**Q1.**

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

Megan is going to roll the dice 400 times.

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

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

**(Total for Question is 2 marks)**

**Q1.**

| Question | | Working | Answer | Mark | Notes |
|---|---|---|---|---|---|
| | | $0.3 \times 400$ | 120 | 2 | M1 for $0.3 \times 400$ oe<br>A1 cao |

**Q2.**

Carolyn has 20 biscuits in a tin.

She has

12 plain biscuits
5 chocolate biscuits
3 ginger biscuits

Carolyn takes at random two biscuits from the tin.

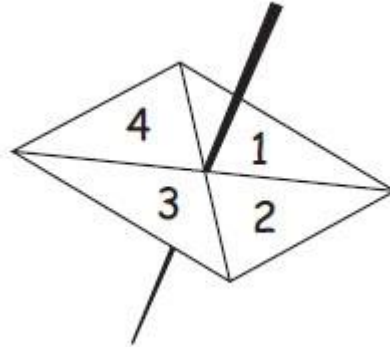Work out the probability that the two biscuits were **not** the same type.

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

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

**Q2.**

| Question | | Working | Answer | Mark | Notes |
|---|---|---|---|---|---|
| | | $\frac{12}{20} \times \frac{11}{19} + \frac{5}{20} \times \frac{4}{19} + \frac{3}{20} \times \frac{2}{19}$<br><br>$1 - (\frac{12}{20} \times \frac{11}{19} + \frac{5}{20} \times \frac{4}{19} + \frac{3}{20} \times \frac{2}{19})$ | $\frac{222}{380}$ | 4 | **B1** for $\frac{12}{19}$ or $\frac{5}{19}$ or $\frac{3}{19}$ (could be seen in working or on a tree diagram)<br>**M1** for $\frac{12}{20} \times \frac{5}{19}$ or $\frac{12}{20} \times \frac{3}{19}$ or $\frac{5}{20} \times \frac{12}{19}$ or $\frac{5}{20} \times \frac{3}{19}$ or $\frac{3}{20} \times \frac{12}{19}$ or $\frac{3}{20} \times \frac{5}{19}$<br>**M1** for $\frac{12}{20} \times \frac{5}{19} + \frac{12}{20} \times \frac{3}{19} + \frac{5}{20} \times \frac{12}{19} + \frac{5}{20} \times \frac{3}{19} + \frac{3}{20} \times \frac{12}{19} + \frac{3}{20} \times \frac{5}{19}$<br>**A1** for $\frac{222}{380}$ oe or 0.58(421...)<br><br>**OR**<br>**B1** for $\frac{8}{19}$ or $\frac{5}{19}$ or $\frac{17}{19}$<br>**M1** for $\frac{12}{20} \times \frac{8}{19}$ or $\frac{5}{20} \times \frac{15}{19}$ or $\frac{3}{20} \times \frac{17}{19}$<br>**M1** for $\frac{12}{20} \times \frac{8}{19} + \frac{5}{20} \times \frac{15}{19} + \frac{3}{20} \times \frac{17}{19}$<br>**A1** for $\frac{222}{380}$ oe or 0.58(421...)<br><br>**OR**<br>**B1** for $\frac{11}{19}$ or $\frac{4}{19}$ or $\frac{2}{19}$<br>**M1** for $\frac{12}{20} \times \frac{11}{19}$ or $\frac{5}{20} \times \frac{4}{19}$ or $\frac{3}{20} \times \frac{2}{19}$<br>**M1** for $1 - (\frac{12}{20} \times \frac{11}{19} + \frac{5}{20} \times \frac{4}{19} + \frac{3}{20} \times \frac{2}{19})$<br>**A1** for $\frac{222}{380}$ oe or 0.58(421...)<br><br>**NB** if decimals used they must be correct to at least 2 decimal places<br><br>**SC : with replacement**<br>**B2** for $\frac{111}{200}$ oe<br><br>**OR**<br>e.g.<br>**B0**<br>**M1** for $\frac{12}{20} \times \frac{8}{20}$ or $\frac{5}{20} \times \frac{15}{20}$ or $\frac{3}{20} \times \frac{17}{20}$<br>**M1** for $\frac{12}{20} \times \frac{8}{20} + \frac{5}{20} \times \frac{15}{20} + \frac{3}{20} \times \frac{17}{20}$<br>**A0** |

**Q3.**

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



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

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

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

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

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

**(3)**

Shunya is going to spin the spinner 200 times.

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

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

**(2)**

**(Total for Question is 5 marks)**

**Q3.**

| | | Working | Answer | Mark | Notes |
|---|---|---|---|---|---|
| | (a) | 1 − 0.2 − 0.1<br>0.7 ÷ 2 | 0.35 | 3 | M1 for correctly using total probability is 1 or 100% if percentages used<br>M1 (dep) for complete correct method to complete the solution<br>A1 for 0.35 or 35% or $\frac{35}{100}$ oe |
| | (b) | | 20 | 2 | M1 for 0.1 × 200 oe<br>A1 cao<br><br>SC : If M0 then award B1 for an answer of $\frac{20}{200}$ |

**Q4.**

The table gives information about the heights, *h* metres, of trees in a wood.

| Height (h metres) | Frequency |
|---|---|
| 0 < h ≤ 2 | 7 |
| 2 < h ≤ 4 | 14 |
| 4 < h ≤ 8 | 18 |
| 8 < h ≤ 16 | 24 |
| 16 < h ≤ 20 | 10 |

Draw a histogram to show this information.
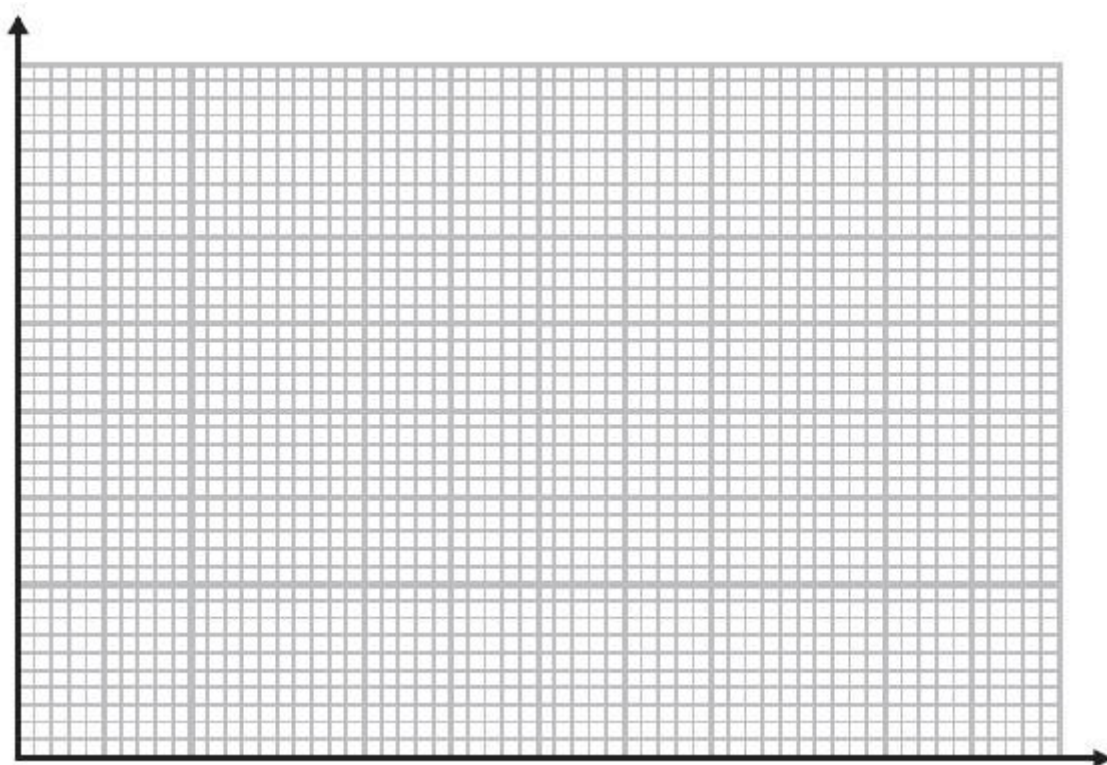
**(Total for Question is 3 marks)**

**Q4.**

| Question | Working | | | Answer | Mark | Notes |
|---|---|---|---|---|---|---|
| | **Height $h$ m** | **Freq** | **FD** | 3 | 3 | B3 fully correct histogram with horizontal axis correctly scaled (B2 for 4 correct blocks **or** 5 correct blocks with incorrect or no scale ) (B1 for 2 correct blocks of different widths **or** any 3 correct blocks) SC : B1 for key, eg. 1 cm$^2$ = 2 (trees) **or** correct values shown for (freq ÷ class interval) for at least 3 frequencies (3.5, 7, 4.5, 3, 2.5) |
| | $0 < h \leq 2$ | 7 | 3.5 | | | |
| | $2 < h \leq 4$ | 14 | 7 | | | |
| | $4 < h \leq 8$ | 18 | 4.5 | | | |
| | $8 < h \leq 16$ | 24 | 3 | | | |
| | $16 < h \leq 20$ | 10 | 2.5 | | | |

**Q5.**

Bob asked each of 40 friends how many minutes they took to get to work.

The table shows some information about his results.

| Time taken (*m* minutes) | Frequency |
|---|---|
| $0 < m \leq 10$ | 3 |
| $10 < m \leq 20$ | 8 |
| $20 < m \leq 30$ | 11 |
| $30 < m \leq 40$ | 9 |
| $40 < m \leq 50$ | 9 |

Work out an estimate for the mean time taken.

. . . . . . . . . . . . . . . . . . . . . . minutes

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

**Q5.**

| Question | | Working | Answer | Mark | Notes |
|---|---|---|---|---|---|
| | | $5 \times 3 + 15 \times 8 + 25 \times 11 + 35 \times 9 + 45 \times 9$ $=1130$ $1130 \div 40$ | 28.25 | 4 | M1 for finding $fx$ with $x$ consistent within intervals (including the end points) allow 1 error M1 (dep) for use of all correct mid-interval values M1 (dep on first M1) for $\Sigma fx \div 40$ or $\Sigma fx \div \Sigma f$ A1 for 28.25 or 28 ¼ |

**Q6.**

The table gives some information about the birds Paula sees in her garden one day.

| Bird | Frequency |
|---|---|
| Magpie | 15 |
| Thrush | 10 |
| Starling | 20 |
| Sparrow | 27 |

Complete the accurate pie chart.
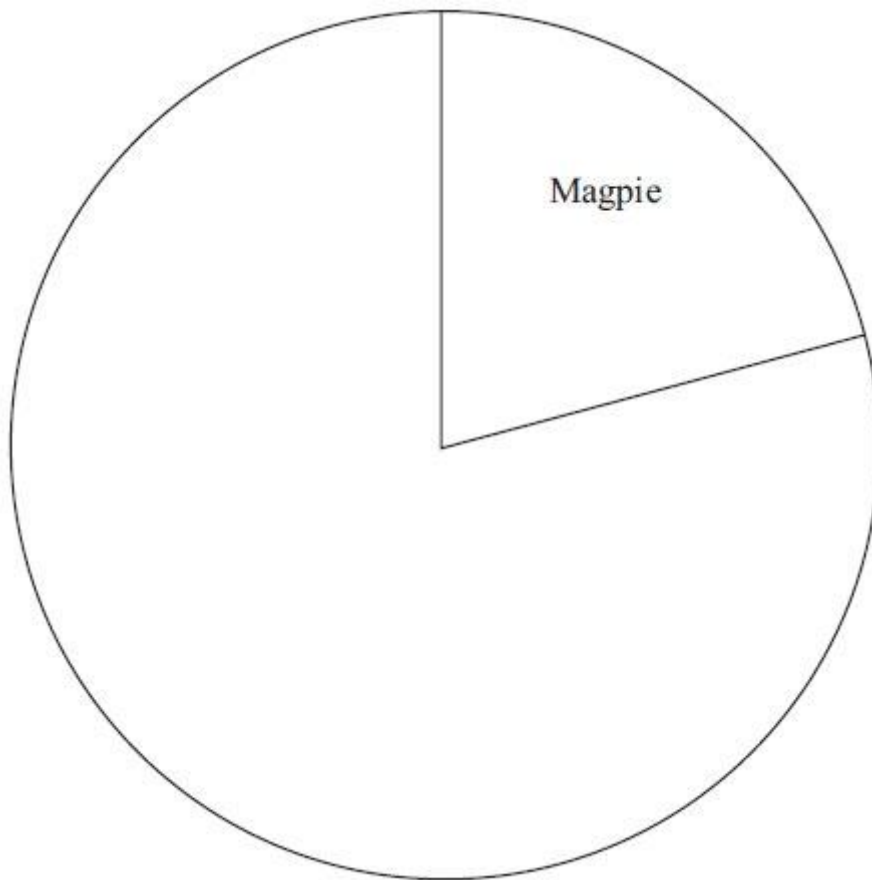


**(Total for Question is 3 marks)**

**Q6.**

| Question | | Working | Answer | Mark | Notes |
|---|---|---|---|---|---|
| | | **Bird / Frequency / Angles table** | Correct pie chart | 3 | M1 for any one of $^{15}/_{72}$ × 360, $^{10}/_{72}$ × 360, $^{20}/_{72}$ × 360, $^{27}/_{72}$ × 360 oe ('72' must clearly come from adding frequencies) |

| Bird | Frequency | Angles |
|---|---|---|
| Magpie | 15 | 75 |
| Thrush | 10 | 50 |
| Starling | 20 | 100 |
| Sparrow | 27 | 135 |

Angles $^{15}/_{72}$ × 360, $^{10}/_{72}$ × 360, $^{20}/_{72}$ × 360, $^{27}/_{72}$ × 360

OR

360 ÷ 72 = 5   5 ×15 = 75 etc

A1 for 75 seen from correct working **or** 50 seen **or** 100 seen **or** 135 seen **or** one sector of angle 50o or 100o or 135o labelled correctly with bird's name **or** all sectors correctly drawn

A1 for correct pie chart fully labelled with birds' names

**OR**

M1 for $^{75}/_{15}$ × 10 **or** $^{75}/_{15}$ × 20 **or** $^{75}/_{15}$ × 27 ('75' should be in the range 73 - 77)

A1 for 50 seen **or** 100 seen **or** 135 seen **or** one sector of angle 50o or 100o or 135o labelled correctly with bird's name **or** all sectors correctly drawn

A1 for correct pie chart fully labelled with birds' names

**NB. Allow a tolerance of ±2° on all drawn angles**

**Q7.**

The table shows information about the ages, in years, of 300 students.

| Insurance | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|
| Number of students | 41 | 40 | 50 | 48 | 53 | 68 |

Ian takes a sample of 50 of these students, stratified by age.

Calculate the number of 16 year old students he should have in his sample.

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

**(Total for Question is 2 marks)**

**Q7.**

| | | Working | Answer | Mark | Notes |
|---|---|---|---|---|---|
| | | | 11 | 2 | M1 for a $\frac{68}{300} \times 50$ oe <br> A1 for 11 (accept 12) |

**Q8.**

Rhiana plays a game.

The probability that she will lose the game is 0.32
The probability that she will draw the game is 0.05

Rhiana is going to play the game 200 times.

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

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

**(Total for Question is 3 marks)**

**Q8.**

| | | Working | Answer | Mark | Notes |
|---|---|---|---|---|---|
| | | | 126 | 3 | M1 for 1 – 0.05 – 0.32 (= 0.63)<br>M1 for '0.63' × 200<br>A1 cao<br>OR<br>M1 for 0.05 × 200 (= 10) or 0.32 × 200 (= 64) or 0.37 × 200 (=74)<br>M1 for 200 – '10' – '64'<br>A1 cao<br>OR<br>M1 for 100 – 5 – 32 (= 63)<br>M1 for "63"/100 × 200<br>A1 cao<br>SC: B2 for $^{126}/_{200}$ as the answer. |

**Q9.**

There are 130 adults at a language school.

Each adult studies one of French or Spanish or German.

96 of the adults are women.

12 of the women study French.

73 of the adults study Spanish.

55 of the women study Spanish.

9 of the men study German.

How many of the adults study French?

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

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

**Q9.**

| PAPER: 1MA0 2H | | | | |
|---|---|---|---|---|
| Question | Working | Answer | Mark | Notes |
| | | 19 | 4 | M1 for 130 − 96 (=34)<br>M1 for 73 − 55 (=18)<br>M1 for '34' − 9 − '18' + 12<br>A1 cao<br>**OR**<br>M1 for 96 − 55 − 12 (=29)<br>M1 for 9 + '29' (=38)<br>M1 for 130 − 73 − '38'<br>A1 cao |

| | F | S | G | |
|---|---|---|---|---|
| W | 12 | 55 | | 96 |
| M | 7 | **18** | 9 | **34** |
| | **19** | 73 | | 130 |

| | F | S | G | |
|---|---|---|---|---|
| W | 12 | 55 | **29** | 96 |
| M | | | 9 | |
| | **19** | 73 | **38** | 130 |

**Q10.**

The table gives information about the temperature, $T$ °C, at noon in a town for 50 days.

| Temperature ($T$ °C) | Frequency |
|---|---|
| $8 < T \leqslant 12$ | 6 |
| $12 < T \leqslant 16$ | 8 |
| $16 < T \leqslant 20$ | 13 |
| $20 < T \leqslant 24$ | 21 |
| $24 < T \leqslant 28$ | 2 |

(a)  Write down the modal class interval.

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

(1)

(b)  Calculate an estimate for the mean temperature.

........................................................ ° C

(4)

(c)  Draw a frequency polygon for the information in the table



(2)
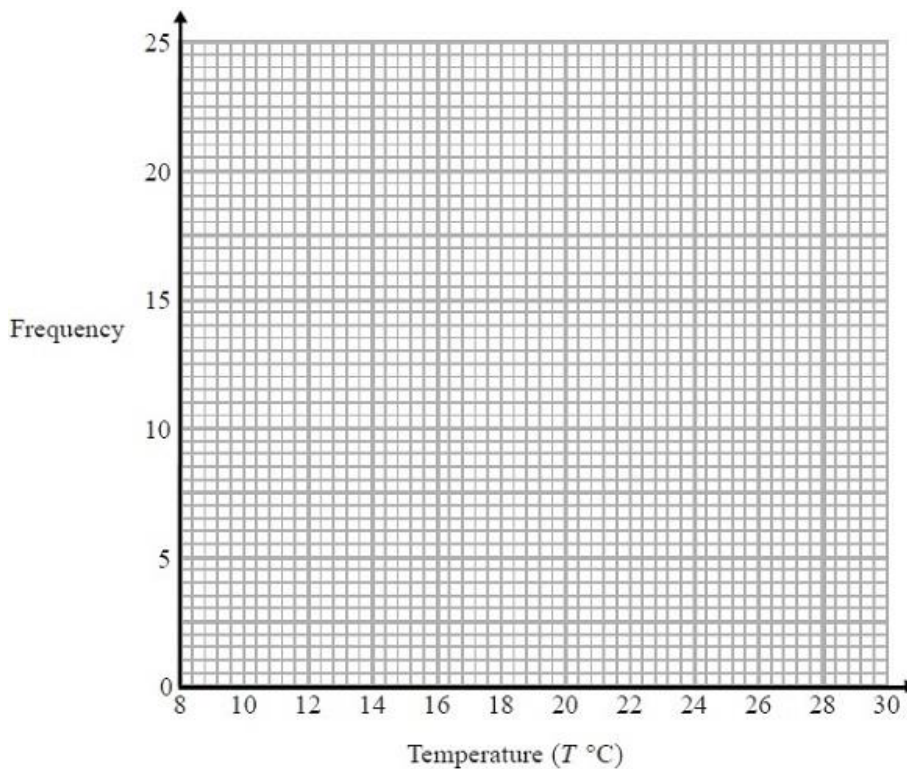
**(Total for Question is 7 marks)**

**Q10.**

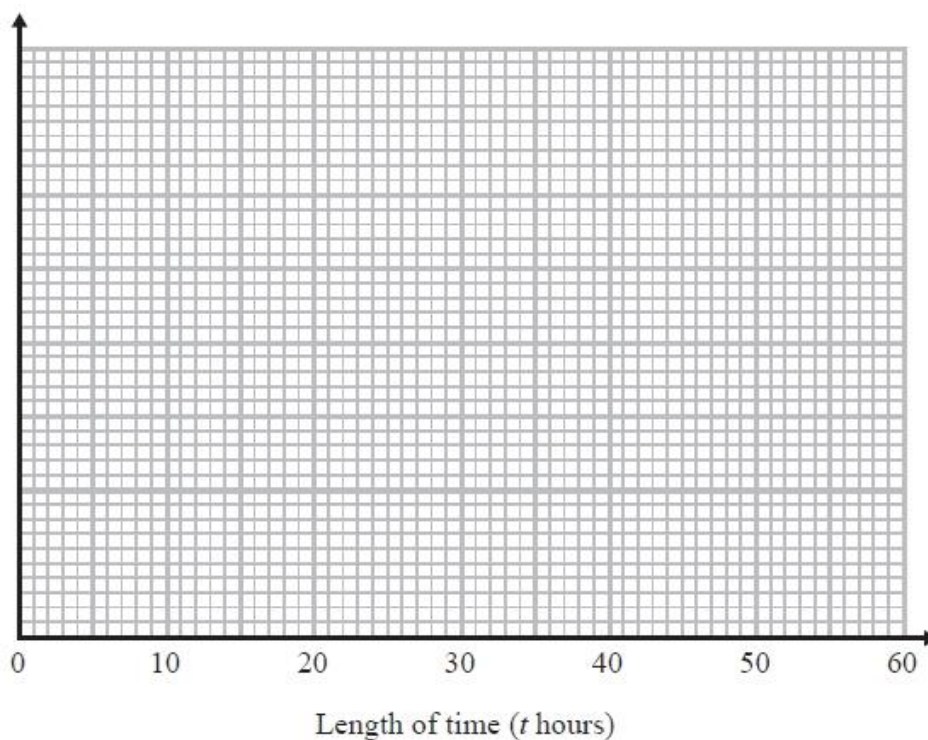| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| (a) | | $20 < T \leq 24$ | 1 | B1 for $20 < T \leq 24$ |
| (b) | $6 \times 10 + 8 \times 14 + 13 \times 18 +$ $21 \times 22 + 2 \times 26 = 920$ $920 \div 50$ | 18.4 | 4 | M1 for finding $fx$ with $x$ consistent within intervals (including the end points) allow 1 error; implied by 820, 1020 <br> M1 (dep) for use of all correct mid-interval values eg 920 <br> M1 (dep on 1st M1) for $\sum fx \div \sum f$ <br> A1 for 18.4 oe |
| (c) | | correct frequency polygon | 2 | B2 for fully correct frequency polygon - points plotted at the midpoint <br> (B1 for all points plotted accurately but not joined with straight line segments) <br> or <br> all points plotted accurately and joined with last joined to first to make a polygon <br> or <br> all points at the correct heights and consistently within or at the ends of the intervals and joined (can include joining last to first to make a polygon) <br> NB: ignore parts of graph drawn to the left of the 1<sup>st</sup> point or the right of the last point |

**Q11.**

The table gives some information about the lengths of time, in hours, that some adults watched TV last week.

| Length of time (t hours) | Frequency |
|---|---|
| $0 \leqslant t < 10$ | 8 |
| $10 \leqslant t < 15$ | 15 |
| $15 \leqslant t < 20$ | 11 |
| $20 \leqslant t < 30$ | 10 |
| $30 \leqslant t < 50$ | 6 |

(a) Work out an estimate for the mean length of time.

.......................................................... hours

(4)

(b) Draw a histogram for the information in the table.



Length of time (t hours)

(3)

**(Total for question = 7 marks)**

**Q11.**

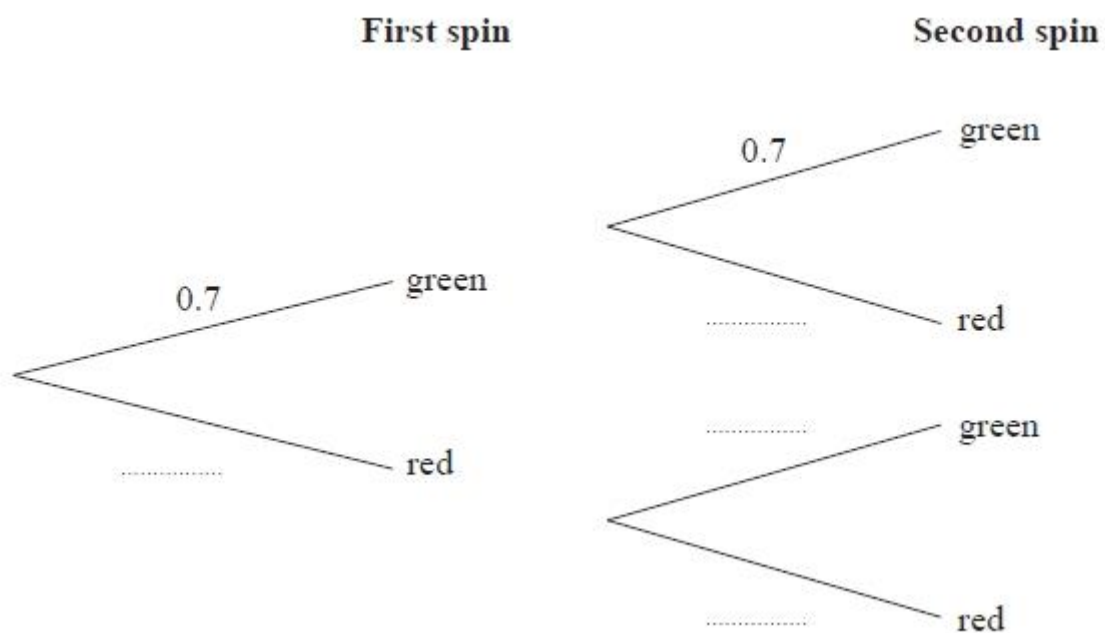| Question | | Working | Answer | Mark | Notes |
|---|---|---|---|---|---|
| | (a) | $5 \times 8 = 40$<br>$12.5 \times 15 = 187.5$<br>$17.5 \times 11 = 192.5$<br>$25 \times 10 = 250$<br>$40 \times 6 = 240$<br>$910 \div 50 = 18.2$ | 18.2 | 4 | M1 for $fx$ consistently within interval including ends (allow 1 error)<br>M1 consistently using appropriate midpoints<br>M1 (dep on first M1) for $\Sigma fx \div \Sigma f$<br>A1 for 18.2 cao |
| | (b) | $0 \leq t < 10$   fd 0.8<br>$10 \leq t < 15$   fd 3<br>$15 \leq t < 20$   fd 2.2<br>$20 \leq t < 30$   fd 1<br>$30 \leq t < 50$   fd 0.3 | Correct histogram | 3 | B3 fully correct histogram with vertical axis correctly scaled.<br>(B2 for 4 correct blocks or 5 correct blocks with incorrect or no scale)<br>(B1 for 2 correct blocks of different widths or any 3 correct blocks or correct FD values for at least 3 frequencies) eg fd of 0.8, 3, 2.2, 1, 0.3 |

**Q12.**

Louise makes a spinner.

The spinner can land on green or on red.
The probability that the spinner will land on green is 0.7

Louise spins the spinner twice.

(a)  Complete the probability tree diagram.

First spin                    Second spin

                                        0.7          green

                              green

              0.7                       ..............  red

                                        ..............  green

              ..............  red

                                        ..............  red

(2)

(b)  Work out the probability that the spinner lands on two different colours.

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

(3)

**(Total for question = 5 marks)**

**Q12.**

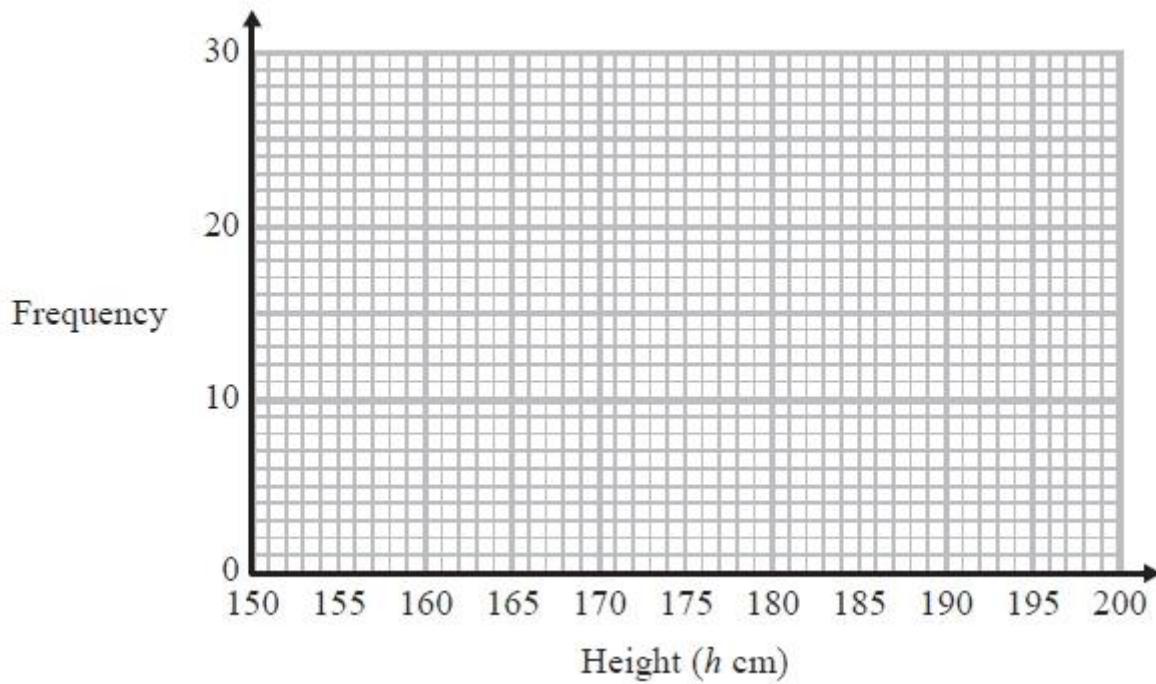| PAPER: 1MA0_2H | | | | |
|---|---|---|---|---|
| Question | Working | Answer | Mark | Notes |
| (a) | | 0.3 <br> 0.3, 0.7, 0.3 | 2 | B1 for 0.3 as first spin oe <br> B1 for 0.3, 0.7, 0.3 in correct positions for second spin oe |
| (b) | | 0.42 | 3 | M1 for '0.3' × '0.7' or 0.7 × '0.3' (=0.21) <br> M1 for '0.3' × '0.7' + 0.7 × '0.3' (OR M2 for $1 - 0.7^2 - 0.3^2$) <br> A1 for 0.42 oe |

**Q13.**

The frequency table gives information about the heights of some people.

| Height ($h$ cm) | Frequency |
|---|---|
| $160 < h \leqslant 165$ | 2 |
| $165 < h \leqslant 170$ | 5 |
| $170 < h \leqslant 175$ | 10 |
| $175 < h \leqslant 180$ | 21 |
| $180 < h \leqslant 185$ | 16 |
| $185 < h \leqslant 190$ | 4 |

Draw a frequency polygon for this information.



**(Total for question = 2 marks)**

**Q13.**

| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| | | Polygon drawn | 2 | B2 for fully correct frequency polygon - points plotted at the midpoint<br>(B1 for all points plotted accurately but not joined with straight line segments)<br>**or**<br>all points plotted accurately and joined with last joined to first to make a polygon<br>**or**<br>all points at the correct heights and consistently within or at the ends of the intervals and joined (can include joining last to first to make a polygon)<br>NB: ignore parts of graph drawn to the left of the 1<sup>st</sup> point or the right of the last point; ignore any histograms drawn. |

**Q14.**

The frequency table gives information about the times it took some office workers to get to the office one day.

| Time (t minutes) | Frequency |
|---|---|
| $0 < t \leq 10$ | 4 |
| $10 < t \leq 20$ | 8 |
| $20 < t \leq 30$ | 14 |
| $30 < t \leq 40$ | 16 |
| $40 < t \leq 50$ | 6 |
| $50 < t \leq 60$ | 2 |

(a) Draw a frequency polygon for this information.
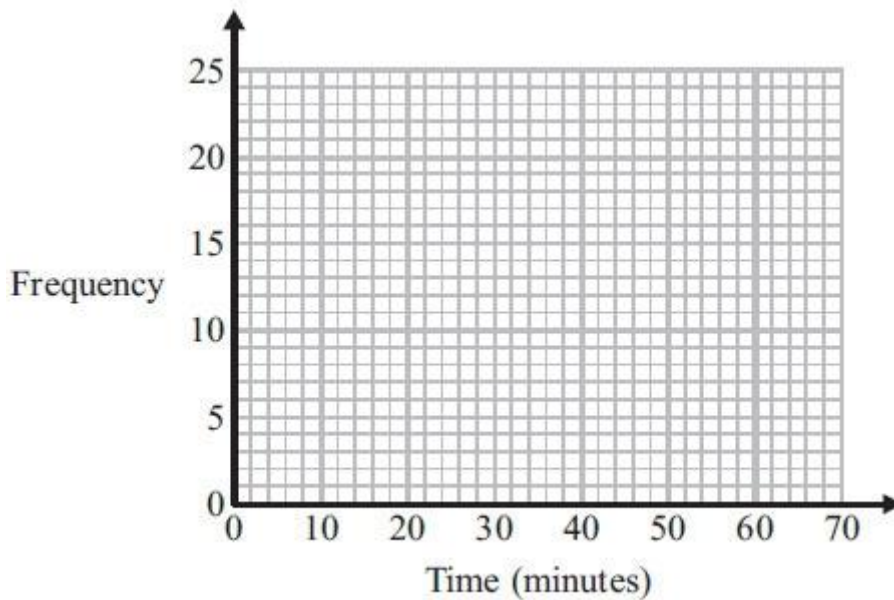


(2)

(b) Write down the modal class interval.

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

(1)

One of the office workers is chosen at random.

(c) Work out the probability that this office worker took more than 40 minutes to get to the office.

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

(2)

**(Total for Question is 5 marks)**

**Q14.**

| Question | | Working | Answer | Mark | Notes |
|---|---|---|---|---|---|
| | (a) | | Correct Frequency Polygon | 2 | B2 Fully correct polygon. Points plotted at the midpoint<br>(B1 All points plotted accurately not joined, **or**<br>one error in plotting but joined **or**<br>all points plotted accurately and joined with, additionally, first joined to last **or**<br>all points at the correct heights and consistently within or at the ends of the intervals **and** joined<br>(Includes joining last to first to make a polygon)) |
| | (b) | | $30 < t \leq 40$ | 1 | NB: ignore polygon before 1st point, and after last point.<br>Ignore any histograms. |
| | (c) | $(6 + 2) = 8$, $(4 + 8 + 14 + 16 + 6 + 2) = 50$ | $\frac{8}{50}$oe | 2 | B1 Allow any notation eg, 30-40 ft polygon<br><br>M1 $(6 + 2) \div (4 + 8 + 14 + 16 + 6 + 2)$ **or** ft figures from polygon **or** $\frac{8}{a}$with $a >$ 8 **or** $\frac{c}{50}$ with $c > 50$**or** 8 and 50 used but notation incorrect (eg. 8:50 , 8 out of 50)<br><br>A1 $\frac{8}{50}$oe (eg. 0.16) **or** ft figures from polygon |



Frequency vs Time(minutes)
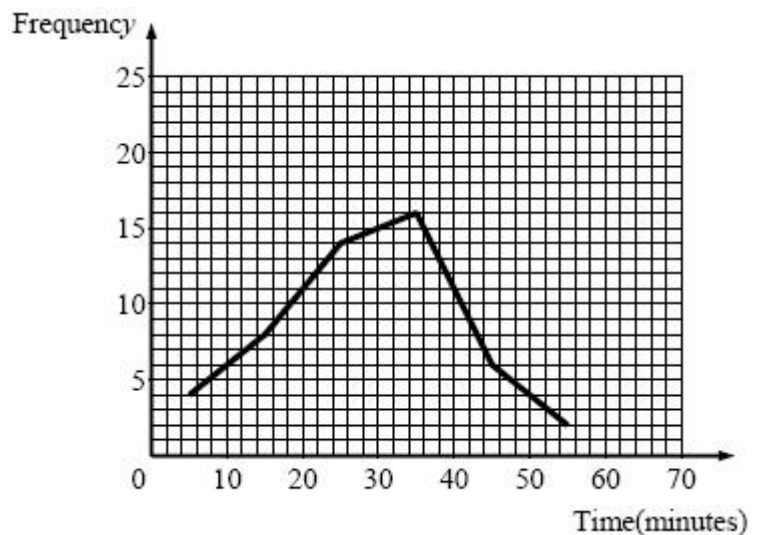
**Q15.**

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

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

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

Mary takes at random a counter from the bag.

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

.........................................................
(2)

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

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

.........................................................
(2)

**(Total for question = 4 marks)**

**Q15.**

| PAPER: 1MA0_2H | | | | |
|---|---|---|---|---|
| Question | Working | Answer | Mark | Notes |
| (a) | | 0.2 | 2 | M1 for $1 - 0.16 - 0.4 - 0.24$ oe <br> A1 cao |
| (b) | | 20 | 2 | M1 for $0.16 \times 125$ oe <br> A1 cao |