can.

(b) Work out how much change Bjorn should get.

\$.....
(3)

(Total for Question 8 is 6 marks)



- 8 Lin has 60 bricks.
He puts his 60 bricks into a bag.

Some information about the 60 bricks is shown in the two-way table.

	orange	blue	yellow	Total
small		7	14	
large	13			33
Total		23		60

- (a) Complete the two-way table.

(3)

One of the bricks is taken at random from the bag.

- (b) Write down the probability that this brick is blue.

.....
(1)

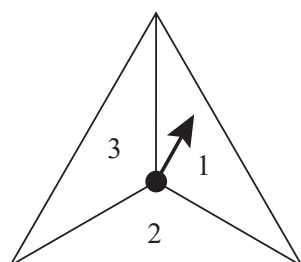
Lin now puts all his large bricks into a sack.
He takes at random a large brick from the sack.

- (c) Write down the probability that this large brick is orange.

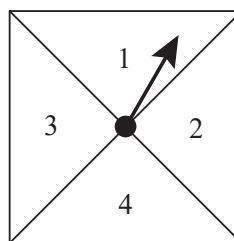
.....
(2)

(Total for Question 8 is 6 marks)

14 Here are two fair spinners.



Spinner A



Spinner B

Chanthira spins each spinner once.

She adds together the number that spinner A lands on and the number that spinner B lands on to find the score.

- (a) Complete the table to show all possible scores.
Three scores have been done for you.

		Spinner B			
		1	2	3	4
Spinner A	1	2	3		
	2	3			
	3				

(2)

- (b) Find the probability that the score will be 4 or less.

.....
(2)

Chanthira now spins both spinners together 84 times.

- (c) Find an estimate for the number of times that spinner **A** and spinner **B** land on the same number.

.....
(2)

(Total for Question 14 is 6 marks)

- 15** Write 880 as a product of powers of its prime factors.
Show your working clearly.

.....
(Total for Question 15 is 3 marks)



- 6 Bohai works in a shop that sells mobile phones.
Last week he sold one mobile phone to each of 300 customers.

The incomplete two-way table shows some information about these mobile phones.

	32 GB	64 GB	128 GB	Total
type A	75		83	195
type B		29		
Total	127			300

- (a) Complete the two-way table.

(3)

Bohai selects at random one of these 300 customers.

- (b) Write down the probability that this customer bought a type **B**, 64 GB mobile phone.

(1)

Bohai now selects at random one of the customers who bought a type **A** phone last week.

- (c) Write down the probability that this customer bought a 128 GB mobile phone.

(2)

(Total for Question 6 is 6 marks)



9 There are 120 cyclists in a cycling club.
There are 67 professional cyclists and the rest are amateur cyclists.
Each of these cyclists was asked to name their favourite type of bike.

The two-way table shows some information about their answers.

	Road bike	Mountain bike	Hybrid bike	Total
Professional	26			67
Amateur		32		
Total	39	54		120

(a) Complete the table.

(3)

(b) Work out the percentage of the cyclists who answered Mountain bike.

..... %
(2)

Jacob is going to draw a pie chart for the age groups of the 120 cyclists.
There are 41 people in the ‘over 60’ age group.

(c) Work out the size of the angle for the sector representing the ‘over 60’ age group.

..... °
(2)

(Total for Question 9 is 7 marks)



SUB-TOPIC P1c

VENN DIAGRAMS & SET NOTATION

Sub-topic P1c · 19 questions · 69 marks · lowest tariff first



- 15** A regular polygon has n sides.
The size of each interior angle of the regular polygon is 140°
Work out the value of n .

$n = \dots\dots\dots$

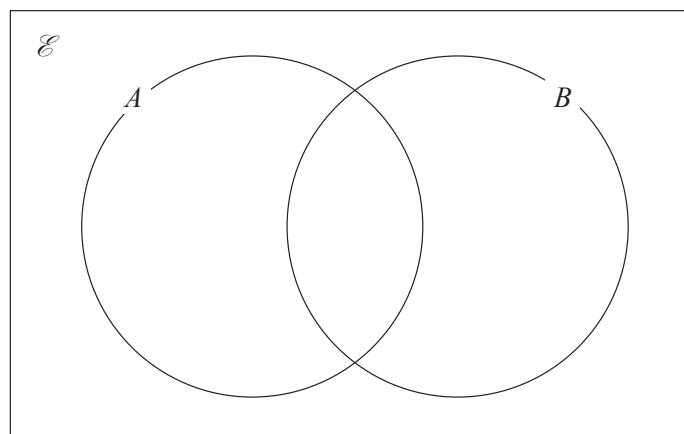
(Total for Question 15 is 3 marks)

- 16** $\mathcal{E} = \{10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20\}$

$A = \{\text{multiples of } 5\}$

$B = \{\text{even numbers}\}$

Complete the Venn diagram for this information.



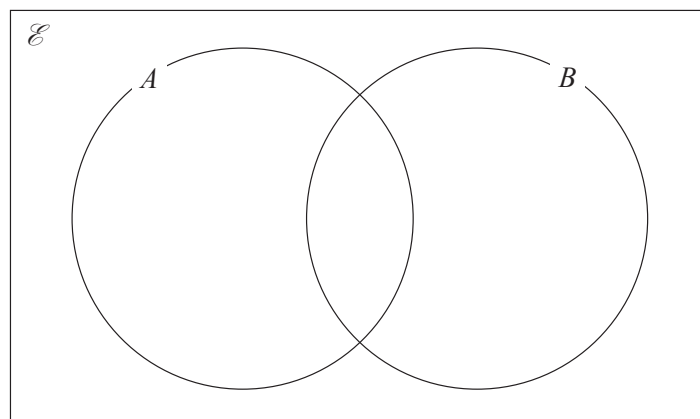
(Total for Question 16 is 3 marks)

12 $\mathcal{E} = \{\text{whole numbers from 1 to 15}\}$

$A = \{\text{even numbers}\}$

$B = \{3, 6, 9, 12, 15\}$

Complete the Venn diagram for the sets $\mathcal{E}$, A and B .



(Total for Question 12 is 3 marks)

13 Find which is larger

32% of 450

or

$\frac{2}{5}$ of 375

You must show all your working.

(Total for Question 13 is 3 marks)



13 Buses leave a bus station to go to the hospital every 16 minutes.

Buses leave the same bus station to go to the college every 20 minutes.

At 9 am a bus leaves the bus station to go to the hospital and at the same time a bus leaves the bus station to go to the college.

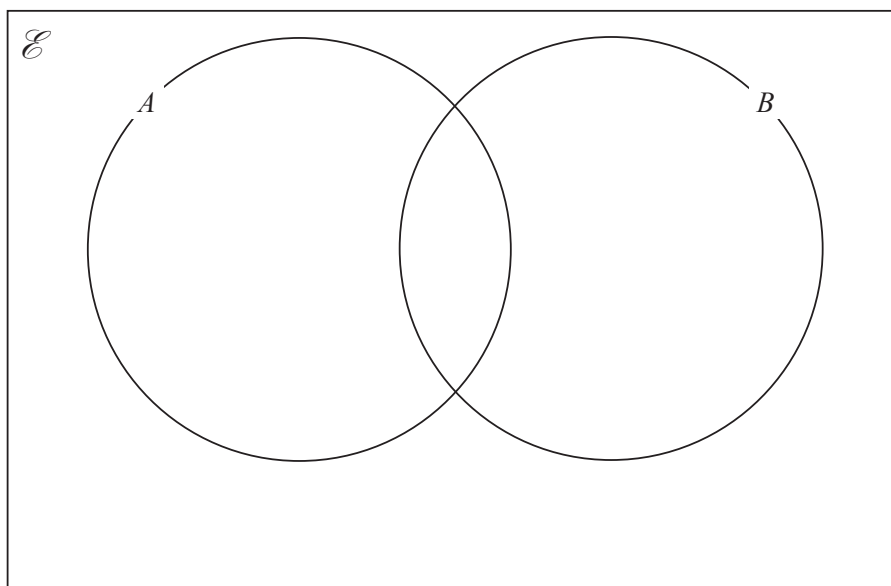
Work out the next time that a bus leaves the bus station to go to the hospital and at the same time a bus leaves the bus station to go to the college.

(Total for Question 13 is 3 marks)

14 $\mathcal{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15\}$

$A = \{\text{even numbers}\}$

$B = \{\text{multiples of 3}\}$



Complete the Venn diagram for the sets $\mathcal{E}$, A and B .

(Total for Question 14 is 3 marks)



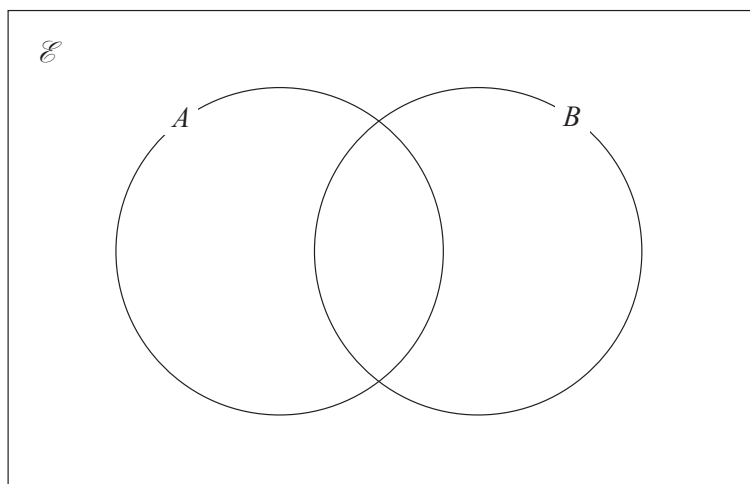
22 $\mathcal{E} = \{4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15\}$

$$A \cap B = \{5, 10, 15\}$$

$$B' = \{7, 8, 9, 11, 12, 13, 14\}$$

$$A' = \{4, 6, 7, 8, 14\}$$

Complete the Venn diagram for this information.



(Total for Question 22 is 3 marks)

23

$$a = 4.2 \times 10^{-24}$$

$$b = 3 \times 10^{145}$$

Work out the value of $a \times b$

Give your answer in standard form.

(Total for Question 23 is 2 marks)

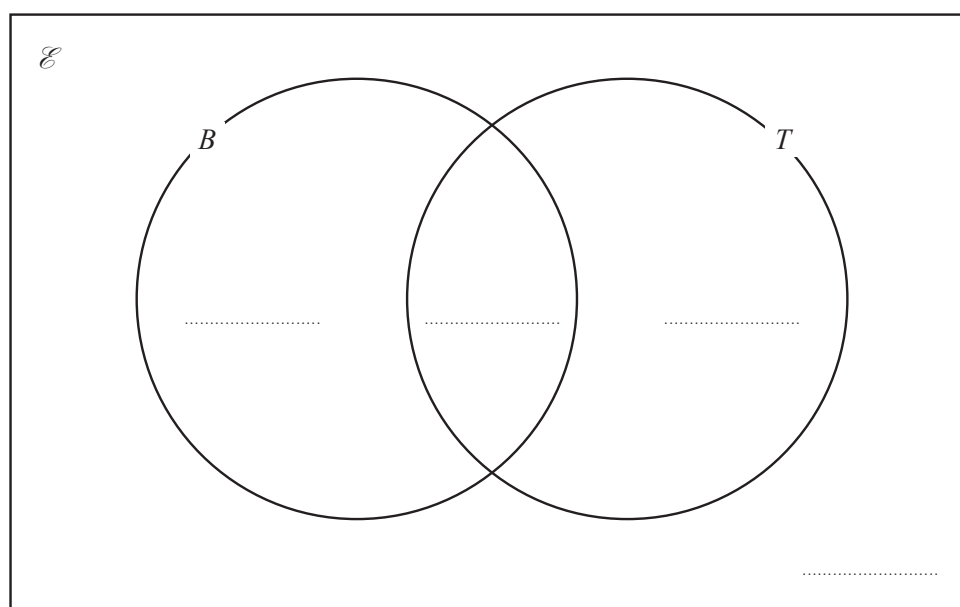


- 10 50 students have lessons at a dance school.
Two of the lessons are ballet lessons (B) and tap lessons (T).

Of the 50 students

- 31 have ballet lessons
- 27 have tap lessons
- 18 have ballet lessons and tap lessons

Complete the Venn diagram for this information.



(Total for Question 10 is 3 marks)

15 Use your calculator to work out the value of

$$\frac{5.21 + 6.37}{9.8} + 8.3^2$$

Write down all the figures on your calculator display.

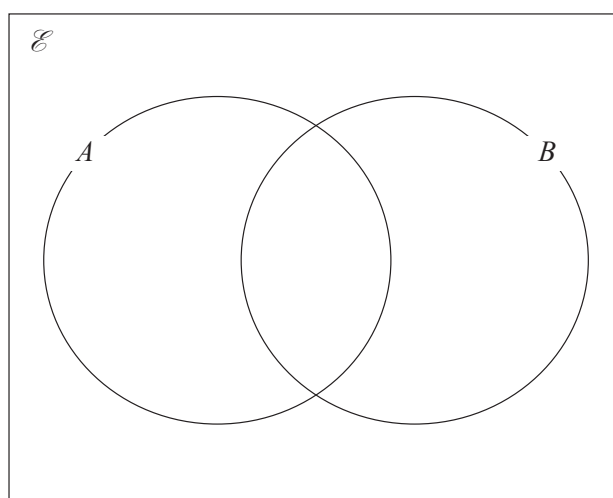
(Total for Question 15 is 2 marks)

16 $\mathcal{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

$$A = \{2, 3, 7, 8, 9\}$$

$$B = \{1, 2, 4, 5, 7, 8, 10\}$$

Complete the Venn diagram for this information.



(Total for Question 16 is 3 marks)

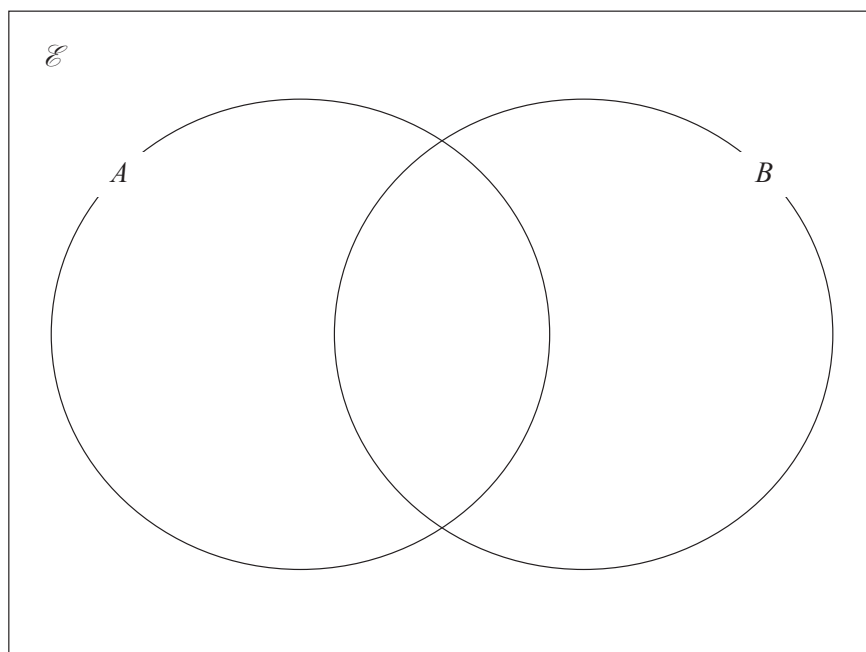
18 $\mathcal{E} = \{11, 12, 13, 14, 15, 16, 17, 18, 19, 20\}$

$A = \{\text{even numbers}\}$

$A \cap B = \{12, 16, 20\}$

$(A \cup B)' = \{17, 19\}$

Complete the Venn diagram for the sets $\mathcal{E}$, A and B



(Total for Question 18 is 3 marks)



14 (a) Work out the value of $\frac{9}{12.4} + \frac{5.3 \times 2.8}{9.64}$

Give your answer as a decimal.

Write down all the figures on your calculator display.

.....
(2)

(b) Write your answer to part (a) correct to 3 significant figures.

.....
(1)

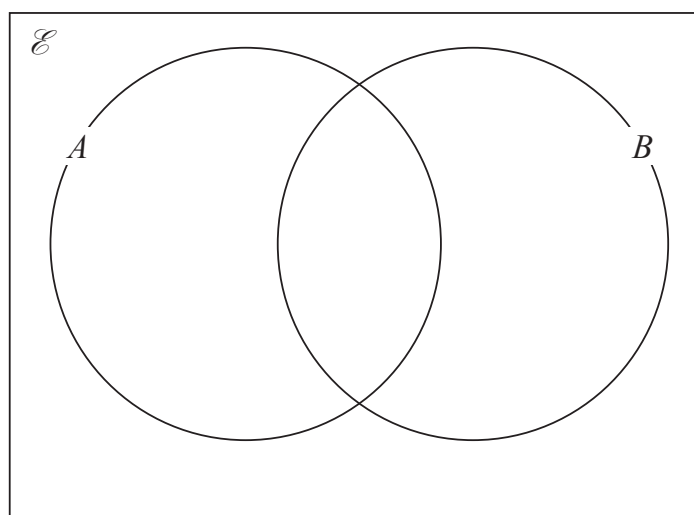
(Total for Question 14 is 3 marks)

15 $\mathcal{E} = \{5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20\}$

$A = \{\text{odd numbers}\}$

$B = \{\text{multiples of 5}\}$

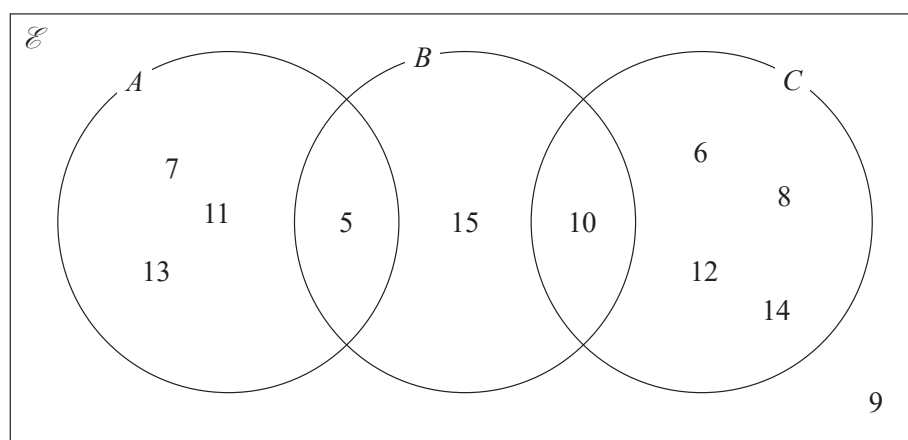
Complete the Venn diagram for this information.



(Total for Question 15 is 3 marks)



18 Here is a Venn diagram.



(a) Write down the numbers that are in the set

(i) A

(1)

(ii) $B \cup C$

(1)

Dominic writes down $9 \notin C$

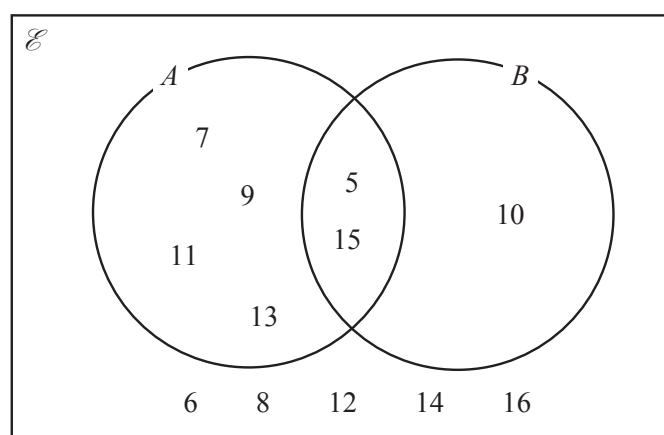
(b) Explain why Dominic is correct.

(1)

(Total for Question 18 is 3 marks)



15 Here is a Venn diagram.



List the members of the set

(a) A

.....
(1)

(b) $A \cap B$

.....
(1)

(c) $(A \cup B)'$

.....
(1)

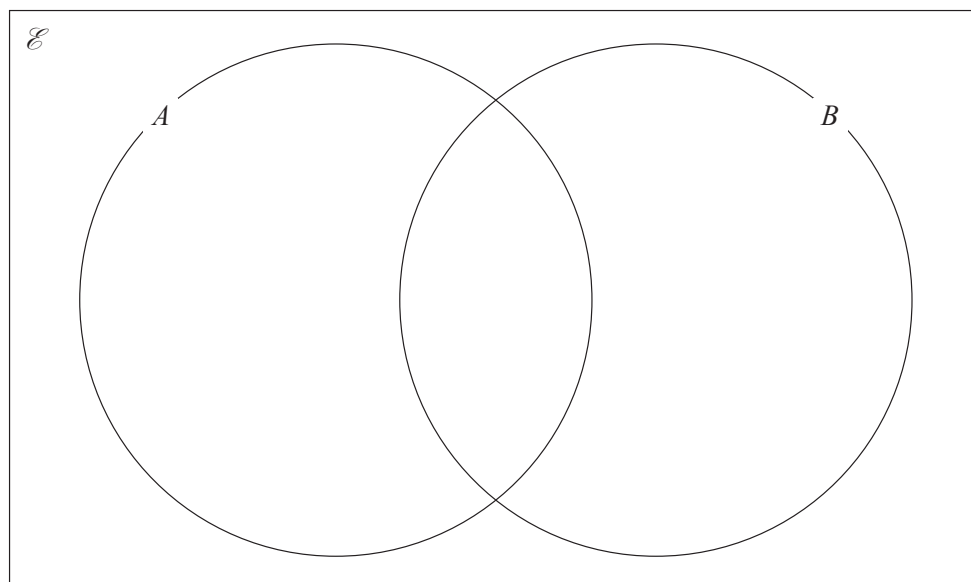
(Total for Question 15 is 3 marks)

15 $\mathcal{E} = \{11, 12, 13, 14, 15, 16, 17, 18, 19, 20\}$

$$A = \{11, 14, 16, 19\}$$

$$B = \{12, 14, 15, 16, 18, 20\}$$

Complete the Venn diagram for this information.



(Total for Question 15 is 3 marks)

16 Use your calculator to work out the value of

$$\frac{17.9}{8.61 + 2.36} - 1.2^2$$

Give your answer as a decimal.

Write down all the figures on your calculator display.

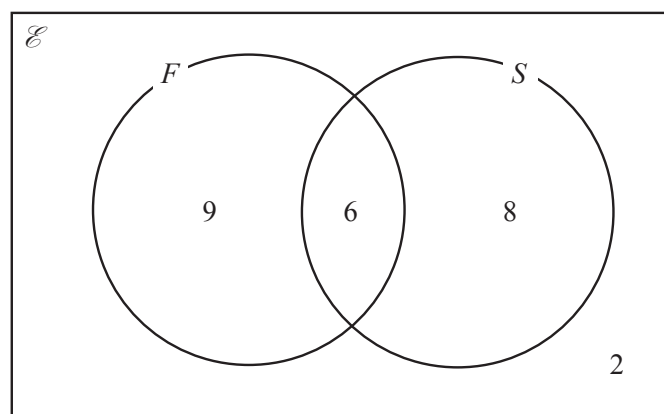
(Total for Question 16 is 2 marks)



16 Some students were asked if they study French (F) or Spanish (S)

The Venn diagram gives information about the results.

The values shown represent numbers of students.



(a) How many of these students study only French or only Spanish?

.....
(1)

One of these students is chosen at random.

(b) Find the probability that this student studies both French and Spanish.

.....
(2)

.....
(Total for Question 16 is 3 marks)



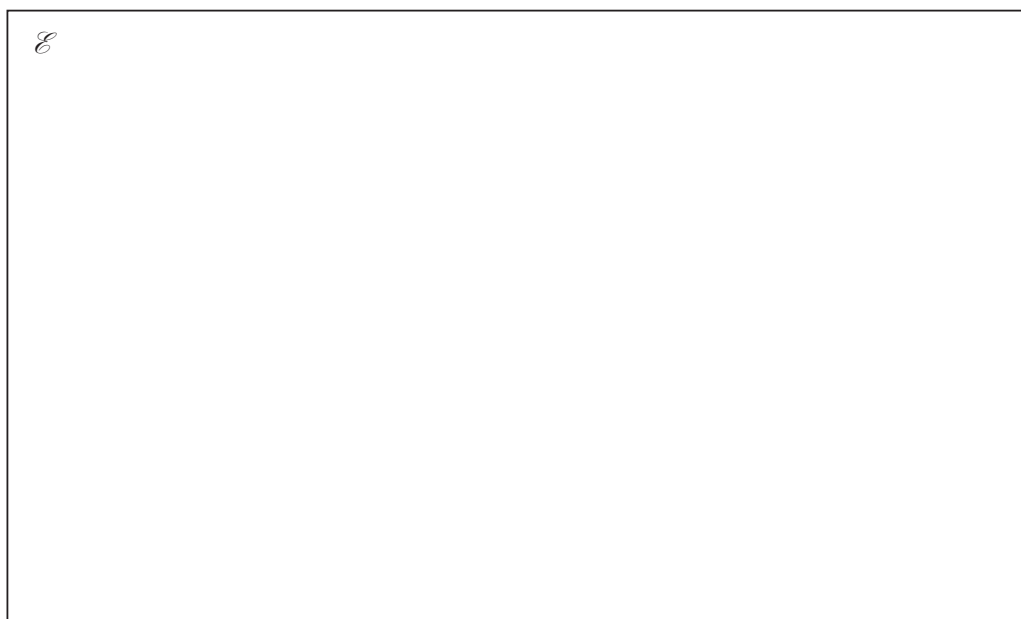
18 $\mathcal{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$

$$A = \{\text{odd numbers}\}$$

$$A \cap B = \{1, 3\}$$

$$A \cup B = \{1, 2, 3, 4, 5, 6, 7, 9, 11, 12\}$$

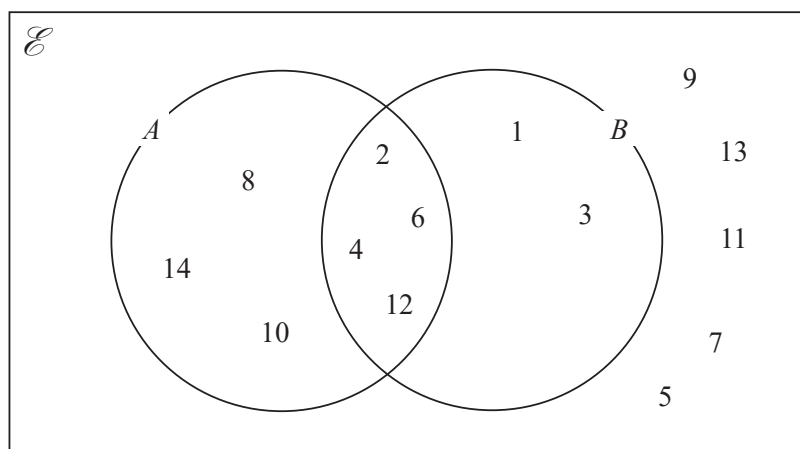
Draw a Venn diagram to show this information.



(Total for Question 18 is 4 marks)



14 The numbers from 1 to 14 are shown in the Venn diagram.



(a) List the members of the set $A \cap B$

.....
(1)

(b) List the members of the set B'

.....
(1)

A number is picked at random from the numbers in the Venn diagram.

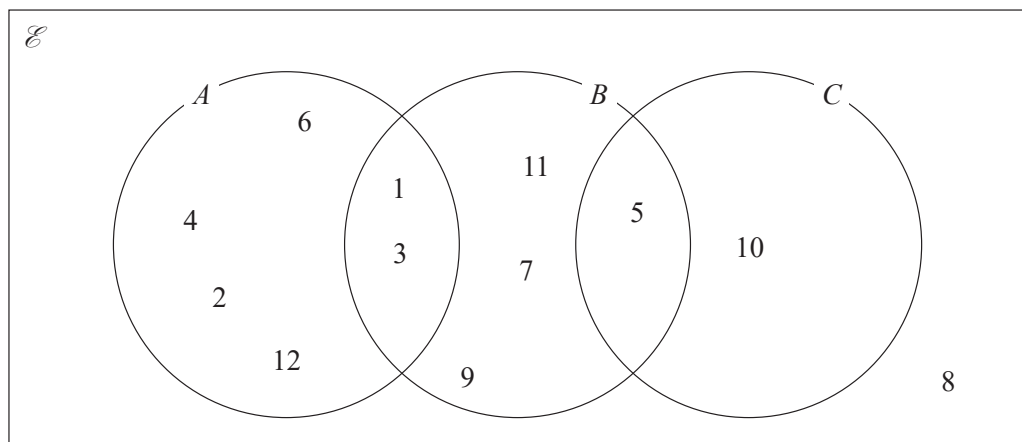
(c) Find the probability that this number is in set A but is **not** in set B.

.....
(2)

(Total for Question 14 is 4 marks)



17 Here is a Venn diagram.



(a) Write down the numbers that are in the set

(i) A

(ii) $B \cup C$

(2)

Brian writes down the statement $A \cap C = \emptyset$

(b) Is Brian's statement correct?

You must give a reason for your answer.

(1)

One of the numbers in the Venn diagram is picked at random.

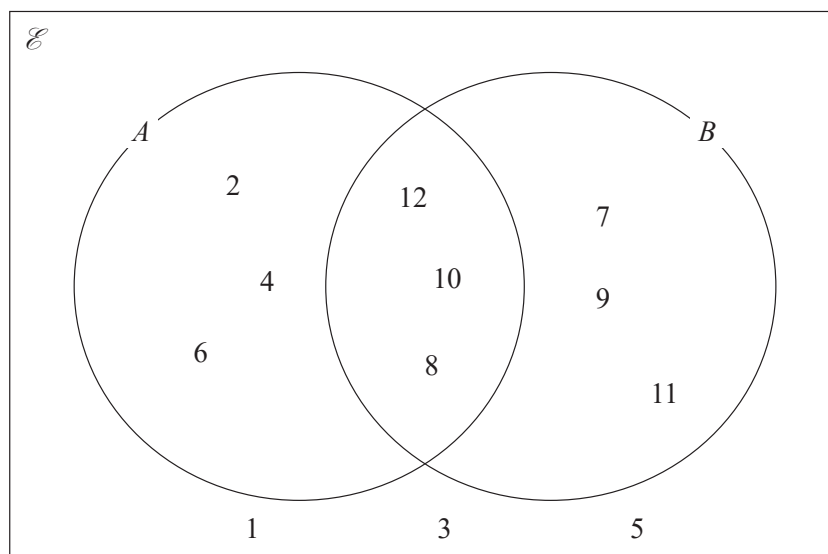
(c) Find the probability that this number is in set C'

(2)

(Total for Question 17 is 5 marks)



19 Here is a Venn diagram with $\mathcal{E} = \{\text{whole numbers from 1 to 12}\}$



(a) List the numbers that are in set A

(1)

(b) List the numbers that are in set $A \cap B$

(1)

(c) List the numbers that are in set $(A \cup B)'$

(1)

One of the numbers in the Venn diagram is chosen at random.

(d) Find the probability that this number is in set $A \cup B$

(2)

(Total for Question 19 is 5 marks)



13 A circle has diameter 18 cm.

Work out the area of the circle.

Give your answer correct to 3 significant figures.

..... cm²

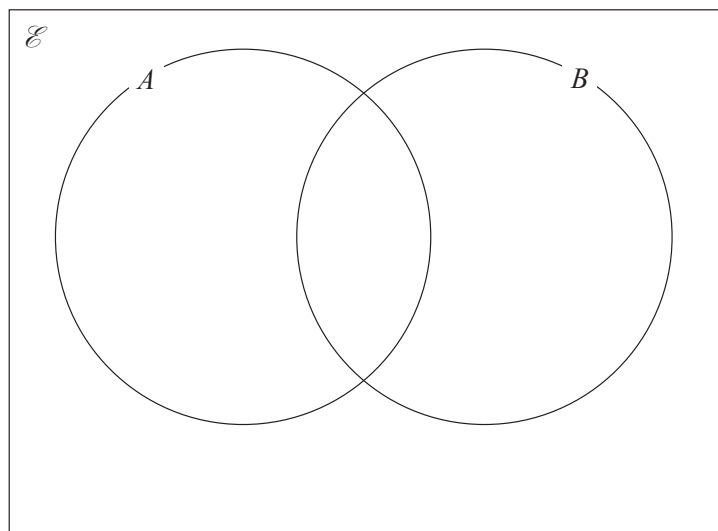
(Total for Question 13 is 2 marks)

14 $\mathcal{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$

$A = \{2, 4, 6, 8, 10, 12\}$

$B = \{3, 6, 9, 12\}$

(a) Complete the Venn diagram below for the sets $\mathcal{E}$, A and B .



(3)

One of the numbers in $\mathcal{E}$ is to be chosen at random.

(b) Find the probability that this number is not in set A **and** not in set B .

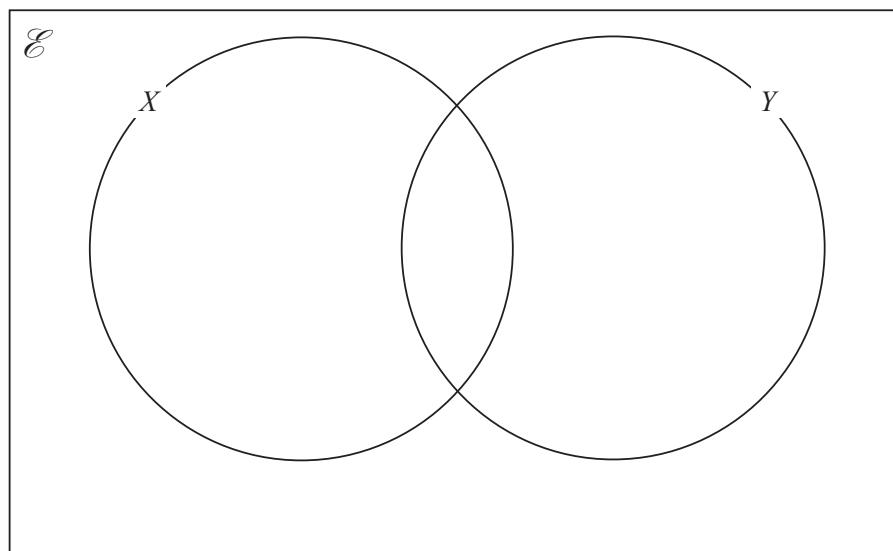
.....
(2)

(Total for Question 14 is 5 marks)



15 $\mathcal{E} = \{2, 4, 6, 8, 10, 12, 14, 16, 18\}$
 $X = \{4, 8, 12, 16\}$
 $Y = \{6, 12, 18\}$

(a) Complete the Venn diagram for this information.



(3)

A number is chosen at random from $\mathcal{E}$

(b) Find the probability that the number is in the set $X \cup Y$

(2)

(Total for Question 15 is 5 marks)



12 30 children were asked whether they have a cat (C) or a dog (D)

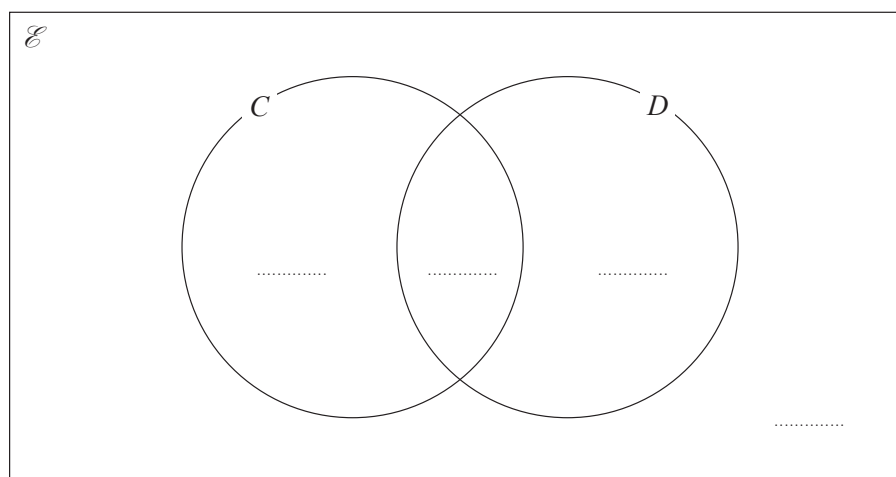
Of the 30 children

5 have both a cat and a dog

13 have a dog

11 have **only** a cat

(a) Complete the Venn diagram.



(3)

One of the children is picked at random.

(b) Find the probability that this child

(i) has a dog,

.....
(1)

(ii) does not have a dog and does not have a cat.

.....
(1)

(Total for Question 12 is 5 marks)



MARK SCHEMES

official mark schemes, in the same order as the questions



International GCSE Maths						
Apart from Q2 (where the mark scheme states otherwise) the correct answer, unless obtained from an incorrect method, should be taken to imply a correct method.						
Question		Working	Answer	Mark		Notes
1	(a)		Nine thousand two hundred and eighty	1	B1	
	(b)		New York	1	B1	
	(c)		700	1	B1	
	(d)		Kolkata	1	B1	
	(e)		17 000	1	B1	
Total 5 marks						
2	(a)		24	1	B1	
	(b)	$26 - 16 (= 10)$	10	2	M1 A1	
	(c)		One and half naan breads drawn	1	B1	
	(d)	$24 + 20 + 16 + 26 + 12 (= 98)$ or $12 \times 8 + 2 (= 98)$	No and 98 seen	2	M1 A1	Must see "No" or "Not correct", "Wrong" etc.
						Total 6 marks
3	(a)		Obtuse	1	B1	
	(b)		Octagon	1	B1	
Total 2 marks						
4	(a)		Marked at 0	1	B1	
	(b)		Marked at 0.5	1	B1	
Total 2 marks						



Question		Working	Answer	Mark	Notes	
5	(i)		81	1	B1	
	(ii)		10	1	B1	
	(v)		23	1	B1	
						Total 3 marks
6	(a)	$\frac{40.194}{8.76}$	4.5883(56164)	2	M1 A1	40.194 or 8.76 seen or implied by 4.588 At least 4 digits reqd after decimal point.
	(b)		4.6	1	B1ft	For 4.6 or ft from (a) if at least 3 s.f.
						Total 3 marks
7	(a)		(2, 3)	1	B1	
	(b)		D	1	B1	
	(c)	$(-2 + 4) \div 2$ or $(3 + 1) \div 2$	(1, 2)	2	M1 A1	
						Total 4 marks

16	0.65×300 oe			M1
		195		A1 (SCB1 for 105)
				Total 2 marks
17	$12.8^2 + x^2 = 16^2$ oe or $163.84 + x^2 = 256$ or $(x^2 =) 16^2 - 12.8^2 (= 92.16)$ or $(x^2 =) 256 - 163.84 (= 92.16)$		4	M1 for applying Pythagoras theorem correctly Allow $\cos^{-1}\left(\frac{12.8}{16}\right) (= 36.9\dots)$ and $\frac{x}{\sin(36.9\dots)} = \frac{16}{(\sin 90)}$
	$(x =) \sqrt{16^2 - 12.8^2} (= \sqrt{92.16}) (= 9.6)$ or $(x =) \sqrt{256 - 163.84} (= \sqrt{92.16}) (= 9.6)$			M1 for square rooting Allow $x = \frac{16}{(\sin 90)} \times \sin(36.9\dots)$
	$(12.8 - "9.6") + "9.6" + "9.6" + 16 + 16 + 16$ oe			M1 (dep on M1) for a complete method to find the perimeter
		70.4		A1 oe e.g. $\frac{352}{5}$
				Total 4 marks

21	eg $0.74 \times 300 (= 222)$ or $1 - 0.74 (= 0.26)$ seen or $\frac{78}{300}$		2	M1 for a method to work out an estimate for the number of games Evie will win or the probability that Evie will lose or an answer of $\frac{78}{300}$
	<i>Correct answer scores full marks (unless from obvious incorrect working)</i>	78		A1 cao
				Total 2 marks

22	(a)	m^7	1	B1
	(b)	8	1	B1 Allow k^8
	(c)	$9x^{12}y^{16}$	2	B2 B1 for a product in the form $ax^p y^q$ where 2 from a , p or q are correct eg $3x^{12}y^{16}$ (Allow $9x^{12}$ or $9y^{16}$ or $x^{12}y^{16}$ so as long as not added to any other terms)
				Total 4 marks



Question	Working	Answer	Mark	Notes
5 (i)		a cross at the notch between $\frac{1}{2}$ and 1	1	B1 A cross or other indication eg an arrow or large dot etc at the correct place.
(ii)		a cross at 0	1	B1 A cross or other indication eg an arrow or large dot etc at the correct place.
Total 2 marks				
Question	Working	Answer	Mark	Notes
6 (a)		A right-angled triangle	1	B1 For a right angled triangle drawn.
(b)		A rectangle with area 20 cm^2	2	B2 eg a rectangle with dimensions 2 cm by 10 cm or 4 cm by 5 cm or 2.5 cm by 8 cm etc (B1 for a rectangle without area 20 cm^2 or any shape with area 20 cm^2)
Total 3 marks				



International GCSE Maths A June 2018 – Paper 2F Mark scheme				
Apart from Questions 20 and 23 where the mark scheme states otherwise, the correct answer, unless clearly obtained by an incorrect method, should be taken to imply a correct method.				
Question	Working	Answer	Mark	Notes
1 (a)		63 100	1	B1
(b)		46800	1	B1
(c)		73.7	1	B1
(d)		9	1	B1
				Total 4 marks
2 (a)		E	1	B1 Accept 0.2
(b)		D	1	B1
(c)		C	1	B1 Accept 0.5
				Total 3 marks
3	400 and 1300 or 900		3	M1 read scales correctly or $1300 \times 0.4 (=520)$ or $400 \times 0.4 (=160)$ or $9 \times 0.4 (=3.6)$ or $(x - y) \times 0.4$ where x and y are readings and $x = 1300$ or $y = 400$
	$(1300-400) \times 0.4$ or "520" – "160"			M1 Difference of both correct readings $\times 0.4$ or
		360		A1 cao
				Total 3 marks

Question	Working	Answer	Mark	Notes
1 (a)		0.23	1	B1
(b)		70	1	B1
(c)		0.2	1	B1
(d)		6 triangles shaded	1	B1
(e)		79	1	B1
2 ai		Likely	1	B1
aii		Impossible	1	B1
(b)		$\times$ at $\frac{3}{10}$	1	B1
3	$150 \div 6$ (=25) or $6 \times 25 = 150$ or $1.03 \div 6$ (=0.17...) "25" $\times$ 1.03 or "0.17..." $\times$ 150	25.75	3	M1 A1 dep
4 (a)		5m	1	B1
(b)		35p	1	B1
(c)		5	1	B1
(d)		15	1	B1

3	(a)		Mweru	1	B1
	(b)		six thousand four hundred and five	1	B1
	(c)		69 000	1	B1
	(d)	5299 × 5.5 =29 144.5 or 29 500 ÷ 5299 = 5.567... or 29 500 ÷ 5.5 =5363.63...		2	M1 for a relevant calculation and answer (rounded or truncated to 2 sf or better)
			yes/no with correct figures and reason		A1 correct figures and a reason that refers to (Lake) Malawi (or 29 500) or refers back to $5\frac{1}{2}$ (or 5.5) or refers to (Lake) Albert (or 5299)
					Total 5 marks

4	(a)		unlikely	1	B1
	(b)		× at $\frac{1}{2}$	1	B1
	(c)		× at 0	1	B1
					Total 3 marks

						Total 3 marks
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Question		Working	Answer	Mark		Notes
19	(a)		-5, 5, 5, -5	2	B2	All 4 correct values If not B2 then B1 for 2 or 3 correct values
	(b)		Fully correct curve	2	M1 A1	Plotting at least 6 points correctly from their table dep on B1 in part(a) Do not accept horizontal line at top of curve or straight line segments
						Total 4 marks

20	(a)	$40 \div 16 \times 12$	30	2	M1 A1	$40 \times \frac{12}{16}$ oe
	(b)	$525 \div 100^2$	0.0525 oe	2	M1 A1	
						Total 4 marks

21		$P(\text{mint}) = 1 - (0.35 + 0.32 + 0.12) (= 0.21)$ $P(\text{strawberry or mint}) = 0.32 + "0.21"$	0.53 oe	3	M1 M1 A1	Or a correct equation summing to 1 Dep Allow 0.53/1
						Total 3 marks

22		$55 \div (6 + 3 + 2) (= 5)$ $(6 \times "5") - (2 \times "5")$	20	3	M1 M1 A1	or $\frac{6}{11} \times 55$ or $\frac{2}{11} \times 55$ or M2 for Won = 30 and Lost = 10
						Total 3 marks



International GCSE Maths				
Apart from questions 16, 21b, 25bii (where the mark scheme states otherwise) the correct answer, unless clearly obtained by an incorrect method, should be taken to imply a correct method				
Q	Working	Answer	Mark	Notes
1 (a)		Ojos del Salado	1	B1
(b)		8 tens	1	B1 accept 80, tens
(c)		Six thousand and forty six	1	B1 cao
(d)		5100	1	B1 cao
(e)		2370	1	B1 accept –2370
Total 5 marks				
2 (a)(i)		Three different numbers less than or equal to 9	1	B1 cao e.g. 1, 2, 3 or 3, 6, 9
(a)(ii)		Three different multiples of ten	1	B1 cao e.g. 10, 20, 30 or 20, 40, 60
(b)		A cross at 0.5	1	B1 cao
Total 3 marks				
3	$(36 - 25) \times 7.45$ oe		3	M2 for a complete method
		81.95		(M1 for $36 - 25 (= 11)$ or for $W \times 7.45$ where W is their weight)
				A1
Total 3 marks				



14	(a)		Reflection $x = 1$	2	B1 for reflection with no mention of translate, rotate, enlarge, move
					B1 for $x = 1$ with no mention of a vector, angle or scale factor
	(b)		Rotation about (0,0) 90° clockwise	3	B1 for rotation with no mention of translate, reflect, enlarge, move
					B1 for 90° clockwise/270° anticlockwise/−90° with no mention of a vector, line of symmetry or scale factor
					B1 for (centre =) (0,0), accept origin or O with no mention of a vector, line of symmetry or scale factor Do not accept $\begin{pmatrix} 0 \\ 0 \end{pmatrix}$ for centre
					Total 5 marks

15	(a)		$\frac{13}{30}$	1	B1 accept 0.43(333...) or 43(.333...)%
	(b)	e.g. $1 - \frac{7}{30}$ or $\frac{13+4+6}{30}$ or $\frac{23}{a}$ where $a > 23$ and $a \neq 30$		2	M1
			$\frac{23}{30}$		A1 accept 0.76(666...) or 0.77 or 76(.666...) or 77%
					penalise incorrect notation once only
					Total 3 marks



Question	Working	Answer	Mark	Notes
13	eg $7 + 5 = 12$ and $\frac{6}{13} = \frac{12}{26}$ or 26 or eg $\frac{7+5}{7+5+x} = \frac{6}{13}$ and $13(7+5) = 6(7+5+x)$		3	M1 for method to find the total number of counters
	eg $26 - 12$ or eg $6x = 84$			M1 complete method to find the number of yellow counters or a correct equation with x terms isolated
	<i>Working not required, so correct answer scores full marks (unless from obvious incorrect working)</i>	14		A1 cao
				Total 3 marks



International GCSE Maths				
Apart from questions 7, 8, 17, 22, 25 and 26 the correct answer, unless clearly obtained by an incorrect method, should be taken to imply a correct method				
Q	Working	Answer	Mark	Notes
1				
(a)		one triangle fully shaded	1	B1 or one quarter of the square shaded (ignoring diagonal lines).
(b)		$\frac{3}{4}$	1	B1 oe
(c)		$\frac{9}{10}$	1	B1 oe
Total 3 marks				
2				
(i)		8	1	B1
(ii)		14	1	B1
(iii)		30	1	B1
(iv)		3 or 23	1	B1 or both 3 and 23
(b)	$108 - 3 (= 105)$ or $x \div 5$ where x is found value from first stage $(108 - 3) \div 5$ oe		2	M1 Allow $108 - 3 \div 5$ or $- 3 \div 5$ with the correct order indicated eg with arrows
		21		A1 cao If no marks scored SCB1 for 107.4 or 543
Total 6 marks				
3				
(a)(i)		unlikely	1	B1
(ii)		evens	1	B1
(b)		cross shown at 0	1	B1
Total 3 marks				

International GCSE Maths				
Apart from Questions 6b, 9, 11, 18, 20b and 21a (where the mark scheme states otherwise), the correct answer, unless clearly obtained by an incorrect method, should be taken to imply a correct method.				
Q	Working	Answer	Mark	Notes
1 (a)		Gazientep	1	B1
(b)		Two thousand, five hundred and thirty four	1	B1
(c)		2350	1	B1 cao
(d)		608	1	B1 Accept –608
(e)		4	1	B1 cao
				Total 5 marks
2 (a)		$8a$	1	B1 cao
(b)		$24b$	1	B1 cao
(c)		27	1	B1 cao
				Total 3 marks
3 (a)(i)		C	1	B1 cao
(ii)		A	1	B1 cao
(b)		Correct reason	1	B1 e.g. for probability cannot be more than 1 oe It adds to 1 oe Scale goes to 1 oe It has to be below 1 oe
				Total 3 marks

9	Allow Triangle drawn with intersecting arcs 6 cm from <i>B</i> and 9 cm from <i>A</i>	Triangle drawn with correct intersecting arcs 6 cm from <i>A</i> and 9 cm from <i>B</i>		B2 for triangle drawn with correct intersecting arcs 6 cm from <i>A</i> and 9 cm from <i>B</i> within the overlay (B1 for two intersecting arcs within the overlay or accurate triangle drawn with no arcs)
				Total 2 marks

10	(i)		$\frac{7}{20}$	1	B1 oe
	(ii)	$\frac{2+6}{20}$ oe or $1 - \frac{5+7}{20}$ oe		2	M1 ft their (i)
			$\frac{8}{20}$		A1 oe penalise incorrect notation only once
					Total 3 marks

International GCSE Maths				
Apart from Question 21, the correct answer, unless clearly obtained by an incorrect method, should be taken to imply a correct method				
Q	Working	Answer	Mark	Notes
1 (a)		15	1	B1
(b)		18	1	B1
(c)		16	1	B1
(d)		2	1	B1
(e)		8 and 18	1	B1
				Total 5 marks
2 (a)		Unlikely	1	B1 Tick at
(b)		Evens	1	B1 Tick at
(c)		Impossible	1	B1 Tick at
				Total 3 marks
3 (a)		Prism	1	B1 Accept pentagon(al) prism
(b) (i)		7	1	B1
(ii)		10	1	B1
(c)	$\pm(70 - 8 \times 5)$ or $- 30$ or $70 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5$ oe		2	M1 Could be done in 2 parts
	Correct answer scores full marks (unless from obvious incorrect working)	30		A1
				Total 5 marks

International GCSE Maths				
Apart from Questions 9, 10, 17, 18b, 28 the correct answer, unless clearly obtained by an incorrect method, should be taken to imply a correct method				
Q	Working	Answer	Mark	Notes
1 (a)		Tuesday	1	B1 accept Tues, Tue, Tu Allow 11 362
(b)		Nine thousand six hundred and fifty three	1	B1
(c)		8930	1	B1 cao
(d)		9 hundreds	1	B1 accept 100(s), hundred(s), 900, nine hundred(s)
(e)		17 391	1	B1 cao
				Total 5 marks

2 (a)		unlikely	1	B1
(b)		× at 0	1	B1
(c)		1 odd number and 2 even numbers	1	B1
				Total 3 marks

5	(a)		(2, 3)	1	B1
	(b)		For the point (6, 1) marked	1	B1 If not marked <i>D</i> then award marks so long as unambiguous.
	(c)		(3.5, 1)	2	B2 oe for both coordinates correct (B1 for a correct calculation for one coordinate $\frac{2+5}{2}$ or $\frac{3+1}{2}$ or for one correct coordinate or for (1, 3.5))
	(d)		line drawn	1	B1 horizontal line drawn – any length as long as unambiguous
Total 5 marks					
6	(a)		Octagon	1	B1
	(b)		8.6	1	B1 allow in range 8.4 – 8.8
	(c)		B, D	1	B1 both given
Total 3 marks					
7	(i)		unlikely	1	B1 Award unlikely together with a fraction. Accept incorrect spelling if meaning is clear
	(ii)		evens	1	B1
	(iii)		impossible	1	B1
Total 3 marks					



17	eg $\frac{14}{3}$ and $\frac{6}{5}$		3	M1	both fractions expressed as improper fractions, no need for $\div$ or $\times$ may be equivalent to those given eg $\frac{70}{15}$ or $\frac{18}{15}$ etc. A student could invert $\frac{6}{5}$ and go straight to the 2nd M1, this mark is then implied.
	$\frac{14}{3} \times \frac{5}{6}$ oe or $\frac{70}{15} \div \frac{18}{15}$			M1	For inverting 2 nd fraction and showing intention to multiply or for both fractions expressed as correct equivalent fractions with the same denominator with intention to divide eg $\frac{70}{15} \div \frac{18}{15}$
	eg $\frac{14}{3} \times \frac{5}{6} = \frac{70}{18} = \frac{35}{9} = 3\frac{8}{9}$ or $\frac{14}{3} \times \frac{5}{6} = \frac{70}{18} = 3\frac{16}{18} = 3\frac{8}{9}$ or $\frac{14}{3} \times \frac{5}{6} = \frac{35}{9} = 3\frac{8}{9}$ or $\frac{14}{3} \div \frac{6}{5} = \frac{70}{15} \div \frac{18}{15} = \frac{70}{18} = \frac{35}{9} = 3\frac{8}{9}$ or correct working to $\frac{35}{9}$ and writing $3\frac{8}{9} = \frac{35}{9}$ (may be earlier in working) <i>working required</i>	Shown		A1	Dep on M2 for conclusion to $3\frac{8}{9}$ from correct working – either sight of the result of the multiplication or division e.g. $\frac{70}{18}$ must be seen or correct cancelling prior to the multiplication to $\frac{35}{9}$ OR writing $3\frac{8}{9} = \frac{35}{9}$ (maybe on first line of working) and correct working as far as LHS = $\frac{35}{9}$ NB: marks are awarded for use of fractions not decimals (but allow a decimal check of answer)
Total 3 marks					

18	1 – (0.32 + 0.13 + 0.28) oe eg 1 – 0.73 (= 0.27) or 0.32 × 200 (= 64) or 0.13 × 200 (= 26) or 0.28 × 200 (= 56) or 0.73 × 200 (= 146)		3	M1 (0.27 may be seen in table) [could work with percentages eg 100 – 32 – 13 – 28 (=27)]
	[1 – “0.73”] × 200 oe eg “0.27” × 200 or 200 – “64” – “26” – “56” or 200 – “146”			M1 for a complete method or for an answer of $\frac{54}{200}$
	Correct answer scores full marks (unless from obvious incorrect working)	54		A1
				Total 3 marks

3	(a)		Cross at $\frac{1}{2}$	1	B1 cao
	(b)		Cross at 0	1	B1 cao
	(c)	Acceptable answers eg 1. It is over 1/more than 1 oe 2. It is over 100%/more than 100% oe 3. Probability of 1/100% is the highest oe 4. Probability ranges from 0 – 1 or 0 – 100% oe 5. 1.2/120% is impossible oe 6. It has to be 1 or less oe 7. It has to be below 1 oe Do not accept eg 1. It is (too) high oe 2. Sum has to be 1 oe This is not an exhaustive list	Correct reason	1	B1 for probability cannot be more than 1 oe Do not allow contradictory answers Any reference to sum of probabilities is 1 is B0
					Total 3 marks

4	(a)		octagon	1	B1
	(b)		240	1	B1
	(c)		C	1	B1 allow c
	(d)		metres	1	B1 or m
					Total 4 marks



9		Triangle drawn with correct intersecting arcs 9 cm from <i>A</i> and 9 cm from <i>B</i>	2	B2 for triangle drawn with correct intersecting arcs 9 cm from <i>A</i> and 9 cm from <i>B</i> within or on the guidelines of the overlay (B1 for two intersecting arcs within or on the guidelines of the overlay or accurate triangle drawn with no arcs)
	<i>Working required</i>			Total 2 marks

10	(a)		$\frac{10}{29}$	1	B1 oe 0.34(48275...) or 34.(48275...) % truncated or rounded
	(b)	$\frac{29-10-7}{29}$ or $1-\frac{10+7}{29}$ or $29-10-7$ or 12 or $1-0.34(482...)-0.24(137...)$		2	M1
		<i>Working not required, so correct answer scores full marks (unless from obvious incorrect working)</i>	$\frac{12}{29}$		A1 oe 0.41(37931...) – 0.42 or 41.(37931...) % – 42% penalise incorrect notation only once
					Total 3 marks

7	180 – 138 (= 42)		4	M1 NB If angles are on the diagram they must be from correct working and correctly assigned
	360 – (“42” + 107 + 125)			M1
	Correct answer scores full marks (unless from obvious incorrect working)	86		A1
		one correct reason		B1 dep on M1 for one correct reason (i) <u>Angles</u> on a straight <u>line</u> add to 180° or angles on a straight <u>line</u> add to <u>180</u> ° (ii) <u>Angles</u> in a <u>quadrilateral</u> sum to 360° or angles in a <u>quadrilateral</u> sum to <u>360</u> °
				Total 4 marks

8	(a)		$\frac{27}{80}$	1	B1 oe 0.33(75) or 33(.75)% truncated or rounded
	(b)	80 – (27 + 10) (= 43) oe or 80 – 37 (= 43) $\frac{80 - (27 + 10)}{80}$ oe or $\frac{80 - 37}{80}$		2	M1
		Correct answer scores full marks (unless from obvious incorrect working)	$\frac{43}{80}$		A1 oe 0.53(75) or 53(.75)% truncated or rounded NB Penalise incorrect notation once
					Total 3 marks

9	41.25 ÷ 15 oe or 2.75 oe or $\frac{52}{15} \times 41.25$ oe		2	M1
	Correct answer scores full marks (unless from obvious incorrect working)	143		A1
				Total 2 marks



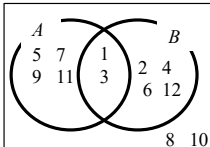
International GCSE Maths				
Values in quotation marks must come from a correct method previously seen unless clearly stated otherwise.				
Q	Working	Answer	Mark	Notes
1 (a)		Montana	1	B1
(b)		314 200	1	B1
(c)		4 thousands	1	B1 accept 4000, thousands
(d)		420 727	1	B1
(e)		Twenty three thousand, eight hundred (and) seventy one	1	B1
				Total 5 marks
2 (a)		unlikely	1	B1
(b)		× at 1	1	B1
(c)		2 numbers which are even	1	B1
				Total 3 marks
3 (a)		5.3 cm or 53 mm or 5cm 3mm	2	B2 for 5.3 cm or 53 mm or 5cm 3mm (allow 5.1 – 5.5 cm or 51 – 55 mm or 5cm 1mm – 5cm 5 mm) (B1 for 5.3 (allow 5.1 – 5.5) or 53 (allow 51 – 55) or cm with a value from 4.8 – 5.8 or mm with a value from 48 – 58)
(b)		109	1	B1 (+ 2)
(c)		hexagon	1	B1
				Total 4 marks

Question	Working	Answer	Mark	Notes
28	$(17 + 28) \div (9 - 4)$ or $45 \div 5$ or $1 - \frac{4}{9} = \frac{5}{9}$ or $(17 + 28) = \frac{5}{9}$ oe or $\frac{p}{p + 28 + 17} = \frac{4}{9}$ oe or $\frac{p}{p + 45} = \frac{4}{9}$ or $\frac{m - 45}{m} = \frac{4}{9}$		3	M1 Allow 0.55(555...) or 55(.555...) % truncated or rounded
	$(17 + 28) \div 5 \times 4$ or $45 \div 5 \times 4$ or $(17 + 28) \div \frac{5}{9} (= 81)$ or $45 \div \frac{5}{9} (= 81)$ or $(17 + 28) \times \frac{9}{5} (= 81)$ or $45 \times \frac{9}{5} (= 81)$ or $(17 + 28) \div 5 \times 4$ or $45 \div 5 \times 4$ or $\frac{5}{9} = \frac{17 + 28}{n}$ oe or $n = 81$ or $9p = 4(p + 28 + 17)$ or $9p - 4p = 180$ oe or $5p = 180$ oe or $9(m - 45) = 4m$ or $9m - 4m = 405$ oe or $5m = 405$ oe or $m = 81$			M1 for the correct calculation for the total number of counters or for the correct calculation for the number of orange counters or for the correct equation for the total number of counters (removing the denominators) or for the correct equation for the number of orange counters (removing the denominators)
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	36		A1 cao
Total 3 marks				

15	$1 - \frac{2}{5} \left(= \frac{3}{5} \right)$ oe or (green : red + blue =) 2 : 3 OR eg $\frac{x}{x+12} = \frac{2}{5}$ or $\frac{n-12}{n} = \frac{2}{5}$		3	M1 for finding the proportion of counters that are not green (may be a percentage or decimal) or for a correct ratio (allow ratio in any order) Values in ratio do not need labels, but if labels are used, they must be correct This is implied by eg 12 (counters) = 3 (parts) OR for forming a correct equation in terms of the number of green counters or the total number of counters in the bag (allow use of any letter)
	$\frac{(7+5)}{"3"}$ oe or $\frac{(7+5)}{"3"} \times 5$ oe (= 20) or $(7+5) \div " \frac{5}{3} "$ (= 20) OR $x = \frac{12 \times 2}{5-2}$ or $n = \frac{5 \times 12}{5-2}$			M1 for a method to find the value one-fifth of the counters or for a method to find the total number of counters in the bag OR for a correct method to solve a correct equation
	Correct answer scores full marks (unless from obvious incorrect working)	8		A1 cao Note: answer $\frac{8}{20}$ scores M1M1A0
				Total 3 marks

Question	Working	Answer	Mark	Notes
9 (a)		Segment shaded	1	B1 Accept minor segment or major segment.
(b)		Chord	1	B1
(c)	$\angle OQT = 90^\circ$ and $\angle OQT = 18^\circ$ or $90 - 18$		3	M1 For 90° and 18° correctly identified in the working or on the diagram or for $90 - 18$ or for other fully correct method
		72		A1
	Angle between <u>tangent</u> and <u>radius</u> is 90 degrees			B1 Correct reason for 90° angle [If used <u>alternate segment theorem</u>]
				Total 5 marks
10 (a)	$\frac{36+33}{135}$		2	M1 for numerator of $36 + 33 (= 69)$ or denominator of 135
		$\frac{69}{135}$		A1 Accept 0.51(11...) or 51.(11...) % 2 sf or better
(b)	$\frac{27}{135} \times 360$ or $360 \div 5$ or $27 \times \frac{8}{3}$ oe		2	M1 allow use of $\frac{8}{3} = 2.666...$ to 1 dp truncated or rounded
		72		A1
				Total 4 marks

Question	Working	Answer	Mark	Notes
14 (a)	7 outcomes with at least one C		2	M1 Identify at least 6 (with no more than 2 incorrectly identified) outcomes with at least one C or an answer of $\frac{6}{16}$ or $\frac{8}{16}$ or $\frac{7}{n}$ where $n > 7$
		$\frac{7}{16}$		A1 Or 0.4375 or 43.75% (allow 2dp rounded or truncated)
(b)	$\frac{7}{16} \times 80$		2	M1 ft from (a) for value between 0 and 1 or for an answer of $\frac{35}{80}$
		35		A1 ft from (a)
Total 4 marks				
15	$\frac{180-80}{2} (= 50)$		3	M1 could be marked correctly on diagram or in working with no contradiction
	$360 - "50" - 90$			M1 dep on first M1
		220		A1 cao
Total 3 marks				

Question	Working	Answer	Mark	Notes
17	$90 \div (2 + 13) (= 6)$ or $\frac{12+x}{90+x} = \frac{1}{3}$ $"6" \times 2 (=12)$ or $"6" \times 13 (=78)$ or $3(12+x) = 90+x$ $("78" \div 2) - "12"$ or $2x = 54$ or $"78" \times 3/2 - "78" - "12"$ oe	27	4	M1 M1 M1 dep on a correct method for "78" and "12" A1
18		Fully correct Venn diagram	4	B4 fully correct Venn diagram with labels A and B (If not B4 then B3 for 3 correct regions, B2 for 2 correct regions B1 for 1 correct region)

19		$2x + 0.18 + 2x + 3x + 0.26 + x = 1$ or $1 - (0.18 + 0.26) (= 0.56)$			M1
		$x = (1 - 0.18 - 0.26) \div (2 + 2 + 3 + 1) (= 0.07)$			M1
		$(0.18 + 4 \times "0.07") \times 200$ or 0.46×200 or $36 + 42 + 14$ oe			M1 dep on M2 and probabilities between 0 and 1 or for $\frac{92}{200}$, oe with 92 seen
			92	4	A1
					Total 4 marks

20		$12 \times 8 \times 5 (= 480)$		3	M1
		"480" $\times 0.7$			M1 dep
			336		A1
					Total 3 marks

22	$1 - (0.24 + 0.31) (= 0.45)$ or $(0.24 + 0.31) \times 180 (= 99)$		4	M1 or for a correct equation for missing values eg $x + 0.24 + 2x + 0.31 = 1$ oe (can be implied by 2 probabilities that total 0.45 in table if not contradicted in working space)
	'0.45' $\div 3 (= 0.15)$ or '0.45' $\times 180 (= 81)$ or $180 - 99 (= 81)$			M1 (or 0.15 correctly placed in table if not contradicted)
	'0.15' $\times 180$ or '81' $\div 3$			M1 Or an answer of $\frac{27}{180}$
		27		A1
				Total 4 marks

15	$15 \times 60 \times 60 (= 54\,000)$ oe or $\frac{60}{12} \times 60 \times 15 (= 4500)$ oe or $5 \times \frac{60}{12} \times 60 (= 1500)$ oe		4	M1	M2 for $\frac{15 \times 60 \times 60 \times 5}{12}$ (= 22 500)
	‘54000’ $\div 12 \times 5 (= 22\,500)$ oe or ‘4500’ $\times 5 (= 22\,500)$ oe or ‘1500’ $\times 15 (= 22\,500)$ oe			M1	
	‘22 500’ $\times 0.002$ oe			M1	dep on M2 for a complete method
		45		A1	
Total 4 marks					

16	<table><tr><td>x</td><td>-2</td><td>-1</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>y</td><td>15</td><td>11</td><td>7</td><td>3</td><td>-1</td><td>-5</td></tr></table>	x	-2	-1	0	1	2	3	y	15	11	7	3	-1	-5	Correct line between $x = -2$ and $x = 3$	3	B3 for a correct line between $x = -2$ and $x = 3$ (B2 for a correct straight line segment through at least 3 of $(-2, 15)$ $(-1, 11)$ $(0, 7)$ $(1, 3)$ $(2, -1)$ $(3, -5)$ or for all of $(-2, 15)$ $(-1, 11)$ $(0, 7)$ $(1, 3)$ $(2, -1)$ $(3, -5)$ plotted but not joined) (B1 for at least 2 correct points stated (may be in a table) or plotted or for a line drawn with a negative gradient through $(0, 7)$ or for a line with a gradient of -4)
	x	-2	-1	0	1	2	3											
y	15	11	7	3	-1	-5												
	$(-2, 15)$ $(-1, 11)$ $(0, 7)$ $(1, 3)$ $(2, -1)$ $(3, -5)$			Total 3 marks														

3	(a)		A and D	1	B1
	(b)		Correctly enlarged shape	2	B2 A correctly drawn shape (B1 for a shape with 3 sides correctly enlarged)
	(c)		hexagon	1	B1 Condone incorrect spelling if meaning is unambiguous
Total 4 marks					
4	(a)		evens	1	B1
	(b)		Cross at 0	1	B1
	(c)		Cross at the 2 nd mark along	1	B1 ie the mark before $\frac{1}{2}$
	(d)		Cross at the 4 th mark along	1	B1 ie the mark after $\frac{1}{2}$
Total 4 marks					
5	(a)		$3w$	1	B1
	(b)		$8a$	1	B1
	(c)		f^5	1	B1
	(d)		$9c - 2h$	2	B2 (B1 for one correct term)
	(e)		$5(2d + 3)$	1	B1
	(f)	$e - g = 7t$ or $\frac{e}{7} = t + \frac{g}{7}$ oe		2	M1
			$t = \frac{e - g}{7}$		A1 oe e.g. $(e - g) \div 7$
Total 8 marks					
6		$30 \div 3.05 (= 9.8...)$		3	M1 oe, e.g. adding 9 lots of 3.05
		$30 - 9 \times 3.05$ oe			M1
			2.55		A1 oe
					Total 3 marks

International GCSE Maths				
Apart from questions 15c, 17, 25 (where the mark scheme states otherwise) the correct answer, unless clearly obtained by an incorrect method, should be taken to imply a correct method				
Q	Working	Answer	Mark	Notes
1 a		Makalu	1	B1 Accept 8485
b		Five thousand eight hundred and ninety five	1	B1
c		800	1	B1 Accept 8 (eight) hundreds, hundreds, 100('s),
d		2077	1	B1 Accept -2077
				Total 4 marks

2 ai		likely	1	B1
aii		impossible	1	B1
b		cross at $\frac{1}{2}$	1	B1
c		cross at $\frac{1}{6}$	1	B1
				Total 4 marks

3 a		Trapezium	1	B1
b		42	1	B1 Accept 40 – 44
c		Correct lines marked	1	B1
d		2	1	B1
				Total 4 marks



15	(a)	$54 \div 9 \times 4$ oe or $\frac{4}{9} \times 54$ oe		2	M1 Allow $0.44(44\dots) \times 54$ or $\frac{24}{54}$
		<i>Correct answer scores full marks (unless from obvious incorrect working)</i>	24		A1
	(b)	$\frac{"24" + n}{54 + n} = \frac{1}{2}$ or $\frac{30}{60}$ or $54 - "24" (= 30)$ and $"30" - "24"$ or $2 \times "30" - 54$		2	M1 ft if $"24" < 27$ or $\frac{6}{60}$
		<i>Correct answer scores full marks (unless from obvious incorrect working)</i>	6		A1
					Total 4 marks

16		$2 \times 0.75 (= 1.5)$ oe or $2 \times 0.75 \times 2 (= 3)$ oe		5	M1 for area of rectangle
		$\pi \times (0.5 \div 2)^2 (= 0.1963)$ or $\frac{1}{2} \times \pi \times (0.5 \div 2)^2 (= 0.09817)$			M1 for area of circle or area of semicircle
		$"1.5" - "0.09817" (= 1.4018\dots)$ or $"3" - "0.1963" (= 2.8036\dots)$			M1
		$"1.4018" \times 2 \times 250 \div 4 (= 175.228\dots)$ or $"2.8036" \times 250 \div 4 (= 175.228\dots)$ or $"1.4018" \times 250 \div 4 (= 87.6\dots)$			M1or for 87 – 88
		<i>Correct answer scores full marks (unless from obvious incorrect working)</i>	175		A1 Allow 175 – 176
					Total 5 marks

17	(a)		140	1	B1 accept 138 – 142 May be seen on diagram.
	(b)	[5.8, 6.2]		4	M1
		'[5.8, 6.2]' $\times$ 500 (= '[2900, 3100]')			M1 ft
		'[2900, 3100]' $\div$ 0.44			M1 ft
			6818		A1 ft answer in range 6590-7045 but must be an integer
Total 5 marks					
18	(a)	$1 - (0.24 + 0.16 + 0.38)$ oe		2	M1
			0.22		A1 oe
	(b)	$0.24 + 0.16 (= 0.4)$ oe		2	M1
			0.4		A1 oe
Total 4 marks					

17	$1 - (0.26 + 0.18) (= 0.56)$ oe or 0.28 oe or $x + x = 1 - (0.26 + 0.18)$ oe		4	M1 0.28 oe may be seen in the table
	$45 \div 0.18 (= 250)$ oe or $\frac{45}{18} (= 2.5)$ oe " $\frac{0.56}{2} \div 0.18 (= \frac{14}{9} = 1.55\dots)$ " oe or " $\frac{56}{2} \div 18 (= \frac{14}{9} = 1.55\dots)$ "			M1
	" $250 \times \frac{0.56}{2}$ " oe or $2.5 \times \frac{56}{2}$ oe or " 250×0.28 " oe or " $0.28 \div 0.18 \times 45$ oe or " $\frac{14}{9} \times 45$ oe or " $28 \div 18 \times 45$ oe or $\frac{45}{18} \times 28$ " oe			M1
		70		A1 ($\frac{70}{250}$ scores M3A0)
				Total 4 marks

17	(a)		0.45	1	B1 oe eg $\frac{9}{20}, \frac{45}{100}, 45\%$
	(b)	eg $1 - (0.25 + 0.2 + 0.2) (= 0.35)$ or $1 - ("0.45" + 0.2) (= 0.35)$ or $300 \times (0.25 + 0.2 + 0.2) (= 195)$		3	M1 allow use of their "0.45" from part (a), check the table
		eg $300 \times "0.35"$ or $300 - "195"$			M1 for a complete method
			105		A1 cao (award $\frac{105}{300}$ M2 only)
Total 4 marks					

18	(a)	eg $6 \times 2.4 + 5 \times 3.5$		2	M1
			31.9		A1 oe
	(b)	($W =$) $5.9n$ or ($W =$) $5.9(n - 1) + 2.4$ or ($W =$) $2.4n + 3.5(n - 1)$		2	M1 for $2.4n + 3.5n$ or $5.9n$ seen
			$5.9n - 3.5$		A1 oe but must be in simplest form eg $-3.5 + 5.9n$
Total 4 marks					

19		$5 \times 12 (= 60)$ or $\frac{15 + 7 - 2 + 23 + x}{5} = 12$ oe or $\frac{x + "43"}{5} = 12$		3	M1 for a method to find the total of the 5 numbers or setting up an equation in x "43" comes from $15 + 7 - 2 + 23$
		$x + 15 + 7 - 2 + 23 = "60"$ or $x + "43" = "60"$ or $"60" - (15 + 7 - 2 + 23)$			M1 for forming an equation with their 60 or for a complete calculation to find the value of x "43" comes from $15 + 7 - 2 + 23$
			17		A1
Total 3 marks					

4	(a)		80	1	B1
	(b)		thousandth	1	B1 oe e.g. 3 thousandth, 1000^{th} , $\frac{1}{1000}$ $\frac{3}{1000}$, 0.003
	(c)		0.04 0.042 0.2 0.204 0.24	1	B1
	(d)		25.79	1	B1
	(e)		36	1	B1
Total 5 marks					

5	(a)(i)				A cross at 0.5	1	B1															
	(ii)				unlikely	1	B1															
	(b)	<table><tr><th>Type of rice</th><th>Tally</th><th>Frequency</th></tr><tr><td>arborio</td><td>IIII</td><td>4</td></tr><tr><td>basmati</td><td>IIII1</td><td>6</td></tr><tr><td>jasmine</td><td>IIII1</td><td>7</td></tr><tr><td>wild</td><td>III</td><td>3</td></tr></table>	Type of rice	Tally	Frequency	arborio	IIII	4	basmati	IIII1	6	jasmine	IIII1	7	wild	III	3				2	B2 for all frequencies correct (B1 for 2 frequencies correct or 2 tallies correct or 1 tally with its frequency correct)
Type of rice	Tally	Frequency																				
arborio	IIII	4																				
basmati	IIII1	6																				
jasmine	IIII1	7																				
wild	III	3																				
							Total 4 marks															

22	$1 - (0.24 + 0.4) (= 0.36)$ oe or $3x + x = 1 - (0.24 + 0.4)$ oe		4	M1
	$48 \div 0.24 (= 200)$ or "0.36" $\div 4 (= 0.09)$ or "0.36" $\div 4 \times 3 (= 0.27)$			M1
	"0.27" $\times$ "200" or "200" $\times$ "0.36" $\div 4 \times 3$ ("200" $- 48 -$ "80") $\div 4 \times 3$			M1 for a complete method
		54		A1
				Total 4 marks

22 ALT	$1 - (0.24 + 0.4) (= 0.36)$ oe or $3x + x = 1 - (0.24 + 0.4)$ oe		4	M1
	$48 \div 24 (= 2)$ oe or $\left(\frac{"0.36"}{4} \times 3\right) \div 0.24 \left(= \frac{9}{8} = 1.125\right)$ oe or $\left(\frac{"36"}{4} \times 3\right) \div 24 \left(= \frac{9}{8} = 1.125\right)$ oe			M1
	"2" $\times$ $\left(\frac{"36"}{4} \times 3\right)$ oe or $\frac{9}{8} \times 48$ oe or ("27" $\div 24$) $\times 48$ oe			M1 for a complete method
	Correct answer scores full marks (unless from obvious incorrect working)	54		A1
				Total 4 marks

20	eg $\frac{x+7}{80} = \frac{1}{4}$ or $4(x+7) = 80$ or $x+7 = 20$		4	M1 for setting up a correct equation in terms of x only
	eg $x = 80 \times \frac{1}{4} - 7 (=13)$ or $4x + 28 = 80$ and $x = \frac{80-28}{4} (=13)$ or $x = 13$			M1 for a complete method to find the value of x or $x = 13$. Award of this mark implies M2.
	eg $80 - ("13" + 7 + "13" - 11 + 3 \times "13") (=19)$ or $\frac{"13" + 7 + "13" - 11 + 3 \times "13"}{80} (= \frac{61}{80})$			M1 for a method to find the number of yellow counters or $P(R \text{ or } B \text{ or } G)$
	Correct answer scores full marks (unless from obvious incorrect working)	$\frac{19}{80}$		A1 oe eg accept 0.2375 or 23.75% or 0.237 or 23.7% or 0.238 or 23.8% or 0.24 or 24%
				Total 4 marks

9	(a)		146	1	B1
	(b)	$64 - 9 (= 55)$ or $(64 - 9) \div 11$ or $11x + 9 = 64$		2	M1 for working backwards from the output of 64 or setting up an equation
		<i>Correct answer scores full marks (unless from obvious incorrect working)</i>	5		A1
Total 3 marks					

10	(a)		$\frac{13}{30}$	1	B1 oe eg 0.43(333...) or 43.(33...)%
	(b)		$\frac{6}{30}$	1	B1 oe eg $\frac{1}{5}$ or $\frac{3}{15}$ or 0.2 or 20%
	(c)	eg $\frac{2}{5} = \frac{16}{40}$ or $\frac{2}{5} \times (10 + 30)(= 16)$ oe		2	M1 for a method to work out the number of white counters now in the bag
		<i>Correct answer scores full marks (unless from obvious incorrect working)</i>	5		A1
Total 4 marks					

11		$94.8(0) - 3 \times 12 (= 58.8(0))$ oe		4	M1 for a method to find the total cost of the children's tickets
		eg $0.3 \times 12 (= 3.6(0))$ oe or $(1 - 0.3) \times 12 (= 8.4(0))$ oe			M1 (indep) for finding 30% or 70% of 12
		"58.8(0)" $\div$ $(12 - "3.6(0)")$ oe or "58.8(0)" $\div$ "8.4(0)" oe			M1 for a complete method to find the number of children's tickets
		<i>Correct answer scores full marks (unless from obvious incorrect working)</i>	7		A1
Total 4 marks					

17	$1500 + (36 \times 450) (= 17\,700)$		4	M1
	"17 700" – 12 500 (= 5200) oe or $\frac{17\,700}{12\,500} (= 1.416)$ oe			M1
	$\frac{5200}{12500} (\times 100)$ oe or $0.416 (\times 100)$ or "5200", $100 \times \frac{52}{125}$ or 141.6 (– 100)			M1
	<i>Working not required, so correct answer scores full marks (unless from obvious incorrect working)</i>	41.6		A1 allow 42 from correct working
				Total 4 marks

18	(a)	$1 - 0.58 (= 0.42)$ or $100 - 58 (= 42)$ $0.58 + 2x + x = 1$ oe		2	M1
		<i>Working not required, so correct answer scores full marks (unless from obvious incorrect working)</i>	0.14		A1 oe eg 14% (must have % sign) or $\frac{7}{50}$ etc SCB1 for an answer of 14 if no other marks are awarded
	(b)	250×0.58 oe or $58 + 58 + (58 \div 2)$ oe		2	M1 or for $\frac{145}{250}$
		<i>Working not required, so correct answer scores full marks (unless from obvious incorrect working)</i>	145		A1 cao
					Total 4 marks



17	$1 - (0.20 + 0.26) (= 0.54)$ oe or $x + 2x + 0.26 + 0.20 = 1$ oe or $x + 2x = 0.54$ oe or		4	M1 showing clear understanding that the total of probabilities is 1 If probabilities are given as percentages then % sign must be seen
	$\frac{0.54}{3} (= 0.18)$ or $\frac{2}{3} \times 0.54 (= 0.36)$ oe or $0.54 \times 450 (= 243)$			M1 for a correct method to find x or $2x$
	$(2 \times) "0.18" \times 450$ oe or 81 or " 0.36 " $\times 450$ oe			M1 or for $\frac{81}{450}$ or $\frac{162}{450}$
	<i>Working not required, so correct answer scores full marks (unless from obvious incorrect working)</i>	162		A1
				Total 4 marks
17 ALT	$(0.2 \times 450) + (0.26 \times 450) (= 207)$ oe or $90 + 117 (= 207)$ or $0.46 \times 450 (= 207)$		4	M1
	$450 - "207" (= 243)$			M1
	$\frac{1}{3} \times "243"$ or 81 or $\frac{2}{3} \times "243"$			M1 or for $\frac{81}{450}$ or $\frac{162}{450}$
	<i>Working not required, so correct answer scores full marks (unless from obvious incorrect working)</i>	162		A1
				Total 4 marks

17	$1 - (0.27 + 0.04 + 0.12) (= 0.57)$ oe or $2x + 0.27 + 0.04 + x + 0.12 = 1$ oe or $0.27 \times 400 (= 108)$ and $0.04 \times 400 (= 16)$ and $0.12 \times 400 (= 48)$		4	M1 for showing a clear understanding that the total of probabilities is 1 or for finding estimates for the number of times the spinner will land on 2 and 3 and 5
	$(x =) \frac{400 - "108" - "16" - "48"}{3} (= 76)$ oe or $\frac{400 - "108" - "16" - "48"}{3} \times 2 (= 152)$ oe			M1 for a method to find the value of x or $2x$ or an estimate for the number of times the spinner will land on 4 or 1
	$(2 \times "0.19" + 0.04 + 0.12) \times 400$ or $2 \times "76" + "16" + "48"$			M1 for a complete method
	Correct answer scores full marks (unless from obvious incorrect working)	216		A1 for an answer of 216 answer of $\frac{216}{400}$ oe scores M3A0
Total 4 marks				



21	$1 - (0.14 + 0.17 + 0.21) (= 0.48)$ or $0.14 + 0.17 + 0.21 + 2x = 1$ oe or $0.14 \times 400 (= 56)$ or $0.17 \times 400 (= 68)$ or $0.21 \times 400 (= 84)$ or $(0.14 + 0.17 + 0.21) \times 400 (= 208)$ oe eg $0.52 \times 400 (= 208)$		4	M1	Correct use of probabilities total 1 or correct calculation for an estimate for number of times the spinner will land on 2 or on 3 or on 5
	$"0.48" \div 2 (= 0.24)$ [could be seen in table] or $400 - 56 - 68 - 84 (= 192)$ oe eg $400 - 208 (= 192)$ or $0.48 \times 400 (= 192)$			M1	A completely correct method to find the probability that the spinner will land on 4 or a completely correct method to find the number of times the spinner will land on 1 or on 4
	$"0.24" \times 400$ oe or $192 \div 2$			M1	a correct calculation to find the estimate required or an answer leading from 96 seen eg $\frac{96}{400}$
	Correct answer scores full marks (unless from obvious incorrect working)	96		A1	cao SCB1 for 104 if no other marks have been awarded
				Total 4 marks	

Question	Working	Answer	Mark	Notes
8	a	y^3	1	B1
	b	$6cd$	1	B1
	c	k	1	B1 accept $1k$
9	a	Alto Campoo	1	B1 Do not accept -8
	b	8	1	B1
	c	$(-7) - 1800 \div 300$ -13	2	M1 for $\pm 1800 \div 300$ or ± 6 A1
10	a	$\frac{10}{20}$	1	B1 Accept $0.5, \frac{1}{2}, \frac{5}{10}, 50\%$
	b	$\frac{3}{20}$	1	B1 Accept $0.15, 15\%$
	c	$\frac{9}{20+1+2+2}$ or $\frac{7}{20}$ $\frac{9}{25} = 0.36$ and $\frac{7}{20} = 0.35$ Adam with reason	3	M1 for at least one probability M1 for both correct probabilities A1 Adam with 0.36 and 0.35 clearly seen oe

Question	Working	Answer	Mark	Notes
15 (a)	$0.15 + 0.26$	0.41 oe	1	B1
(b)	$1 - (0.15 + 0.26 + 0.33)$ or $1 - 0.74 (=0.26)$			M1 can be implied by two values where $P(\text{brown}) + P(\text{yellow}) = 0.26$ (may be seen in table)
	$(P(\text{yellow}) = \frac{0.26 - 0.06}{2})$ or 0.1			M1 for a complete method to find $P(\text{yellow})$
	150×0.1			M1 independent mark Award for $150 \times p$ where $0 < p < 1$
		15	4	A1 NB: An answer of $\frac{15}{150}$ scores M3 A0



9	(a)(i)		$\frac{2}{11}$	3	B1 oe e.g. 0.18....
	(a)(ii)		$\frac{5}{11}$		B1 oe, e.g. 0.45...
	(a)(iii)		0		B1 oe e.g. $\frac{0}{11}$
	(b)	$\frac{1}{6} = \frac{5}{30}$ oe or $5 \times 6 (= 30)$		2	M1
			18		A1
					Total 5 marks

10	(a)		47	1	B1
	(b)	$(82 + 9) \div 7$ or $82 + 9 (= 91)$		2	M1 for + 9 or $\div 7$
			13		A1
	(c)		$7y - 9$	2	B2 oe e.g. $y \times 7 - 9$
					(B1) for $7y$ or $y - 9$ or $y = 7y - 9$
					Total 5 marks

9	(a)(i)		$\frac{10}{25}$	1	B1 for 0.4 oe
	(ii)		$\frac{8}{25}$	1	B1 for 0.32 oe (penalise incorrect notation once only in (a))
	(b)		2	1	B1 for 2
	(c)	$(1 \times 14) + (2 \times 17) + (3 \times 15) + (4 \times 12) + (5 \times 9)$ $(= 14 + 34 + 45 + 48 + 45)$		2	M1 For correct products seen – condone one incorrect product or one missing product
			186		A1 for 186
					Total 5 marks

10	$5.25 \div 3 (= 1.75)$		4	M1
	$[9.75 - (2 \times '1.75')] \div 5 (= 1.25)$			M1
	$(5 \times '1.75') + (3 \times '1.25')$ $(= 8.75 + 3.75)$			M1
		12.5(0)		A1
				Total 4 marks

21	(a)	eg $1 - (0.2 + 0.12 + 0.08) (= 0.6)$ or $1 - \left(\frac{20}{100} + \frac{12}{100} + \frac{8}{100} \right) \left(= \frac{60}{100} \right)$ oe or $100(\%) - (20(\%) + 12(\%) + 8(\%)) (= 60(\%))$ or $0.2 + 0.12 + 0.08 + 3x + x = 1$ oe		3	M1 for a correct calculation for the remaining probabilities or a correct equation for the remaining probabilities
		“0.6” $\div 4 (= 0.15)$ oe or “0.6” $\div 4 \times 3$ or “0.6” $\times 0.75$ oe (Sight of 0.15 in the table for Orange or Pink or 0.45 for Pink gains M2)			M1 For dividing the remaining probability by 4 or finding $\frac{3}{4}$ of the remaining probability NB “0.6” means 0.6 must come from correct working
		<i>Working not required, so correct answer scores full marks (unless from obvious incorrect working)</i>	0.45		A1 or $\frac{9}{20}$ oe or 45% (if working in % final answer must have % sign). Allow $\frac{0.45}{1}$ If no answer on answer line, check in the correct space in table above.
	(b)	0.12×150 oe eg $12 + 6$		2	M1 for a correct calculation to find the number of times the spinner lands on blue
		<i>Working not required, so correct answer scores full marks (unless from obvious incorrect working)</i>	18		A1 (an answer of $\frac{18}{150}$ scores M1A0 as this is a probability not a number of times)
Total 5 marks					



21	$28 \div 0.35 (= 80)$ oe eg $(28 \div 7) \times 20 (= 80)$		5	M1 indep for calculating total number of sweets
	$1 - (0.2 + 0.35) (= 0.45)$ oe or $(0.2 + 0.35) \times "80" (= 44)$ or $28 + "16" (= 44)$			M1 or for a correct equation for missing values eg $x + 2x + 0.2 + 0.35 = 1$ oe (can be implied by 2 probabilities that total 0.45 in table if not contradicted in working space)
	$"0.45" \div 3 (= 0.15)$ oe or $"0.45" \times "80" (= 36)$ or $"80" - "44" (= 36)$			M1 (or 0.15 or 0.3 seen in table – either order)
	$"80" \times "0.15"$ or $"80" \times "0.3" (= 24)$ or $"36" \div 3$ or $"36" \div \frac{3}{2} (= 24)$			M1 A correct calculation for the number of white sweets or the number of pink sweets
		12		A1
21 alt	$1 - (0.2 + 0.35) (= 0.45)$ or $100(\%) - 20(\%) - 35(\%) = 45(\%)$		5	M1 or for a correct equation for missing values eg $x + 2x + 0.2 + 0.35 = 1$ oe
	$"0.45" \div 3 (= 0.15)$ $45(\%) \div 3 (= 15(\%))$			M1 (or 0.15 or 0.3 seen in table – either order)
	$\frac{n}{28} = \frac{0.15}{0.35}$ or $\left(\frac{n}{0.15} = \frac{28}{0.35}\right)$ oe or $\frac{n}{28} = \frac{0.3}{0.35}$ or $\left(\frac{n}{0.3} = \frac{28}{0.35}\right)$ or $35\% = 28$ so $5\% = 4$			M1 for using proportion with an expression for n white sweets or finding 5% oe to enable calculation to 15%
	$(n =) 28 \times \frac{0.15}{0.35}$ or $(n =) 0.15 \times \frac{28}{0.35}$ or $15\% = 3 \times 4$ or $28 \times \frac{0.3}{0.35}$ or $0.3 \times \frac{28}{0.35}$ or $30\% = 6 \times 4 (= 24)$			M1 a calculation using proportion that would lead to finding their n or $2n$
		12		A1
				Total 5 marks



28	(a)	eg $x + 0.15 + 0.5 + y + 0.13 + 0.03 = 1$ oe or $x + y = 1 - 0.15 - 0.5 - 0.13 - 0.03$ oe or $x + y + 0.81 = 1$ oe or $x + y = 1 - 0.81$ oe or $1 - 0.15 - 0.5 - 0.13 - 0.03 = 0.19$ oe or $1 - 0.81 = 0.19$ oe		2	M1 for setting up an equation in x and y using the sum of probabilities equals 1 or for showing that probabilities add up to 1
		Working required	Shown		A1 correctly rearranges to $x + y = 0.19$ (must be shown from a correct method) or a clear statement that $x + y = 0.19$
	(b)	$x + y = 0.19$ $3x - y = 0.09$ Adding $(x + 3x = 0.19 + 0.09$ or $4x = 0.28)$ or $3x - (0.19 - x) = 0.09$ or $x + 3x - 0.09 = 0.19$	$3x + 3y = 0.57$ $3x - y = 0.09$ Subtracting $(3y - -y = 0.57 - 0.09$ or $4y = 0.48)$ or $3(0.19 - y) - y = 0.09$ or $\left(\frac{0.09 + y}{3}\right) + y = 0.19$		3 M1 for a correct method to eliminate x or y : coefficients of x or y the same and correct operator to eliminate selected variable (condone any one arithmetic error in multiplication) or writing x or y in terms of the other variable and correctly substituting (condone missing brackets)

	$“0.07” + y = 0.19$ or $3 \times “0.07” - y = 0.09$ or $y = 0.19 - “0.07”$ or $y = 3 \times “0.07” - 0.09$	$3x + 3 \times “0.12” = 0.57$ or $3x - “0.12” = 0.09$ or $x = 0.19 - “0.12”$ or $x = \left(\frac{0.09 + “0.12”}{3} \right)$			M1 dep on first M1 for a correct method to find other variable by substitution of found variable into one equation or for repeating the above method to find the second variable.
	<i>Working required</i>		$x = 0.07$ and $y = 0.12$		A1 oe dep on M1
	Total 5 marks				

19 (a)		0.7	1	B1 oe eg $\frac{7}{10}$ oe or 70% or $\frac{0.7}{1}$ If probabilities are given as percentages then % sign must be seen
(b)	eg $1 - (0.12 + 0.2 + 0.38) (= 0.3)$ oe or $1 - "0.7" (= 0.3)$ oe or $0.12 + 0.20 + 0.38 + 4x + x = 1$ oe or $"0.7" \times 350 (= 245)$ oe or $0.12 \times 350 (= 42)$ or $0.38 \times 350 (= 133)$		4	M1 fit their "0.7" If probabilities are given as percentages then % sign must be seen
	eg $"0.3" \div 5 (= 0.06)$ or $"0.3" \div 5 \times 4 (= 0.24)$ or 0.24 or $(x =) 0.06$ or $(4x =) 0.24$ or $"0.3" \times 350 (= 105)$ oe or $350 - "245" (= 105)$ oe or $350 - "42" - 0.20 \times 350 - "133" (= 105)$ oe			M1
	eg $"0.06" \times 350 (= 21)$ oe or $"105" \div 5 (= 21)$ oe or $"0.06" \times 4 \times 350$ oe or $"0.24" \times 350$			M1 or for $\frac{21}{350}$ or $\frac{84}{350}$
	Correct answer scores full marks (unless from obvious incorrect working)	84		A1 cao
				Total 5 marks

Question	Working	Answer	Mark	Notes
10 (a)		$\frac{7}{20}$	1	B1 oe
(b)	$20 - 7 - 11 (= 2)$ and $"2" + 7 (= 9)$ OR $20 - 11 (= 9)$		2	M1 for a complete method to find the number of beads that are either red or yellow- may be seen in probabilities
		$\frac{9}{20}$		A1 oe
(c)	eg $\frac{1}{2} \times 26 (= 13)$		3	M1 for a method to calculate the number of pink counters
	eg $10 - ("13" - 5) (= 2)$ or $26 - (26 - 10 - 5) - "13" (= 2)$			M1 for a complete method to find the final number of blue counters
		$\frac{2}{26}$		A1 oe

9	(a)					Correct scores	2	B2 for all scores correct (B1 for 3 or 4 scores correct)	
		Spinner A							
		1	2	3					
		Spinner B	1	1	2				3
			2	2	4				6
3	3		6	9					
4	4		8	12					
(b)						$\frac{4}{12}$	1	B1 ft oe accept 0.33(33...)	
						Total 3 marks			

10	$\frac{30}{100} \times 250 (= 75)$ oe or $250 - 160 (= 90)$		3	M1
	“90” – “75” or “75” – “90”			M1
	Correct answer scores full marks (unless from obvious incorrect working)	15		A1 allow –15
				Total 3 marks

10	$\frac{4}{5} \times 120 (= 96)$ oe					4	M1
	“96” $\times$ 46 (= 4416) oe						M1
	“4416” – 120×28 or “4416” – “3360”						M1
	Correct answer scores full marks (unless from obvious incorrect working)				1056		A1
							Total 4 marks

11			Seoul	Tokyo	Total	correct table	3	B3 for all correct entries (B2 for 6 or 7 or 8 correct entries) (B1 for 3 or 4 or 5 correct entries)
		Business	51	35	86			
		Economy	25	69	94			
		Total	76	104	180			
	Correct answer scores full marks (unless from obvious incorrect working)							Total 3 marks

12	(a)	$[7.3 - 7.7] \times 3$		2	M1
		Correct answer scores full marks (unless from obvious incorrect working)	22.5		A1 accept an answer in the range 21.9 – 23.1
	(b)	for stating 8 cm or within or on guidelines on overlay		1	B1
		for $\times$ from B with a bearing of 110° or $\times$ plotted within or on guidelines on overlay or line drawn within or on guidelines		1	B1
			Correct position	1	B1 within or on guidelines
					Total 5 marks

7	(a)		$5cd$	1	B1
	(b)		7	1	B1
	(c)		4	1	B1
	(d)		$6k + 11m$	2	B2 If not B2 then award B1 for $6k$ or $11m$
	(e)		$12g + 4$	1	B1
Total 6 marks					

8				Europe	Africa	Asia	Total		B4 for all 12 correct values. If not B4 then award (B3 for 9 or 10 or 11 correct values) (B2 for 6 or 7 or 8 correct values) (B1 for 4 or 5 correct values)
		Male	10	3	16	29			
		Female	14	6	11	31			
			24	9	27	60			
Total 4 marks									

7	(a)	e.g. $(8.3 - 3.2) \div 3$		2	M1 for a complete method
			1.7		A1
	(b)	$9.45 \div 7$		2	M1
			1.35		A1
Total 4 marks					

8	(a)		bus	train	plane	total		3	B3 for all 6 entries correct (B2 for 4 or 5 correct entries) (B1 for 2 or 3 correct entries)
		men	12	15	53	80			
		women	17	28	25	70			
		total	29	43	78	150			
	(b)							1	B1 oe e.g. $\frac{3}{16}$, 0.1875, 18.75%
									Total 4 marks

9		$4 \times 4 \times 4 (= 64)$ or $60 \times 48 \times 40 (= 115\,200)$ OR $60 \div 4 (= 15)$, $48 \div 4 (= 12)$, $40 \div 4 (= 10)$ oe “115 200” $\div$ “64” or “15” $\times$ “12” $\times$ “10”		3	M1 for finding the volume of either the cube or carton OR finding the number of cartons that fit along each edge of the box
			1800		M1 for a complete method
					A1
Total 3 marks					



7	(a)		$13x - 2y$	2	B2 accept $-2y + 13x$ (B1 for $13x$ or $-2y$)
	(b)	$2n = 16 - 5$ or $2n = 11$ oe $(16 - 5) \div 2$		2	M1 for a correct first step or a correct calculation for n
			5.5		A1 for 5.5 or $\frac{11}{2}$ or $5\frac{1}{2}$
					Total 4 marks

8	(a)		ramen	soba	udon	Total	Correct table	3	B3 (B2 B1	All 6 correct entries 4 or 5 correct entries 2 or 3 correct entries)
		Boiled	18	<u>5</u>	<u>8</u>	31				
		Fried	<u>10</u>	12	7	<u>29</u>				
		Total	<u>28</u>	<u>17</u>	15	60				
	(b)						$\frac{7}{60}$	1	B1	accept 0.11666... (accept 2 d.p. or better truncated or rounded) or 11.666...% (accept 2 s.f. or better truncated or rounded)
									Total 4 marks	

7	(a)		$6p$	1	B1
	(b)		$8y^2$	1	B1
	(c)		e^5	1	B1
	(d)		$20cd$	1	B1
	(e)		26	1	B1
	(f)	$424 = 4n$	106	2	M1 For 424 or $324 + 225 - 125$ with at most one error
				A1 SCB1 for 524 or 674	
	(g)		$3(3t - 2)$	1	B1
					Total 8 marks

8		3 kg = 3000 g or 150 g = 0.15 kg or 180 g = 0.18 kg or 1350 g = 1.35(0) kg	1650	3	B1 may be seen used as part of a calculation
		$3 \times 150 + 5 \times 180 (= 1350)$ $3 \times 0.15 + 5 \times 0.18 (=1.35(0))$		M1 Could use their converted values	
				A1	
					Total 3 marks

9	(a)		1	2	3	4	5	6		2	B2 B2 for all scores completed correctly. B1 for 6, 7, 8 or 9 scores completed correctly
		6	5	4	3	2	1	0			
		7	6	5	4	3	2	1			
		8	7	6	5	4	3	2			
	(b)								$\frac{15}{18}$	1	B1ft oe ($\frac{5}{6}$ or 0.83(33...) or 83.(33..)%) ft from complete table
	(c)								$\frac{9}{18}$	1	B1ft oe Penalise incorrect notation once only ft from complete table
Total 4 marks											

5	(a)		1	2	3		2	B2	For all 10 entries correct in table (B1 for 6, 7, 8 or 9 correct entries)
		2	3	4	5				
		4	5	6	7				
		6	7	8	9				
		8	9	10	11				
10	11	12	13						
	(b)(i)						$\frac{10}{15}$	1	B1ft oe eg $\frac{2}{3}$ or 0.66, 0.67, 0.666, 0.667 etc
	(ii)						$\frac{8}{15}$	1	B1ft 0.53(333...) (SC B1(marks in (ii)) if both parts using “correct values” but incorrect probability notation eg 10 : 15, 8 : 15)
Total 4 marks									

6	$12 \times 1.40 + 12 \times 0.5 \times 1.40$ (=25.20) oe eg $(1.4 + 0.7) \times 12$ (= 25.20)		4	M1	correct method to find the cost for offer A
	$0.8 \times 7.20 \times$ “4” (=23.04) oe or “4” $\times 7.20 - 0.2$ (“4” $\times 7.20)$ oe eg $28.80 - 5.76$ (= 23.04) where $4 = 24 \div 6$			M1	indep correct method to find the cost for offer B
	$12 \times 1.40 + 12 \times 0.5 \times 1.40 - 0.8 \times 7.20 \times 4$ or “25.20” – “23.04”			M1	dep on M2 A fully correct method to find the difference
		2.16		A1	allow –2.16
Total 4 marks					

5	(a)	Spinner A <table><tr><td></td><td>1</td><td>1</td><td>2</td><td>3</td></tr><tr><td>5</td><td>4</td><td>4</td><td>3</td><td>2</td></tr><tr><td>7</td><td>6</td><td>6</td><td>5</td><td>4</td></tr><tr><td>8</td><td>7</td><td>7</td><td>6</td><td>5</td></tr><tr><td>9</td><td>8</td><td>8</td><td>7</td><td>6</td></tr><tr><td>11</td><td>10</td><td>10</td><td>9</td><td>8</td></tr></table> Spinner B		1	1	2	3	5	4	4	3	2	7	6	6	5	4	8	7	7	6	5	9	8	8	7	6	11	10	10	9	8	2	B2 All correct (B1 for 5, 6, 7, 8 or 9 values completed correctly)
	1	1	2	3																														
5	4	4	3	2																														
7	6	6	5	4																														
8	7	7	6	5																														
9	8	8	7	6																														
11	10	10	9	8																														
	(b)(i)		1	B1ft oe 0.65 or 65% or ft from a completed table																														
	(ii)		1	B1ft oe 0.3 or 30% or ft from a completed table penalise incorrect notation only once penalise the incorrect denominator only once (as long as denominator > 13 and is the same in b(i) and b(ii))																														
				Total 4 marks																														

14	(a)	(3)	(4)	5	6	For all correct values	2	B2 for all correct values (B1 for 6 or 7 correct values)
		5	6	(7)	8			
		7	8	9	(10)			
	(b)						2	M1 for $\frac{m}{12}$ where $m < 12$ or $\frac{11}{n}$ where $n > 11$ or for 11:12
		Correct answer scores full marks (unless from obvious incorrect working)				$\frac{11}{12}$		A1 oe 0.91(666...) or 91(.666...) % truncated or rounded
								Total 4 marks

15	0.35 × 140 (= 49) oe or 14 + 14 + 14 + 7 (= 49) oe or $\frac{1}{4} \times 140 (= 35)$ oe or 140 ÷ 4 (= 35) or 0.4 × 140 (= 56) oe		4	M1
	“49” × 6 (= 294) oe or “35” × 8 (= 280) oe or (140 – “49” – “35”) × 10 (= 560) or “56” × 10 (= 560)			M1 for 1 correct
	“49” × 6 (= 294) oe and “35” × 8 (= 280) oe and (140 – “49” – “35”) × 10 (= 560) or “56” × 10 (= 560)			M1 for all correct
	Correct answer scores full marks (unless from obvious incorrect working)	1134		A1 cao
				Total 4 marks

Question	Working	Answer	Mark	Notes
10* (a)		A correct reason	1	B1 He should have got $30 + 20$ oe The answer should be 50 oe $-4 \times -5 = (+) 20$ oe Minus and minus gives a positive oe etc
(b)		1, 3, 5, 7, 9	2	B2 for 1, 3, 5, 7, 9 with no extras (in any order) (B1 for four correct values with no more than one incorrect or for five correct values with no more than one incorrect)
Total 3 marks				

Question	Working	Answer	Mark	Notes																				
11 (a)	<table border="1"> <thead> <tr> <th></th><th>tennis</th><th>athletics</th><th>cricket</th><th>Total</th></tr> </thead> <tbody> <tr> <td>Monday</td><td>29</td><td>23</td><td>58</td><td>110</td></tr> <tr> <td>Tuesday</td><td>33</td><td>50</td><td>47</td><td>130</td></tr> <tr> <td>Total</td><td>62</td><td>73</td><td>105</td><td>240</td></tr> </tbody> </table>		tennis	athletics	cricket	Total	Monday	29	23	58	110	Tuesday	33	50	47	130	Total	62	73	105	240	A correctly completed table	3	B3 (B2 for 4 or 5 correct entries B1 for 2 or 3 correct entries)
	tennis	athletics	cricket	Total																				
Monday	29	23	58	110																				
Tuesday	33	50	47	130																				
Total	62	73	105	240																				
(b)		$\frac{58}{105}$	1	B1 oe 0.55(238...) or 55(.238...) % truncated or rounded																				
Total 4 marks																								

Question	Working					Answer	Mark	Notes
5 (a)		chocolate	strawberry	vanilla	TOTAL	Correct completed table	3	B3 fully correct table
	cones	16	40	22	78			B2 for 4 or 5 correct entries
	tubs	7	14	21	42			B1 for 2 or 3 correct entries
	TOTAL	23	54	43	120			
(b)						$\frac{22}{120}$	2	M1 For $\frac{22}{n}$ ($n > 22$) or $\frac{m}{120}$ ($m < 120$) A1 oe, allow 0.18(33...)
								Total 5 marks

6 (a)						1800	1	B1
						32 045	1	B1
						Correct statement	1	B1 e.g. Billy should have done 5×7 and added 2 to the answer to this.
						Correct sum	1	B1 e.g. 2 + 4= 6 (2 added to any even number)
								Total 4 marks



6	a		15rt	1	B1 oe
	b	eg $(x =) (27 - 5) \div 4$			M1 complete method
			5.5	2	A1 oe
	c	$7 \times 2 - 5 \times 4$			M1
			-6	2	A1
	d	$2 \times (-3)^2 - 5$			M1
			13	2	A1
Total 7 marks					

7	a		BG, BO, BP, RG, RO, RP, YG, YO, YP	2	B2 all 9 combinations given with no extras or repeats
					(B1) at least 5 correct combinations given, condone repeats and incorrect combinations
	b		$\frac{1}{3}$	1	B1 oe, ft from (a), accept 0.33(33...)
	c				M1 for $\frac{7}{a}$ where $a > 7$ or $\frac{b}{20}$ where $b < 20$
			$\frac{7}{20}$	2	A1 oe
Total 5 marks					



11		Correct triangle	2	B2 For a fully correct triangle with arcs shown (B1 for a correctly sized triangle with no arcs shown or for an incorrectly sized triangle with arcs shown where $AC = BC$ or correct arcs not joined) (overlay required)
				Total 2 marks
12	(a)	BL, BM, BS CL, CM, CS DL, DM, DS	2	B2 for all 9 combinations with no extras or repeats (B1 for at least 4 correct combinations (ignoring repeats))
	(b)	$\frac{47}{100}$	1	B1 oe
	(c)	$\frac{49}{53}$	2	B2 oe accept 0.9245... or 92(.45...) % (B1 for $\frac{c}{53}$ where $c < 53$ or $\frac{49}{d}$ where $d > 49$)
				Total 5 marks
13	e.g. $0.5 \times (6 + 13) \times 3$		2	M1 for a complete method
		28.5		A1 oe
				Total 2 marks

7	(a)		0.405, 0.45, 0.5, 0.504, 0.54	1	B1
	(b)		8	1	B1
	(c)		$3\frac{4}{9}$	1	B1
	(d)	0.28 or $\frac{22}{25}$ or $\frac{7}{25} + 0.88$ or $\frac{2}{25}$ oe		2	M1
		Correct answer scores full marks (unless from obvious incorrect working)	0.58		A1 oe eg $\frac{29}{50}$
Total 5 marks					

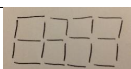
8	(a)		apple pie	fruit	ice cream	Total	3	B3 Fully correct table If not B3, then B2 for 4 or 5 correct B1 for 2 or 3 correct
		Year 5			8	36		
		Year 6	34	8				
		Total		14	10			
	(b)	$\frac{22}{80}$					2	M1
					$\frac{11}{40}$	A1		
						Total 5 marks		



11	(a)					CF, CL, CM, FL, FM, LM	2	B2 for all 6 combinations with no extras of repeats (B1 for at least 3 correct combinations (ignoring repeats))
	(b)		Chocolate	Mint	Vanilla	Total	Correct two-way table	B2 for all 4 correct values (B1 for 2 or 3 correct values)
		Saturday	32	11	28	71		
		Sunday	16	20	13	49		
		Total	48	31	41	120		
	(c)					$\frac{67}{100}$	1	B1 oe
								Total 5 marks

12	eg $360 \div 15$ or $\frac{(n-2) \times 180}{n} = 180 - 15$		2	M1
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	24		A1
				Total 2 marks

Question	Working			Answer	Mark	Notes
6 (a)				Correct completed table	3	M2 for at least 4 correct entries or M1 for at least 2 correct entries
	Biology	Chemistry	Physics	TOTAL		
boys	25	5	7	37		A1 fully correct table.
girls	6	4	33	43		
TOTAL	31	9	40	80		
(b)				43 80	1	B1 0.5375 or 0.538
(c)				4 43	2	M1 For $\frac{4}{n}$ ($n > 4$) or $\frac{m}{43}$ ($m < 43$) A1 Correct probability (allow 0.093(02...)) NB:penalise incorrect notation in (b) and (c) once only
7 (a)				14	1	B1
(b)				220	2	M1 A1 For $-10, \times 2$ or 110
8				8 hours 35 mins	2	B2 for (B1 for 8 hours or 35 minutes or 515 minutes)
9	(2 × 2.10) + (2 × 1.80) (= 7.80) or 20 – 8.75 (=11.25) or [20 – (‘7.80’ + 8.75)] ÷ 3 or [11.25 – 2(2.10 + 1.80)] ÷ 3			1.15	3	M1 M1 A1

6	(a)		Correct shape drawn	1	B1
	(b)	7, 12, 17, 22, 27, 32, 37 or $5 \times 7 + 2$ or $17 + (4 \times 5)$ $7 + (6 \times 5)$			M1 for adding 5 and continuing to at least pattern 7 (allow one error) or for a correct diagram or any correct method which would lead to 37
			37	2	A1
	(c)	7, 12, 17, 22, 27, 32, 37, 42, 47, 52, 57, 62 or $5n + 2 = 62$ or $62 \div 5 (= 12.4)$			M1 for continuing the sequence to at least 62 (list of values may be seen in earlier parts of question)
			12	2	A1
	(d)	For identifying all terms in sequence end in 2 or 7 or none of the numbers end in 3 or method to count on as far as 122 e.g. No, 122 and 127 are both in sequence or e.g. No, 122 in sequence or method to find n when term is 123 e.g. solving $5n + 2 = 123$ or $(123 - 2) \div 5 (= 24.2)$ or e.g. 121 not multiple of 5 or $121 \div 5$ not whole number/it's a decimal	No with reason	1	B1
					Total 6 marks

7	(a)	<table><tr><td></td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr><tr><td>1</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr><tr><td>2</td><td>2</td><td>4</td><td>6</td><td>8</td><td>10</td><td>12</td></tr><tr><td>3</td><td>3</td><td>6</td><td>9</td><td>12</td><td>15</td><td>18</td></tr></table>		1	2	3	4	5	6	1	1	2	3	4	5	6	2	2	4	6	8	10	12	3	3	6	9	12	15	18	Fully correct table	2	B2 fully correct table (B1 for 4 or 5 or 6 correct entries)
		1	2	3	4	5	6																										
	1	1	2	3	4	5	6																										
	2	2	4	6	8	10	12																										
3	3	6	9	12	15	18																											
(b)								M1 for $\frac{a}{18}$ where $0 < a < 18$ or for $\frac{4}{b}$ where $b > 4$																									
							$\frac{4}{18}$	2	A1 oe accept 0.22(2.....) or 22.(2.....)%																								
(c)		'8' '6' $\frac{8}{18}$, $\frac{6}{18}$ or '8','6' or 0.4(4..), 0.3(3..) or 40%, 30% or better							M1 ft from their complete table for two figures that can be used for comparison, one of which must be correct																								
							Yes oe with reason	2	A1																								
									Total 6 marks																								

8	(a)	$(8 \times 0.58) (= 4.64)$			M1 for a method to work out the cost of 8 pencils
		$23.62 - (8 \times 0.58) (= 18.98)$ or $23.62 - ('4.64') (= 18.98)$			M1 for a method to work out the cost of 13 rulers
			\$1.46	3	A1
	(b)	$15 \div 0.62 (= 24.193....)$ or 24 or 14.88			M1
		$15 - '24' \times 0.62$ or $15 - '14.88'$ or $(24.1(935.....) - 24) \times 0.62$ or $0.193(548...) \times 0.62$			M1 for a complete method
			\$0.12	3	A1

Question	Working					Answer	Mark	Notes
8 (a)		orange	blue	yellow	total		3	B3 All 6 entries correct B2 for 4 or 5 correct entries B1 for 2 or 3 correct entries
	small	6	7	14	27			
	large	13	16	4	33			
	total	19	23	18	60			
(b)						$\frac{23}{60}$	1	B1 Allow 0.38(333...) or 38(.33...)%
(c)						$\frac{13}{33}$	2	B2 B1 for $\frac{n}{33}$ where $n < 33$ or $\frac{13}{m}$ where $m > 13$
								Total 6 marks

9 (a)			1	B1 Correct diagram
(b)		13, 16	1	B1 Both values correct
(c)		22	1	B1
(d)		$C = 3P - 2$ oe	2	B2 B1 for $3P$ or $3P + \text{constant}$ (constant $\neq -2$)
(e)		(Yes) pattern 28 has 136 triangles	1	B1 or $5 \times 28 - 4 = 136$ oe Sight of 28 is sufficient
				Total 6 marks

10	$n - 3 = 13$ oe or $n = 16$ or $(6 + m) \div 2 = 8.5$ oe or $m = 11$		2	M1
		$n = 16$ & $m = 11$		A1 Both values correct
				Total 2 marks

14	(a)	Spinner A	Spinner B					Correct values	2	B2 (B1 for all 9 correct values 5 or 6 or 7 or 8 correct values)
				1	2	3	4			
			1	(2)	(3)	4	5			
			2	(3)	4	5	6			
			3	4	5	6	7			
	(b)							2	M1 for $\frac{6}{m}$ where $m > 6$ or $\frac{n}{12}$ where $n < 12$	
							$\frac{6}{12}$		A1ft $\frac{"6"}{12}$ oe ft their table. isw incorrect cancelling.	
	(c)	$\frac{3}{12} \times 84$						2	M1 allow “a fraction” $\times 84$ fraction cannot be zero or improper	
							21		A1 cao	
Total 6 marks										

15			3	M1 for continual prime factorisation (at least two consecutive steps correct) or at least two stages of a factor tree, or table, correct.
				M1 for a fully correct factor tree or a list (2,2,2,2,5,11) or $2 \times 2 \times 2 \times 2 \times 5 \times 11$
		$2^4 \times 5 \times 11$		A1 dep M2 for $2^4 \times 5 \times 11$ (with working seen)
				Total 3 marks



6	(a)		32 GB	64 GB	128 GB	Total		3	B3 For all correct entries (B2 for 4 or 5 correct entries) (B1 for 2 or 3 correct entries)
		type A	75	37	83	195			
		type B	52	29	24	105			
		Total	127	66	107	300			
	(b)						$\frac{29}{300}$	1	B1 oe eg 0.096(666...)
	(c)						$\frac{83}{195}$	2	B2 oe eg 0.42(564...) (B1 for $\frac{83}{m}$ where $m > 83$ or $\frac{n}{195}$ where $n < 195$)
									Total 6 marks

7	(a)		6	1	B1
	(b)		19	1	B1
	(c)		$5h$	1	B1 oe
	(d)		$3a + 11f$	2	B2 oe eg $11f + 3a$ (B1 for $3a$ or $11f$)
					Total 5 marks

9	(a)		Road	Mountain	Hybrid	Total		3	B3 for all 6 entries correct B2 for 4 or 5 correct entries B1 for 2 or 3 correct entries
		Professional	26	22	19	67			
		Amateur	13	32	8	53			
		Total	39	54	27	120			
	(b)	$\frac{54}{120} \left(= \frac{9}{20} = 0.45 \right)$ oe or $\frac{54}{120} \times 100$ oe						2	M1
		Correct answer scores full marks (unless from obvious incorrect working)					45		A1 cao
	(c)	$\frac{41}{120} \times 360$ oe eg $0.34(166\dots) \times 360$ or 41×3 or $360 \div \frac{120}{41}$ or $360 \div 2.9(268\dots)$						2	M1
		Correct answer scores full marks (unless from obvious incorrect working)					123		A1
									Total 7 marks

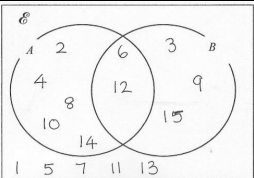
10	(a)		11	1	B1
	(b)	21 ÷ 2 (=10.5) or 11th oe or 10,11,11,11,,,,,12,12,13... etc with no more than one error		2	M1 For a correct method to find position of median
			13		A1
	(c)	10×1+11×7+12×2+13×5+14×4+15×2 or 10 + 77 + 24 + 65 + 56 + 30 oe		2	M1 For at least 4 correct products
		Correct answer scores full marks (unless from obvious incorrect working)	262		A1 (NB: an answer of 12.476.. alone or with 262 ÷ 21 gains M1 only)
					Total 5 marks

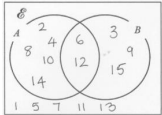


16			3	B3 B3 for all 4 correct regions B2 or 2 or 3 correct regions B1 for 1 correct regions
Total 3 marks				

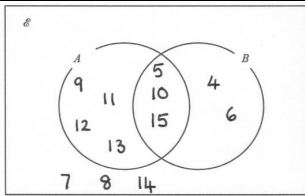
17	(a)		x^7	1	B1
	(b)	eg $7^8 \times 7^4 = 7^{12}$ or $7^8 \div 7^3 = 7^5$ or $7^5 \times 7^4$ or $7^4 \div 7^3 = 7$ or $7^8 \times 7$ or $7^{12} \div 7^3 = 7^{12-3}$		2	M1 for one correct step – must be written as a power of 7
			7^9		A1 for 7^9
Total 3 marks					

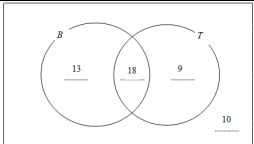
18	32.4×100^3		2	M1 for 32.4×100^3 oe
		32 400 000		A1 for 32 400 000 accept 3.24×10^7
Total 2 marks				

10	e.g. $4 \times 6 (= 24)$		4	M1	for finding the perimeter of square														
	e.g. $(\text{“}24\text{”} - 6) \div 2 (= 9)$			M1	for finding the length of the longest side in the triangle														
	e.g. $18 \times 3 + 6$ or $\text{“}9\text{”} \times 6 + 6$			M1	oe, allow their length of the longest side in the triangle as long as clearly stated or identified (could be on diagram)														
		60		A1	dep on M2														
Total 4 marks																			
11	<table><tr><td>x</td><td>-1</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>y</td><td>-5</td><td>-2</td><td>1</td><td>4</td><td>7</td><td>10</td></tr></table>	x	-1	0	1	2	3	4	y	-5	-2	1	4	7	10	3	3	B3 for a correct line between -1 and 4 B2 for a correct straight line segment through at least 3 of (-1, -5)(0, -2)(1, 1)(2, 4)(3, 7)(4, 10) OR for all of (-1, -5)(0, -2)(1, 1)(2, 4)(3, 7)(4, 10) plotted but not joined B1 for at least 2 correct points plotted or stated (ignore incorrect points) OR for a line drawn with a positive gradient through (0, -2) and clear intention to use a gradient of 3 OR a line drawn with a gradient of 3	
x	-1	0	1	2	3	4													
y	-5	-2	1	4	7	10													
Total 3 marks																			
12			3	B3 for all entries correct (B2 for 3 sections of the Venn diagram correct) (B1 for 2 sections of the Venn diagram correct)															
Total 3 marks																			

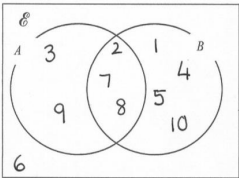
14		Fully correct Venn diagram	3	B3 for all 4 correct regions B2 for 3 correct regions B1 for 2 correct regions																				
Total 3 marks																								
15 (a)	<table border="1"> <thead> <tr> <th></th><th>hockey</th><th>rugby</th><th>football</th><th>Total</th></tr> </thead> <tbody> <tr> <td>year 10</td><td>12</td><td>42</td><td>24</td><td>78</td></tr> <tr> <td>year 11</td><td>27</td><td>16</td><td>29</td><td>72</td></tr> <tr> <td>Total</td><td>39</td><td>58</td><td>53</td><td>150</td></tr> </tbody> </table>		hockey	rugby	football	Total	year 10	12	42	24	78	year 11	27	16	29	72	Total	39	58	53	150		3	B3 for all 6 entries (B2 for 4 or 5 correct entries) (B1 for 2 or 3 correct entries)
	hockey	rugby	football	Total																				
year 10	12	42	24	78																				
year 11	27	16	29	72																				
Total	39	58	53	150																				
(b)	$\frac{78}{150} \times 100$ oe		2	M1																				
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	52		A1																				
Total 5 marks																								

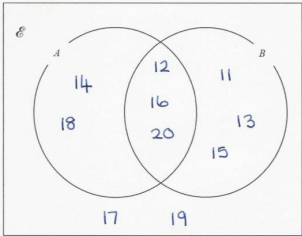
21	(a)	$5x \leq 2 + 7$ or $5x \leq 9$ or $\frac{5x}{5} - \frac{7}{5} \leq \frac{2}{5}$ oe		2	M1 allow any sign instead of $\leq$ or for an answer of 1.8 oe or x and 1.8 oe with the incorrect sign
			$x \leq 1.8$		A1 oe
	(b)(i)	$(y \pm 7)(y \pm 5)$		2	M1 for $(y \pm 7)(y \pm 5)$ or $(y + a)(y + b)$ where $ab = -35$ or $a + b = -2$
			$(y - 7)(y + 5)$		A1 isw if student goes on to solve the equation in this part
	(ii)		7, -5	1	B1ft answer must fit from their $(y + a)(y + b)$ in (b)(i). Award B0 for 7, -5 if no marks scored in (i)
					Total 5 marks

22			3	B3 all 4 parts of diagram correct
				(B2 for 2 or 3 parts correct)
				(B1 for 1 part correct)
				SCB1 if no marks scored, award B1 if 4,6 in the section $A \cap B'$ and 9, 11, 12, 13 in the section $A' \cap B$
				Total 3 marks

10			3	B3 for a fully correct Venn diagram (B2 for 3 correct values) (B1 for 1 or 2 correct values)
				Total 3 marks

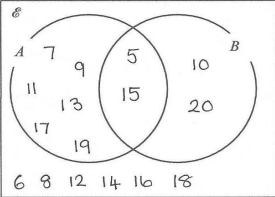
11	$0 \times 5 + 1 \times 5 + 2 \times 3 + 3 \times 10 + 4 \times 7 + 5 \times 6 (= 99)$ or $0 + 5 + 6 + 30 + 28 + 30 (= 99)$		3	M1 for at least 4 correct products with intention to add
	"99" $\div 36$			M1
		2.75		A1 oe If no other marks awarded, award SC B1 for 2.8(88...)
				Total 3 marks

16			3	B3 For all 4 regions of Venn diagram correct (B2 for 2 or 3 regions correct, B1 for 1 region correct) numbers must not be repeated in a region
Total 3 marks				
17			3	M1 for $d = 9$ or $(c + d) \div 2 = 8$ (algebraically or clearly labelled integers) or $d - a = 4$ (algebraically or clearly labelled integers)
				M1 for two of $a = 5$ or $c = 7$ or $d = 9$ or $(c + d) \div 2 = 8$ (algebraically or clearly labelled integers) or $d - a = 4$ (algebraically or clearly labelled integers)
		$a = 5, b = 6,$ $c = 7, d = 9$		A1 All correct
Total 3 marks				

Question	Working	Answer	Mark	Notes
18			3	B3 Fully correct (B2 for 2 or 3 'regions' correct, B1 for one 'region' correct)
				Total 3 marks



14	(a)	0.725(806...) or 1.53(9419...) or 14.8(4) or 2.26 or 2.27 or 2.265		2	M1
		Correct answer scores full marks (unless from obvious incorrect working)	2.2652(25539...)		A1
	(b)		2.27	1	B1 ft from (a) dep on a number that has 4 or more significant figures
Total 3 marks					

15		Numbers placed correctly in Venn diagram	3	B3 for a completely correct Venn diagram
				B2 for 2 or 3 correct regions
				B1 for 1 correct region
Total 3 marks				

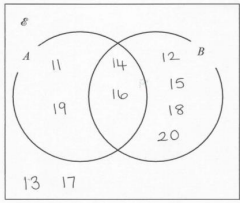
18	(a)(i)	7, 11, 13, 5	5, 7, 11, 13	1	B1
	(ii)	5, 15, 10, 6, 8, 12, 14	5, 6, 8, 10, 12, 14, 15	1	B1
	(b)		Correct reason	1	B1 eg 9 is not a member of <i>C</i> or 9 is not in <i>C</i> or <i>C</i> only contains 6, 8, 10, 12, 14 or 9 is outside of <i>C</i> there must be no contradictory or incorrect statements
					Total 3 marks

13	$1750 \times 100 (= 175\,000)$	$160 \div 100 (= 1.6)$		4	M1 for a correct conversion (can be embedded in working) eg. $502(.654...) \div 100$
	$\pi \times 160 (= 502(.654...))$	$\pi \times "1.6" (= 5.02...) \text{ or}$			M1
	$"175\,000 \div "502(.654...)" (= 348.151...)$	$1750 \div "5.02..." (= 348.151...)$			M1 allow $1750 \div "502(.654...)" (= 3.48...)$ or $175\,000 \div "5.02" (= 34815...)$
			348		A1 cao
					Total 4 marks

14	(a)		30	1	B1 allow 28 – 32
	(b)	$[7.8, 8.2] \times 4.5$		2	M1 allow 7.8 – 8.2
			36		A1 allow 35 – 37
					Total 3 marks

15	(a)		5 7 9 11 13 15	1	B1 all numbers must be present with no repeats. Numbers can be in any order
	(b)		5 15	1	B1
	(c)		6 8 12 14 16	1	B1
					Total 3 marks



15			3	B3 For all 4 parts of Venn diagram correct (B2 for 2 or 3 parts correct, B1 for 1 part correct)
Total 3 marks				
16	$1.63(17\dots)$ or $1.43(17\dots)$ or $\frac{5258}{27425}$ or $0.19, 0.191, 0.192, 0.1917$		2	M1 A start to the calculation or an answer given as a fraction or a prematurely rounded answer
	Correct answer scores full marks (unless from obvious incorrect working)	0.19172(28806)		A1 at least 5 dp
Total 2 marks				

15	eg $40 \div 5 (= 8)$ or $40 \times 8.5 (= 340)$		4	M1 for starting to work with the ratio or working out the total income from the chocolate cakes
	eg $7 \times "8" (= 56)$			M1 for method to find the number of lemon cakes
	eg $"340" + "56" \times 12.75$ or $"340" + 714$			M1 for a complete method
	<i>Correct answer scores full marks (unless from obvious incorrect working)</i>	1054		A1 cao If no other marks awarded, award SCB2 for answer of 439(.166....) SCB1 for 141(.66...) or 297(.5(0))
Total 4 marks				
16	(a)	17	1	B1 cao
	(b)		2	M1 for $\frac{6}{m}$ where $m > 6$ or $\frac{n}{25}$ where $n < 25$ or answer of 6 : 25 or 6 out of 25
	<i>Correct answer scores full marks (unless from obvious incorrect working)</i>	$\frac{6}{25}$		A1 oe eg 0.24, 24%
Total 3 marks				

13	(a)		(3,5) (5,5) (5,8)	2	B2 If not B2 then award B1 for a reflection in $x = 2$ [(1,-1) (-1,-1) (-1,-4)] or for correct shape in the correct orientation
	(b)			3	B1 Rotation (with none of reflection, translation, enlargement, mirrored, flipped or moved (up, right, left, down etc) stated)
					B1 (centre) (0,0) or origin (O) (award if no vector or equation of line or SF mentioned)
			Rotation of 90° anticlockwise about (0,0)		B1 90° anticlockwise or 270° clockwise
					Total 5 marks

14	(a)		2, 4, 6, 12	1	B1
	(b)		5, 7, 8, 9, 10, 11, 13, 14	1	B1
	(c)			2	M1 for $\frac{a}{14}$ with $a < 14$ or $\frac{3}{b}$ with $b > 3$ or for 3 and 14 used with incorrect notation e.g. 3 : 14
			$\frac{3}{14}$		A1 for $\frac{3}{14}$ oe or 0.214(...)
					Total 4 marks



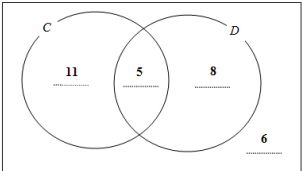
Question	Working	Answer	Mark	Notes
16 a		y^{14}	1	B1
b		$16m^{12}$	2	B2 if not B2 then B1 for am^{12} or $16m^b$ or 2^4m^{12} $b \neq 0, 12$ $a \neq 1, 16$
c	$5x + 15 = 3x - 4$ or $x + 3 = \frac{3x}{5} - \frac{4}{5}$ e.g. $5x - 3x = -4 - 15$	$-\frac{19}{2}$ oe	3 2	M1 for removing bracket in a correct equation or dividing all terms by 5 in a correct equation M1 ft from $ax + b = cx + d$ for correctly isolating terms in x on one side of equation and constant terms on the other side A1 dep on at least M1
d (i)		$(x - 4)(x + 6)$		M1 for $(x + a)(x + b)$ where either $ab = -24$ or $a + b = +2$ e.g. $(x - 6)(x + 4)$ A1
(ii)		4, -6	1	B1 cao or ft from any $(x + p)(x + q)$
17 ai		1, 2, 3, 4, 6, 12	1	B1 cao
aii		1, 3, 5, 7, 9, 10, 11	1	B1 cao
b		Yes with reason	1	B1 e.g. no numbers in both A and C or A and C do not intersect or A and C do not overlap or A and C are mutually exclusive
c		$\frac{10}{12}$ oe	2	M1 for $12 - 2 (=10)$ or $\frac{a}{12}$ with $a < 12$ or 10 and 12 used with incorrect notation E.g. 10 : 12 A1 for $\frac{10}{12}$ oe or 0.83(3...) or 83(3..)%

Question	Working	Answer	Mark	Notes
16	$0.5 \times 6 \times 6 \times 5 (= 90)$ $0.5 \times \pi \times 3^2 \times 5 (= 22.5\pi = 70.6858\dots)$ or $\pi \times 3^2 \times 5 (= 45\pi = 141.37166\dots)$ '90' – '70.6858.....'	19.3	4	M1 Correct method for volume of A M1 Correct method for volume of B or correct volume of cylinder M1 Correct method to find the difference in the volume A1 19 – 19.4
17 (a)		$6n + 4$	2	M1 for $6n + k$ (k may be 0 or absent) oe A1 oe eg $10 + (n - 1)6$ or $n \times 6 + 4$
(b)	...40, 46,... -2, 1, 6, 13, 22, 33 46 ... $6n + 4 = n^2 - 3$ oe	e.g. 22 or 46	2	M1 continuing sequence and writing at least 5 terms of 2 nd sequence – allow one error or A1 for a correct equation ft part (a) or other number in both sequences eg -2
18	$0.07 \times 10\,800 (= 756)$ oe $10\,800 + '756'$	11 556	3	M1 M1 A1 M2 for $1.07 \times 10\,800$ oe
19 (a)		2, 4, 6, 8, 10, 12	1	B1
(b)		8, 10, 12	1	B1
(c)		1, 3, 5	1	B1
(d)		$\frac{9}{12}$	2	M1 A1 for 9 or $\frac{m}{12}$ ($m < 12$) oe

14	a		Fully correct Venn diagram	3	B3 fully correct Venn diagram (B2 for 2 or 3 sections correct B1 for 1 section correct)
	b				M1 ft from (a) $\frac{4}{a}$ where $a \geq 4$ or $\frac{b}{12}$ where $b \leq 12$
			$\frac{4}{12}$	2	A1 oe
					Total 5 marks

15	a		$15a + 20$	1	B1
	b		$2(2c - 7)$	1	B1
	c	E.g. $5x - x = 6 + 11$ or $4x - 11 = 6$ or $5x = x + 17$			M1 for correct rearrangement with x terms on one side and numbers on the other or the correct simplification of either x terms or numbers on one side in a correct equation
		$4x = 17$ or $-4x = -17$			M1
			4.25	3	A1 oe, dep on at least M1
					Total 5 marks

15	(a)		3	B3 fully correct (B2 for three correct regions) (B1 for one or two correct regions) [a repeat in a region is an error]
	(b)	'6' 9	2	M1 Numerator correct (or value intended as numerator) or correct for their Venn diagram (so long as fraction not improper) or 6 out of 9 or 6 : 9 oe (ie correct values in incorrect form)
			$\frac{6}{9}$	A1 Oe allow (0.66)666....rounded or truncated Allow 0.6 only if preceded by $\frac{6}{9}$
Total 5 marks				

12 (a)		Correct Venn diagram	3	B3 for all sections completed correctly If not B3 then award B2 for 3 correct sections B1 for 1 or 2 correct sections
(b)(i)		$\frac{13}{30}$	1	B1 oe, ft their Venn diagram
(ii)		$\frac{6}{30}$	1	B1 oe, ft their Venn diagram
Total 5 marks				
13	eg $8 \times 12 (= 96)$ or $7 \times 3 (= 21)$ or $3 \times 15 (= 45)$ or $8 \times 9 (= 72)$ or $15 \times 12 (= 180)$ or $7 \times 9 (= 63)$		5	M1 for a method to find one relevant area accept $15 - 8$ as 7 and $12 - 3$ as 9
	eg “96” + “21” (= 117) or “45” + “72” (= 117) or “180” – “63” (= 117)			M1 for a complete method to find the total area
	eg $117 \div 7 (= 16.7... \text{ or } 17)$			M1 (indep) for a method to find the number of tins for their area ft from any value that has come from a calculation that includes at least 2 of the given dimensions
	eg “17” $\times$ 23.9			M1 for a method to calculate the cost for their number of tins dependent on previous M1
	Working required	406.3(0)		A1 dep on M1
Total 5 marks				