Write your name here

| Surname | Other names |
|---|---|
| | |

**Pearson Edexcel**
**Level 1/Level 2 GCSE (9-1)**

Centre Number | | | | | |

Candidate Number | | | | |

# Mathematics

## Paper 3 (Calculator)

**Foundation Tier**

Mr Coren 'Practice Paper 'we haven't seen this stuff yet'

**Time: 1 hour 30 minutes**

Paper Reference
**1MA1/3F**

**You must have:** Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

## Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- You must **show all your working**.
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- **Calculators may be used.**
- If your calculator does not have a $\pi$ button, take the value of $\pi$ to be 3.142 unless the question instructs otherwise.

## Information

- The total mark for this paper is 80
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*

## Advice

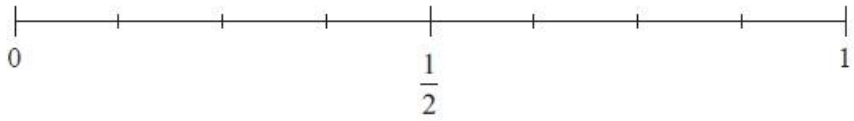
- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

*Turn over* ▶

**Q1.** Luke has a fair 8-sided dice.
The dice is labelled 1, 2, 3, 4, 5, 6, 7 and 8

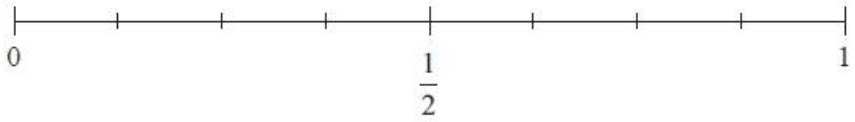
Luke rolls the dice once.

(a) On the probability scale below, mark with a cross (×) the probability that Luke gets an even number.



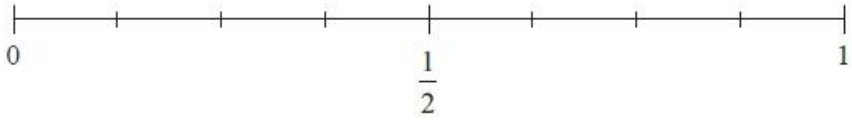

**(1)**

(b) On the probability scale below, mark with a cross (×) the probability that Luke gets a number less than 10




**(1)**

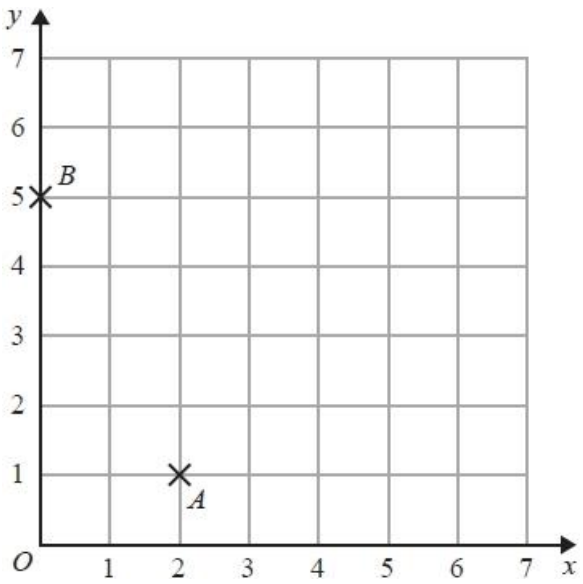
(c) On the probability scale below, mark with a cross (×) the probability that Luke gets a number greater than 6




**(1)**

**(Total for question = 3 marks)**

**Q2.**




(a) Write down the coordinates of the point *A*.

( ..... , ..... ) **(1)**

(b) Write down the coordinates of the point *B*.

( ..... , ..... ) **(1)**

(c) Write down the coordinates of the midpoint of *AB*.

( ..... , ..... ) **(1)**

(d) On the grid, mark with a cross (×) a point *C* so that *ABC* is an isosceles triangle.

Label this point *C*. **(1)**

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

**Q3.** Here is the number of goals a hockey team scored in each of 10 matches.

3 4 3 2 5 3 5 6 2 4

Find

(i) the median

.....

(ii) the range

.....

(iii) the mean

.....

**(Total for Question is 6 marks)**

**Q4.**

(a) Find the value of $\sqrt[3]{97.336}$

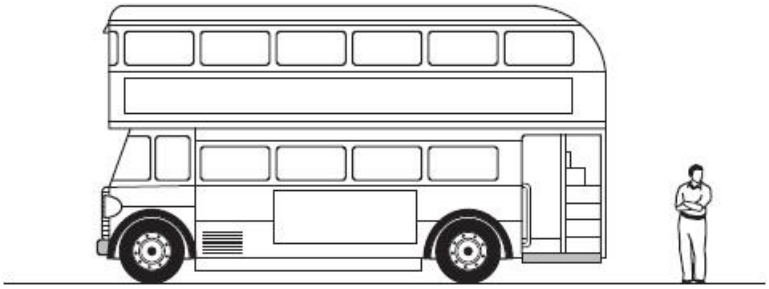
..... **(1)**

(b) Find the value of $\sqrt{7.29} + (2.3 - 0.85)^2$

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

**(Total for question = 3 marks)**

**Q5.**



The picture shows a bus driver standing next to his bus.
The bus driver and the bus are drawn to the same scale.

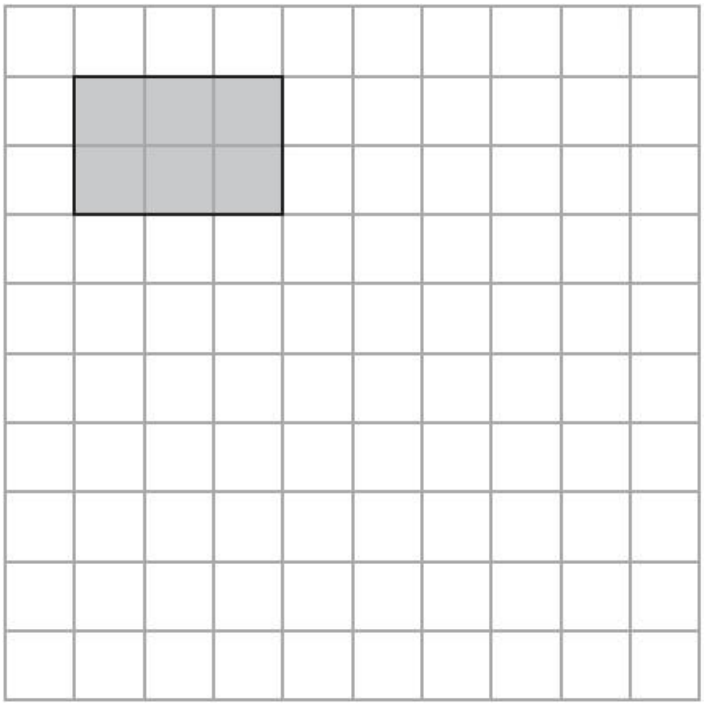
Work out an estimate for the height of the bus.
You must clearly show how you get your answer.

.....

**(Total for question = 3 marks)**

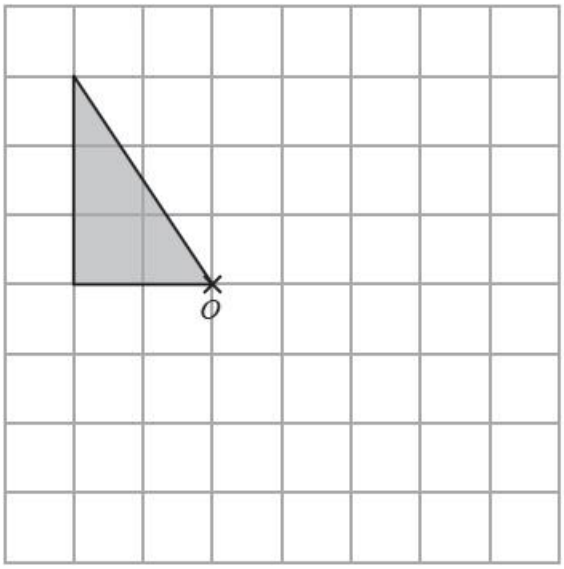
**Q6.**

(a) On the grid, draw an enlargement of the rectangle with scale factor 2



**(1)**

(b) On the grid, rotate the triangle 90° clockwise about the point *O*.




**(2)**

**(Total for question = 3 marks)**

**Q7.**

Work out the reciprocal of 0.125

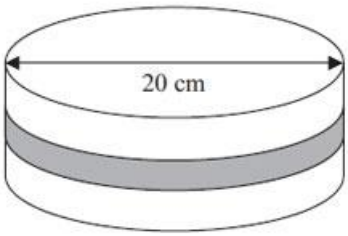
.....

**(Total for question is 1 mark)**

**Q8.**

Susan has a round cake.
The cake has a diameter of 20 cm.

Diagram **NOT** accurately drawn



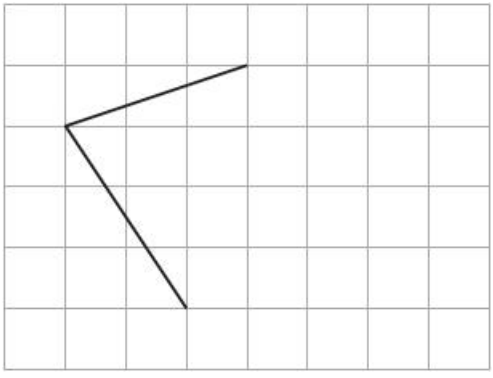

Susan wants to put a ribbon round the cake.
What is the least length of ribbon she can use?

.....

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

**Q9.**

On the grid, complete the diagram of a parallelogram.



**(Total for question = 1 mark)**

**Q10.** Dan, Harry and Regan sell cars.

Dan sells $x$ cars.
Harry sells 5 more cars than Dan.
Regan sells twice as many cars as Dan.

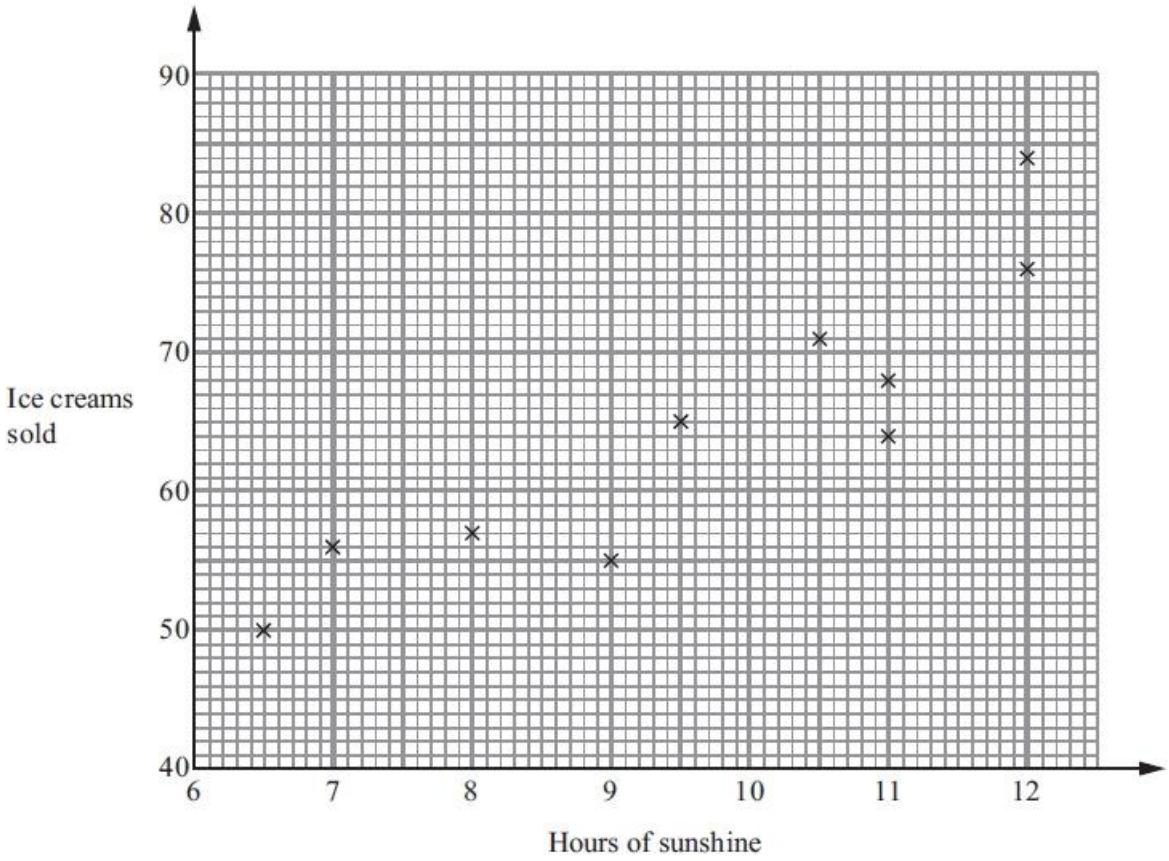
Write an expression, in terms of $x$, for the mean number of cars Dan, Harry and Regan sell.

.....

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

**Q11.** A beach cafe sells ice creams.
Each day the manager records the number of hours of sunshine and the number of ice creams sold.

The scatter graph shows this information.




On another day there were 11.5 hours of sunshine and 73 ice creams sold.

(a) Show this information on the scatter graph. **(1)**

(b) Describe the relationship between the number of hours of sunshine and the number of ice creams sold.

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

One day had 10 hours of sunshine.

(c) Estimate how many ice creams were sold.

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

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

**Q12.** Here are the first five terms of an arithmetic sequence.

–3 1 5 9 13

Find an expression, in terms of $n$, for the $n$th term of this sequence.

.....

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

**Q13.** Jamal plays 15 games of ten-pin bowling.

Here are his scores.

| | | | | |
|---|---|---|---|---|
| 72 | 59 | 75 | 66 | 79 |
| 75 | 66 | 63 | 89 | 76 |
| 65 | 79 | 77 | 71 | 83 |

(a) Draw an ordered stem and leaf diagram to show Jamal's scores.

**(3)**

Gill plays 15 games of ten-pin bowling.

The table gives some information about her scores.

| | |
|---|---|
| Highest score | 95 |
| Lowest score | 75 |
| Mean score | 80 |

*(b) Compare the distribution of Jamal's scores and the distribution of Gill's scores.

**(5)**

**(Total for Question is 8 marks)**

**Q14.**

*ABC* is a straight line.


The length *AB* is five times the length *BC*.
*AC* = 90 cm.

Work out the length *AB*.

..... cm

**(Total for question = 3 marks)**

**Q15.**

The diagram shows a right-angled triangle.

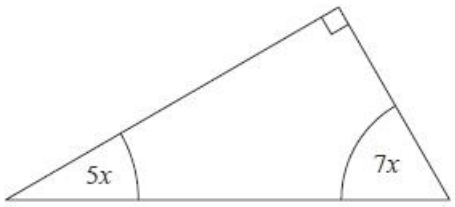



Diagram **NOT** accurately drawn

All the angles are in degrees.

Work out the size of the smallest angle.

..... °

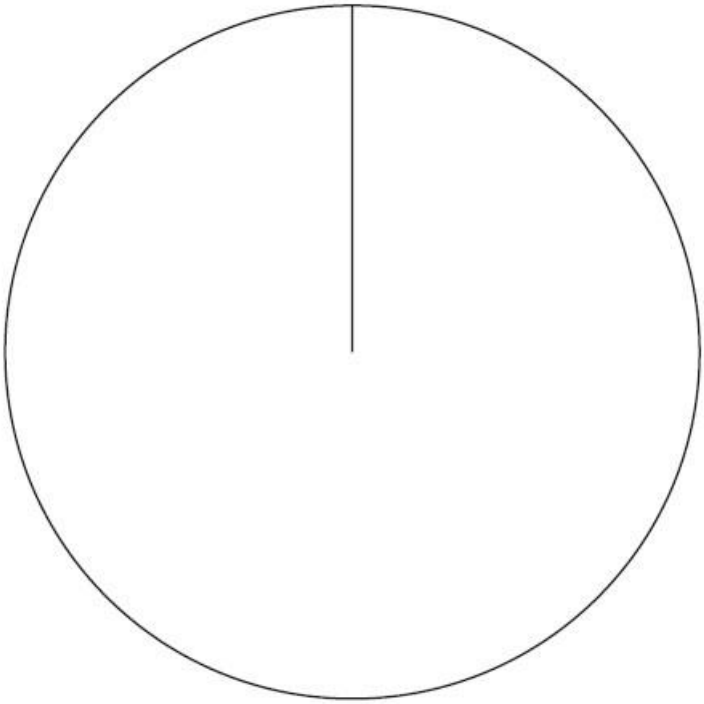
**(Total for question = 3 marks)**

**Q16.** A group of Year 10 students was asked to choose a new subject to study.

The table shows information about the choices.

| Subject | Number of students | |
|---|---|---|
| **construction** | 40 | |
| **hairdressing** | 56 | |
| **tourism** | 24 | |

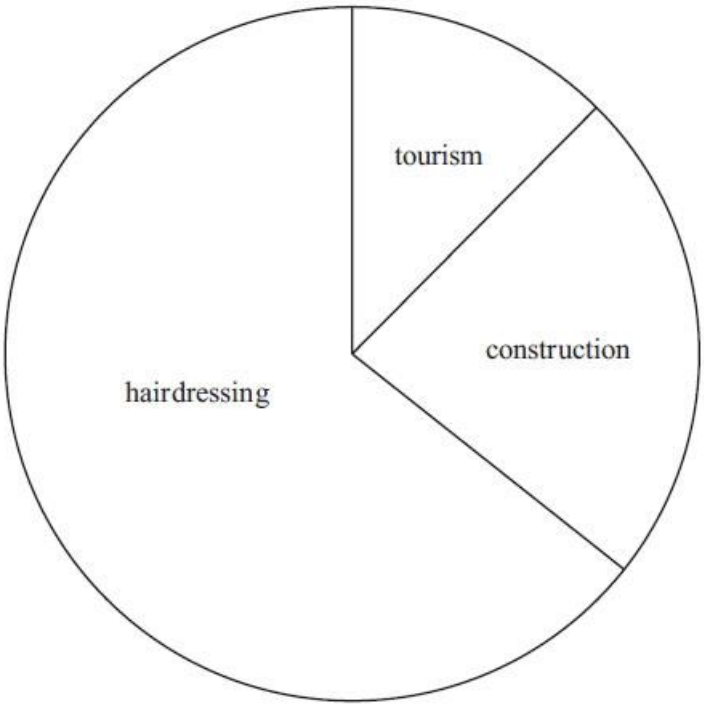
(a) Draw an accurate pie chart to show this information.



**(3)**

A group of Year 11 students was also asked to choose a new subject to study.

This pie chart shows information about their choices.



Danny says

"The pie charts show that hairdressing was chosen by more Year 11 students than by Year 10 students."

(b) Is Danny correct? . . . . . .

You must explain your answer.

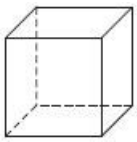
.....
.....
.....
.....

**(1)**

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

**Q17.**

Here is a cube.

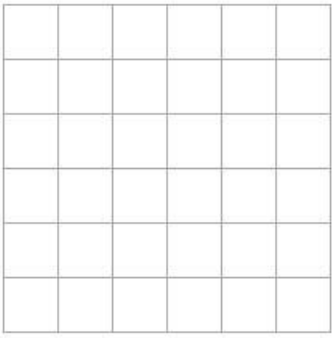


(a) How many vertices does a cube have?

.....

**(1)**

(b) On the grid, draw a net of a cube.



**(2)**

The diagram shows a cube of side 3 cm.

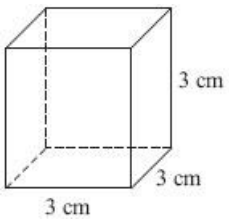



Diagram **NOT** accurately drawn

(c) Work out the total surface area of this cube.

. . . . . $cm^2$

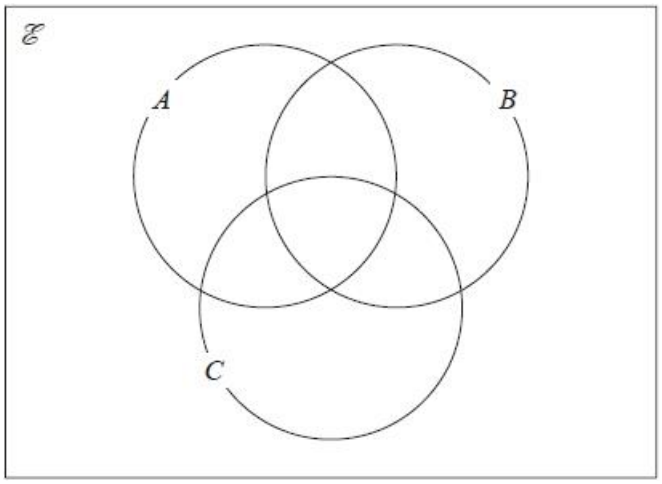
**(2)**

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

**Q18.** $\mathscr{E}$ = even numbers between 1 and 25

$A$ = 2, 8, 10, 14 $B$ = 6, 8, 20 $C$ = 8, 18, 20, 22

(a) Complete the Venn diagram for this information.




**(4)**

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

(b) Find the probability that the number is a member of A ∩ B.

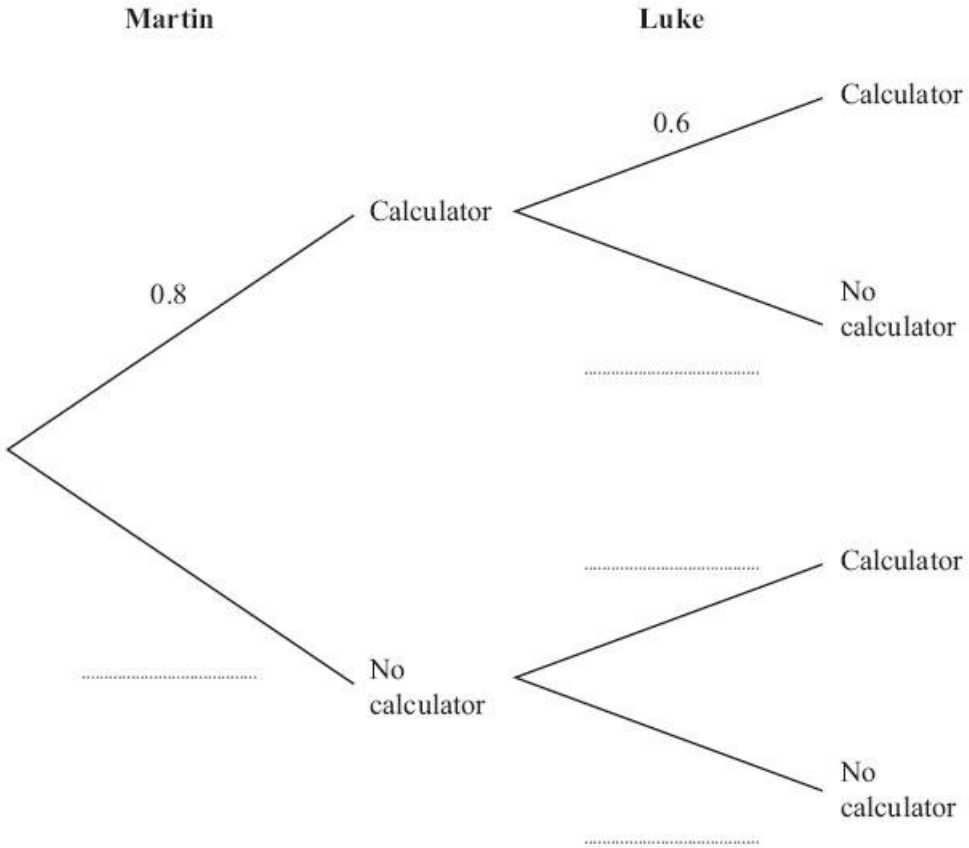
..... **(2)**

**(Total for question = 6 marks)**

**Q19.** Martin and Luke are students in the same maths class.

The probability that Martin will bring a calculator to a lesson is 0.8
The probability that Luke will bring a calculator to a lesson is 0.6

(a) Complete the probability tree diagram.




**(2)**

(b) Work out the probability that **both** Martin and Luke will **not** bring a calculator to a lesson.

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

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

**Q20.**

*ABCDE* is a regular polygon.
*EB* is a straight line.
Angle *EBC* = 72°.

Work out the size of the angle marked *x*.

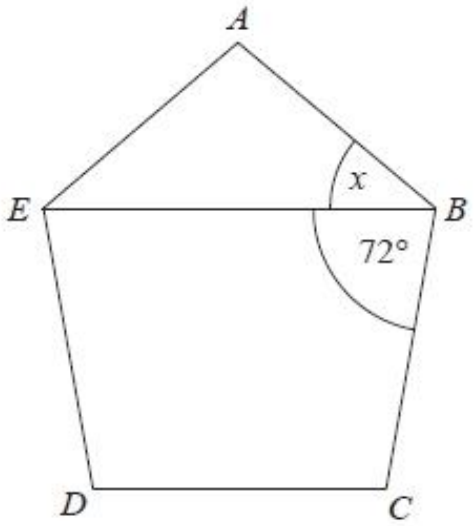



Diagram **NOT** accurately drawn

..... °

**(Total for question = 3 marks)**

**Q21.** The table shows some information about the foot lengths of 40 adults.

| Foot length ($f$ cm) | Number of adults |
|---|---|
| $16 \leqslant f < 18$ | 3 |
| $18 \leqslant f < 20$ | 6 |
| $20 \leqslant f < 22$ | 10 |
| $22 \leqslant f < 24$ | 12 |
| $24 \leqslant f < 26$ | 9 |

(a) Write down the modal class interval.

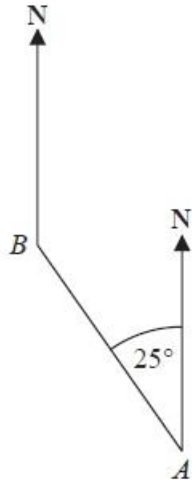
..... **(1)**

(b) Calculate an estimate for the mean foot length.

..... cm **(3)**

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

**Q22.** The diagram shows the positions of two churches, *A* and *B*.




Amber says,

"The bearing of church *B* from church *A* is 025º"

Amber is wrong.
Explain why.

.....

.....

**(Total for question = 1 mark)**

**Q23.** Here is part of a field.

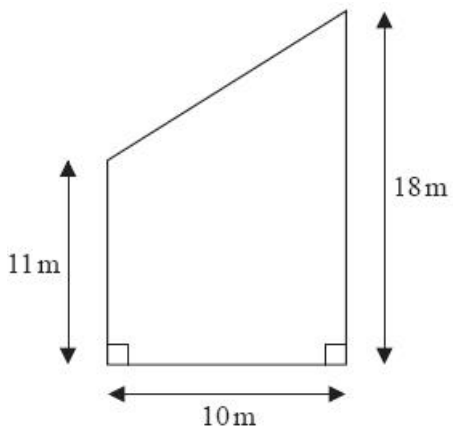



Diagram **NOT** accurately drawn

This part of the field is in the shape of a trapezium.
A farmer wants to put a fence all the way around the edge of this part of the field.

The farmer has 50m of fence.

Does he have enough fence?
You must show all your working.

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

**Q24.** Three companies sell the same type of furniture.

The price of the furniture from Pooles of London is £1480
The price of the furniture from Jardins of Paris is €1980
The price of the furniture from Outways of New York is $2250

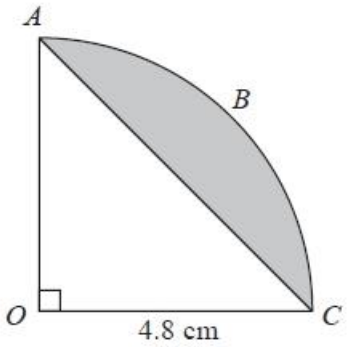
The exchange rates are

£1 = €1.34
£1 = $1.52

Which company sells this furniture at the lowest price?
You must show how you get your answer.

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

**Q25.**




The arc *ABC* is a quarter of a circle with centre *O* and radius 4.8 cm.
*AC* is a chord of the circle.

Work out the area of the shaded segment.
Give your answer correct to 3 significant figures.

..... $cm^2$

**(Total for question = 3 marks)**

**Q26.** Make $g$ the subject of the formula $T = \sqrt{\frac{g+6}{2}}$

.....

**(Total for question = 3 marks)**

**Q27.** David drives to the supermarket on his way home from work.

The table shows some information about his journey.

| | Time |
|---|---|
| Leaves work | 1730 |
| Gets to supermarket | 1745 |
| Leaves supermarket | 1810 |

(a) How many minutes is David at the supermarket?

..... minutes

**(1)**

David leaves the supermarket at 1810
He drives 20 miles to his home.
The speed limit for the journey is 30 mph.

David drives within the speed limit.

(b) Can David get home before 1900?

Give reasons for your answer.

**(3)**

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

**Q28.**

Derek buys a house for £150 000
He sells the house for £154 500

(a) Work out Derek's percentage profit.

.....

**(3)**

Derek invests £154 500 for 2 years at 4% per year compound interest.

(b) Work out the value of the investment at the end of 2 years.

.....

**(3)**

**(Total for Question is 6 marks)**

**Q29.**

(a) Factorise $x^2 - 169$

.....

**(1)**

(b) Expand and simplify $(3x + 2)(2x - 1)$

.....

**(2)**

**(Total for question = 3 marks)**

**Q30.** The diagram shows a ladder leaning against a vertical wall.

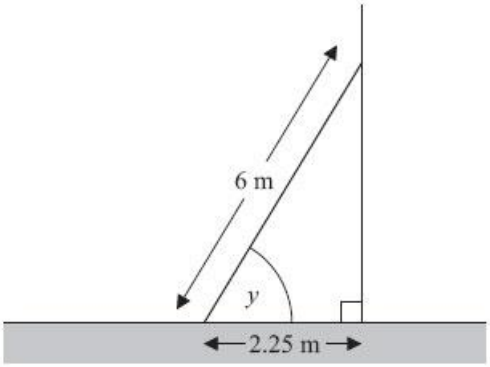



Diagram **NOT** accurately drawn

The ladder stands on horizontal ground.

The length of the ladder is 6 m.
The bottom of the ladder is 2.25 m from the bottom of the wall.

A ladder is safe to use when the angle marked *y* is about 75°.

Is the ladder safe to use?
You must show all your working.

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

**Q31.**

Solve the simultaneous equations

$$2x + 3y = 10$$
$$4x - y = -1$$

*x* = .....

*y* = .....

**(Total for question = 3 marks)**

**Q32.**

*A* is the point with coordinates (5, 9)
*B* is the point with coordinates (*d*, 15)

The gradient of the line *AB* is 3

Work out the value of *d*.

.....

**(Total for question = 3 marks)**

**Q33.**

Claire is making a loaf of bread.
A loaf of bread loses 12% of its weight when it is baked.

Claire wants the baked loaf of bread to weigh 1.1 kg.

Work out the weight of the loaf of bread before it is baked.

..... kg

**(Total for question = 3 marks)**

**Q34.**

Here are the equations of four straight lines.

Line A $y = 2x + 4$
Line B $2y = x + 4$
Line C $2x + 2y = 4$
Line D $2x - y = 4$

Two of these lines are parallel.
Write down the two parallel lines.

Line ..... and line .....

**(Total for question is 1 mark)**

**Q35.**

The density of apple juice is 1.05 grams per $cm^3$.

The density of fruit syrup is 1.4 grams per $cm^3$.

The density of carbonated water is 0.99 grams per $cm^3$.

25 $cm^3$ of apple juice are mixed with 15 $cm^3$ of fruit syrup and
280 $cm^3$ of carbonated water to make a drink with a volume of 320 $cm^3$.

Work out the density of the drink.
Give your answer correct to 2 decimal places.

..... $g/cm^3$

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

## Examiner's Report

Q1.
Parts (a) and (b) were answered well. In part (c) a minority plotted the point at 1/8, 3/8 or indeed some other point.

**Q2.**
The only error in the first three parts was where the coordinates were given in reverse order. In part (d) many students found placing the point difficult; in many cases the point given failed to produce an isosceles triangle.

**Q3.**

Some candidates got confused between the various statistical measures in this question and correct calculations were often seen in the wrong places.

Most candidates were able to order the given data in part (i) and use the middle values to work out the median. Common incorrect answers seen were 3, 4 (both the middle terms) and 3, 5 (both the middle terms of the unordered data).

In part (ii) most candidates were able to work out the range of the numbers. A small number of candidates gave their final answer as 2, 6.

Part (iii) of this question was done quite well but a significant number of candidates did not show any working. When working was present it frequently lacked a final division by 10.

**Q4.**
No Examiner's Report available for this question

**Q5.**
It was pleasing that many students gave sensible estimates for the height of the bus. These estimates were usually given in metres or in feet and inches. Students who did not have a sensible estimate for the height of the bus driver often achieved one mark for multiplying this height by a number in the range 2 to 2.5. Some of the students who estimated the height of the bus driver in feet and inches got into difficulties when attempting to multiply this height by 2, e.g. 5ft 7in × 2 = 10ft 14in or 5.7ft × 2 = 10.14ft. Some students worked only in centimetres, using actual measurements from the diagram, and some failed to include units with their answer.

**Q6.**
This question differentiated well. Marks were lost in part (a) since students drew the rectangle inaccurately, or failed to scale up both dimensions. In part (b) it was not uncommon to see incorrect rotations of 180°, about a different point, or rotated with a flip.

**Q7.**
No Examiner's Report available for this question

**Q8.**

Surprisingly few candidates reached the correct final answer with units on a relatively straightforward circumference question, albeit in the context of ribbon round a cake. Several candidates used the area formula or missed the required units. The mark for giving centimetres associated with a final answer was gained by others who had made no progress with circumference.

**Q9.** No Examiner's Report available for this question

**Q10.**

This question was answered very poorly. Students struggled to write down correct expressions for the number of cars Harry and Regan each sold. Common errors included writing $5x$, rather than $x + 5$, for the number of cars Harry sold and either $x^2$ or $x + 5 \times 2$, instead of $2x$, for the number of cars Regan sold. Some students were awarded one mark for adding three correct expressions but $4x + 5$ was usually then given as the final answer. Very few students attempted to divide their total by 3. Many students did not appear to appreciate that Regan sold twice as many cars as Dan or that the question asked for the *mean number* of cars sold.

**Q11.** This question was answered well by very many candidates, although it was alarming to see some fundamental errors in the plotting of the additional information in part (a). Many candidates also missed out the plot completely possibly because the lack of an answer line meant they went straight on to (b) without being aware of the demands of (a)

In part (b), candidates needed to relate the amount of sunshine with the number of ice creams sold to be able to score the mark, descriptions such as 'the hotter it is the more ice creams are sold', which was a common answer, gained no credit. An alternative approach saying positive correlation was also acceptable but merely saying the relationship was positive was not enough.

In (c), few candidates showed any working, eg line of best fit, and either scored full marks for an answer within the given range or no marks at all. Those that drew a line of best fit often just joined the last point to the origin and were out of tolerance, but still then didn't use it to find an answer.

**Q12.** No Examiner's Report available for this question

**Q13.** In part (a) a number of candidates gained 2 or 3 marks. Those who lost a mark usually forgot the key though a few missed a value or forgot to sort the leaves. Weaker candidates simply sorted the values or attempted to tally them and the very weak due some interesting pictures of plants!

In part (b) small number of candidates gained full marks. The better candidates scored 3 marks for stating highest, lowest and mean values for Jamal, a few of which were able to gain one of the QWC marks for a correct statement. Many failed to realise that they needed to calculate Jamal's mean or incorrectly attempted to do so. Candidates who gained 2 marks were usually correctly calculating the mean and those who only gained 1 mark were usually correctly stated the highest and lowest scores for Jamal. Very few candidates found the range but those that did were usually the more able candidates and gained 3 or more marks.

**Q14.** Those students who started by dividing 90 by 6 generally went on multiply the result by 5 and write down a final answer of 75. Some of those that got to 75 in their working then wrote a different answer, such as 15, on the answer line and scored two of the three marks. The mistake made by many students was to divide 90 by 5 and then multiply the result by 4, giving a common incorrect answer of 72. Very few students used the diagram to support their thinking.

**Q15.** Students attempted this question well and even if no marks were scored students performed calculations involving 180 or 90 hence demonstrating understanding of the sum of the angles in a triangle, if not of the algebra or ratio skills required to solve the problem. Students who chose to form an equation equivalent to $90+7x+5x=180$ and solve it, often gained full marks and were more successful than those using a ratio approach. Weaker students, pleasingly were using 180 but often did $180\div7$ and $180\div5$ to find a value for $x$.

**Q16.** There is clear evidence that many candidates attempting this question were doing so without the aid of a protractor. Drawing angles of 40, 56, 24 resulted in four sectors, which did not appear to bother some candidates. The majority drew a pie chart with three sectors that only approximated to the proportions of the number of students in each category.

Part (b) was also poorly answered, with too many answers referring to the sizes of the sectors or angles, rather than focussing on the actual number of students (which we did not know). Although most tried to justify a reason for "no", there were equally some acceptable justifications for an answer of "yes".

**Q17.** In part (a) of this question many candidates had difficulty writing down the number of vertices on a cube. A common incorrect answer seen was 12, the number of edges of a cube.

Most candidates were able to draw a correct net for a closed box in part (b), usually cross-shaped. A common incorrect answer seen was for candidates to draw a net for an open box.

A significant number of candidates started drawing their nets using 2×2 cm squares for each face. This resulted in difficulties with fitting all six faces on the grid. As a result some candidates extended the grid, some reduced the size of one or two faces and some omitted to include the sixth face altogether.

In part (c) few candidates were able to work out the surface area of the cube. By far the most common incorrect answer ssen was 27, ie the volume of the cube.

Other common incorrect answers were 5×9 (the surface area for an incorrect number of faces, 36 (from 12×3 the total length of the edges) and 18 (usually from 6×3).

**Q18.**
Many students scored 3 of the 4 marks in part (a) for correctly placing the eight numbers in sets *A*, *B* and *C*. Common mistakes included writing 20 and/or 8 in more than one region and writing three 8s in the intersection of all three sets. The outside region, $(A \cup B \cup C)'$ , proved to be much more problematic. It was very common to see either no numbers at all in this region or duplicates of numbers that had already been placed inside the circles or all numbers listed. It should be emphasised to students that each number in the universal set should appear just once in a Venn diagram.

In part (b) many students scored one mark for the correct denominator of 12 or for a denominator (usually 8) that followed through correctly from their Venn diagram. Common incorrect denominators were 25 and 11. A correct numerator was seen less frequently and it was evident that many students were unable to identify the region $A \cap B$ .

**Q19.**
The first part was generally correct, although it was not uncommon for candidates to put different probabilities on Luke's second branch. The most common wrong ones were 0.8 and 0.2 or 0.4 and 0.6 reversed.

In (b) a lot of candidates with a fully correct tree diagram could follow through correctly. However, it was common to see 0.2×0.4=0.8 even though candidates did have access to a calculator. The main error seen was adding 0.2 and 0.4 resulting in 0.6, this was seen very frequently.

**Q20.**
This question was well attempted by most students, but more often than not, they did not achieve full marks. Common incorrect responses were from students who did not realise that it was necessary to calculate the interior or exterior angle of the pentagon in order to calculate the value of *x*. Other common incorrect responses included, assuming all angles in the quadrilateral, *BCDE*, were equal to 72 or that all the angles in the triangle, *ABE*, were equal to 60. Some students simply did 72÷2 which does lead to the correct answer but is clearly an incorrect and incomplete method and gained no marks. Another common incorrect response which gained 1 mark was where students correctly the found the interior angle of a pentagon then incorrectly did 108÷2 =54.

**Q21 & Q22** No Examiner's Report available for this question

**Q23.**
This proved to be a difficult question for Foundation tier students. Many of the students who realised that they needed to find the length of the sloping edge did not know how to do so and gained no marks. Those who did use Pythagoras' theorem were often able to find the length of the sloping edge and then go on to find the perimeter of the field. Some, however, included more than the four sides of the trapezium in their perimeter calculation. Area calculations were very common indeed with students comparing the area they had found with the 50m of fence available.

**Q24 & Q25** No Examiner's Report available for this question

**Q26.**
This question was an opportunity for students to demonstrate correct algebra. However, very few could make the correct first step of squaring both sides or multiplying by root 2. Only a few made any progress with this question. Sometimes a string of errors led coincidentally to the correct answer, but in this case no marks could be awarded.

**Q27.**
Part (a) was usually well answered; the main error was in finding the difference between 1730 and 1810. In contrast, part (b) was not well answered. Some understood it was speed as evidenced by the drawing of an SDT triangle but sometimes this was incorrectly produced. Many thought the required calculation was 30 ÷ 20 and could gain no further credit as a result. 20 ÷ 30 was a better approach, but rounding this to just 0.6 inevitably led to inaccurate calculations, usually leading to 36 minutes and 18.10 Many successful students who calculated the 40 correctly then failed to get the final (QWC) mark since they did not explain fully how they knew David could get home on time.

**Q28.**

The majority of candidates were able to gain a mark in part (a), most often for working out the profit. Following this, some candidates successfully used a 'build up' method to arrive at 3% but many were unable to make further progress. Some just divided 4500 by 100 and gave an answer of 45%; others worked out 150 000 ÷ 4500, giving 33.3% as their final answer. Some responses reached 103% but stopped there, failing to realise that this was an increase of 3%.

In part (b), many used simple rather than compound interest, for which they gained 1 of the 3 available marks. Evaluating $154\,000 \times 0.04^2$ was seen from some candidates rather than the correct $154\,000 \times 1.04^2$. The most common approach, however, was to calculate the interest year by year.

**Q29.**
No Examiner's Report available for this question

**Q30.**
Many correctly identified Cosine as the method of solution, found the angle and wrote an appropriate statement to go with it. Some candidates however tried Pythagoras with either the Sine or Cosine Rule with varying degrees of success.

**Q31.**
No Examiner's Report available for this question

**Q32.**
Working out the value of $d$ proved to be beyond most students on this Foundation tier paper and many did not even attempt to answer the question. Those that did make an attempt often started by finding that the difference in the $y$ coordinates is 6. Most students then simply added 6 to the $x$ coordinate and gave an answer of 11. A few students, though, used the 6 and the gradient to work out the difference in the $x$ coordinates as 2 and they were usually able to complete the solution. Some students wrote down $y = 3x + c$ as a first step and a few started with $(15 – 9)/(d – 5)$ but in both scenarios fully correct solutions were rare. A significant number of students attempted to draw a grid and mark the given coordinates and line on it and in some cases they were able to find correct values or the final answer and could gain credit for this. Correct answers of $d = 7$ were sometimes given with no working shown

**Q33.**
A good proportion of students showed an understanding of "reverse percentages" and were able to use 88% or 0.88 to answer the question successfully. Some students identified the need to use 88% or 0.88 but not how to use it correctly. They usually gained some credit for this. There were, as expected, a large number of students who merely increased 1.1 kg by 12% so 1.232 kg was a commonly seen incorrect answer.

**Q34.**
No Examiner's Report available for this question

**Q35.**
Many students were able to use volume × density to find the mass of at least one of the ingredients. Most went on to find the masses of all three ingredients and add these to find the mass of the drink. Rather surprisingly, many students stopped at this point and gave 324.45 as the final answer. Those who showed a complete process to find the density of the drink usually gave a correct answer. A common mistake in this question was to divide volume by density in an attempt to find mass. Some students simply added the three volumes and added the three densities and attempted to do something with their results. Even when they had written the "density triangle" in the working space some students did not know how to proceed.

## Mark Scheme

Q1.

| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| (a) | | Mark at $\frac{1}{2}$ | 1 | B1 for mark at $\frac{1}{2}$ |
| (b) | | Mark at 1 | 1 | B1 for mark at 1 |
| (c) | | Mark at $\frac{1}{4}$ | 1 | B1 for mark at $\frac{1}{4}$ |

**Q2.**

| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| (a) | | (2, 1) | 1 | B1 cao |
| (b) | | (0, 5) | 1 | B1 cao |
| (c) | | (1, 3) | 1 | B1 cao |
| (d) | | Point | 1 | B1 for point marked,<br>eg at (4, 5) or (4, 3) or (5, 5) or (7, 6) or (3, 4) or (4, 7) |

**Q3.**

| | | Working | Answer | Mark | Notes |
|---|---|---|---|---|---|
| | (i) | 2 2 3 3 3 4 4 4 5 5 6 | 3.5 | 6 | M1 for ordering the data condone one extra or one omission<br>A1 for 3.5 or 3½ |
| | (ii) | | 4 | | M1 for 6 – 2 or 2 – 6<br>A1 cao |
| | (iii) | | 3.7 | | M1 for (2+2+3+3+3+4+4+5+5+6) ÷ 10 condone missing brackets or 37÷10<br>A1 for 3.7 or $3\frac{7}{10}$<br>[SC B1 for 31.6 or 33.4] |

**Q4.**

| Question | Working | Answer | Notes |
|---|---|---|---|
| (a) | | 4.6 | B1 cao |
| (b) | | 4.8025 | B1 for 2.7 or 2.1025 (implied by answer of 4.8025)<br>B1 cao |

**Q5.**

| Question | | Working | Answer | Mark | Notes |
|---|---|---|---|---|---|
| | | | 3.2 m - 5 m | 3 | M1 man's height seen as 1.6 m - 2 m oe or 5 ft 3 in - 6<br>M1 for 2 to 2.5 × 'man's height'<br>A1 for 3.2 m - 5 m oe or 10 ft 6 in - 16 ft 6 in oe (units needed) |

**Q6.**

| 5MB3F_01 November 2015 | | | | | |
|---|---|---|---|---|---|
| Question | | Working | Answer | Mark | Notes |
| | (a) | | correct enlargement | 1 | B1 for a 4 by 6 rectangle |
| | (b) | | correct rotation | 2 | B2 cao<br>(B1 for rotation, direction and angle correct but wrong centre OR rotation, direction and centre correct but wrong angle) |

**Q7.**

| Paper 1MA1:3F | | | |
|---|---|---|---|
| **Question** | **Working** | **Answer** | **Notes** |
| | | 8 | B1 cao |

**Q8.**

| Question | | Working | Answer | Mark | Notes |
|---|---|---|---|---|---|
| | | π × 20 | 62.8 cm | 3 | M1 π × 20 or π × 19.5 or π × 19.95<br>A1 62.8 – 63<br>B1(indep) for units consistent with answer |

**Q9.**

| Question | | Working | Answer | Mark | Notes |
|---|---|---|---|---|---|
| | | | Parallelogram | 1 | B1 complete parallelogram |

**Q10.**

| PAPER: 5MB1F_01 | | | | |
|---|---|---|---|---|
| **Question** | **Working** | **Answer** | **Mark** | **Notes** |
| | | $\frac{x+x+5+2x}{3}$ | 2 | M1 for intention to add $x$, $x+5$, $2x$ or $4x+5$ seen or ambiguous answer, e.g. "$4x+5$" ÷ 3<br>A1 for $\frac{x+x+5+2x}{3}$ oe |

**Q11.**

| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| (a) | | Point at (11.5, 73) | 1 | B1 Point plotted ± ½ small square |
| (b) | | | 1 | B1 for description of dynamic relationship eg "the more hours of sunshine, the more ice creams sold" or positive correlation [Note: 'sunnier' implies 'more hours of sunshine'] |
| (c) | | 62 - 70 | 2 | B2 for answer in the range 62-70<br>OR<br>M1 for a single straight line of best fit with positive gradient, passing between (6.5, 45), ( 6.5, 59) and (12, 70), (12, 80) or a vertical line drawn from 10<br>A1 for answer in range 62-70 or ft from single straight "line of best fit" with positive gradient |

**Q12.**

| Question | Working | Answer | Notes |
|---|---|---|---|
| | | $4n-7$ | M1 method to deduce $n$th term e.g. $4n+k$<br>A1 for $4n-7$ oe |

**Q13.**

| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| (a) | | 5 \| 9<br>6 \| 3 5 6 6<br>7 \| 1 2 5 5 6 7 9 9<br>8 \| 3 9<br>Key: eg, 7/2 represents 72 | 3 | M1 for at least 2 correct 'rows' with correct stem and correct ordered or unordered leaf<br>A1 for a fully correct ordered stem and leaf diagram<br>B1 for a key<br>[Ignore spacing on leaves provided the order is` correct] |
| (*b) | Gill: HV 95 >, LV 75 >, Mean 80 >, Range 20 <<br>Jamal: HV 89, LV 59, Mean 73, Range 30 | Comparisons | 5 | M1 for '72+59+76+...'÷15 or 1095 ÷ 15 (= 73)<br>M1 for 95 – 75 (=20) **or** '89' – '59' (= 30) or '89' and '59' seen ft from their stem and leaf diagram in (a)<br>A1 for mean of Jamal's scores is 73 cao or for ranges of 20 and 30 cao<br>C1 (dep on first M1) ft for a correct comparison of mean scores, e.g. Gill's mean score > Jamal's mean score oe<br>C1 ft for a correct comparison of ranges, (dep on M1 awarded for correct method to find range) e.g. The range of Gill's scores < The range of Jamal's scores<br>**or** a correct comparison of both end values (dep on M1 awarded for '89' and '59' seen) , e.g. Gill's lowest score > Jamal's lowest score and Gill's highest score > Jamal's highest score. oe<br>[For the award of C2, the word 'score' must be explicitly stated. If not deduct 1 mark] |

**Q14.**

| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| | | 75 | P1<br>P1<br>A1 | for 90 ÷ 6 (= 15) or for connecting *AB* and *BC* by ratio or proportion eg 5 and 1 on the diagram<br>for a complete method to find the length *AB* eg 90 ÷ 6 × 5 (= 75)<br>cao |

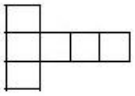
**Q15.**

| PAPER: 5MB3F_01 | | | | | |
|---|---|---|---|---|---|
| Question | | Working | Answer | Mark | Notes |
| | | | 37.5 | 3 | M1 for $90 \div 5x \div 7x = 180$ oe or uses the ratio of 5:7 eg 5+7 (=12)<br>M1 for ($x$=) 90÷12 (=7.5)<br>A1 cao |

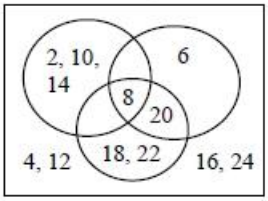
**Q16.**

| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| (a) | construction = 120°<br>hairdressing = 168°<br>tourism = 72° | 120°<br>168°<br>72° | 3 | M1 for correct working to find an angle (could be implied by one angle drawn correctly on the pie chart.<br>A1 all three angles drawn ±2°<br>B1 (dep on M1) correct labels<br>NB: stating the angles is not labels |
| (b) | | explanation | 1 | B1 ft reason given eg NO and "we don't know the actual figures", "there could be less Y10 students", or refers to the fact that the totals for the pie charts (or the sample groups) could be different<br>NB: YES could also be justified. |

**Q17.**

| | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| (a) | | 8 | 1 | B1 cao |
| (b) | |  | 2 | M1 for 5 or 6 squares drawn and joined<br>A1 for a correct net<br>[NB missing internal lines may be implied by grid] |
| (c) | | 54 | 2 | M1 for 3 × 3 × 6 oe<br>A1 cao |

**Q18.**

| Question | Answer | Mark | Mark scheme | Additional guidance |
|---|---|---|---|---|
| (a) | Venn diagram | C4 | fully correct Venn diagram |  |
| | | (C3 | 7 of the 8 regions correct **or** for a diagram with only one number incorrectly placed) | |
| | | (C2 | 5 or 6 of the 8 regions correct) | |
| | | (C1 | 3 or 4 of the 8 regions correct) | |
| (b) | $\frac{1}{12}$ | M1 | ft for identification of 1 or 12 eg from the diagram | Need not be written as a fraction or probability at this stage. eg could be a ratio 1:12 |
| | | A1 | ft oe | Acceptable equivalents are (eg, could ft) any fraction equivalent to $\frac{1}{12}$, 0.08(33..) or 8(.33..)% |

**Q19.**

| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| (a) | | 0.2<br>0.4, 0.6, 0.4 | 2 | B1 for Martin correct<br>B1 for Luke correct |
| (b) | | 0.08 | 2 | M1 for "0.2" × "0.4" ft values from tree diagram if both < 1<br>A1 cao |

**Q20.**

| PAPER: 5MB3F_01 | | | | |
|---|---|---|---|---|
| **Question** | **Working** | **Answer** | **Mark** | **Notes** |
| | | 36 | 3 | M1 for 3×180 ÷ 5 (=108) or 540 ÷ 5 (=108) or for a correct calculation to find the exterior angle eg 360 ÷ 5 or 180 – 360 ÷ 5 (=108)<br>M1 (dep) for "108" – 72 or 180 – "360 ÷ 5" – 72 or "360 ÷ 5" ÷ 2<br>A1 cao<br>OR<br>M1 for $x + x + (72 + x) = 180$ oe or $5(x + 72) = 540$ oe<br>M1 for $(x =)\ (180 - 72) \div 3$ oe or $(x =)\ 540 \div 5 - 72$ oe<br>A1 cao |

**Q21.**

| Paper 1MA1: 2F | | | |
|---|---|---|---|
| **Question** | **Working** | **Answer** | **Notes** |
| (a) | | $22 \leq f < 24$ | B1 |
| (b) | | 21.9 | M1 $x \times f$ using midpoints<br>M1 (dep on previous mark) "$x \times f$" ÷ 40<br>A1 accept 22 if working seen |

**Q22.**

| Question | Working | Answer | Notes |
|---|---|---|---|
| | | explanation | C1 'The bearing is 335°' or 'She should have measured clockwise from north' oe |

**Q23.**

| Question | | Working | Answer | Mark | Notes |
|---|---|---|---|---|---|
| * | | | No not enough | 5 | M1 for substituting into Pythagoras' theorem<br>M1 for complete correct use of Pythagoras' theorem<br>M1 for a complete method to find the perimeter of the trapezium<br>A1 51.(20655..)<br>C1 (dep on first two Ms) for correct conclusion dependent upon supporting calculations |

**Q24.**

| Paper 1MA1: 2F | | | |
|---|---|---|---|
| **Question** | **Working** | **Answer** | **Notes** |
| | | Jardins of Paris | P1 correct process to convert one price to another currency, eg 1980 ÷ 1.34<br>P1 for a complete process leading to 3 prices in the same currency<br>C1 for 3 correct and consistent results and a correct comparison made. |

**Q25.**

| Question | Working | Answer | Notes |
|---|---|---|---|
| | $\frac{1}{4} \times \pi \times 4.8^2$<br>$\frac{1}{2} \times 4.8 \times 4.8$<br>$\frac{1}{4} \times \pi \times 4.8^2 - \frac{1}{2} \times 4.8 \times 4.8$ | 6.58 | B1 for use of formula for area of a circle<br>P1 for complete process to find area of shaded region<br>A1 for 6.56 – 6.58 |

**Q26.**

| Question | Answer | Mark | Mark scheme | Additional guidance |
|---|---|---|---|---|
| | $g = 2T^2 - 6$ | M1 | for $T^2 = \frac{g+6}{2}$ or $\sqrt{2} \times T = \sqrt{g+6}$ | |
| | | M1 | (dep) for $T^2 \times 2 = g + 6$ or $\left(\sqrt{2} \times T\right)^2 = g + 6$ oe | Can only award this mark if the first M mark has been awarded. |
| | | A1 | for $g = 2T^2 - 6$ oe | |

**Q27.**

| PAPER: 1MA0/2F | | | | |
|---|---|---|---|---|
| **Question** | **Working** | **Answer** | **Mark** | **Notes** |
| (a) | | 25 | 1 | B1 cao |
| *(b) | | yes with correct comparative figures | 3 | M1 for method to calculate journey time travelling at 30 mph,<br>eg $\frac{20}{30}$ (=0.66…) or 40 (mins)<br>M1 (dep) for method to work out arrival time at home, (consistent units),<br>eg 18 10 + "40 mins" (=18 50)<br>C1 for yes with comparison of 40 minutes with 50 minutes or stating arrival time home as 18 50<br>OR<br>M1 for method to calculate speed in order to get home by 1900<br>eg 20 ÷ $\frac{50}{60}$ (= 24 mph)<br>M1 (dep) for stating speed as 24 mph<br>C1 for yes with supporting calculations showing speed as 24 mph |

**Q28.**

| | | Working | Answer | Mark | Notes |
|---|---|---|---|---|---|
| | (a) | 154500 – 150000<br>$^{4500}/_{150000} \times 100$ | 3 | 3 | M1 for 154500 – 150000 or 4500<br>M1 for $'154500 - 150000'/_{150000} \times 100$ oe<br>A1 cao<br>**OR**<br>M1 for $^{154500}/_{150000}$ (× 100)<br>M1 for $"^{154500}/_{150000} \times 100"$ – 100 oe<br>A1 cao |
| | (b) | 154500 × $^4/_{100}$ + 154500<br>160680 × $^4/_{100}$ + 160680<br>or<br>$154500 \times 1.04^2$ | 167107.20 | 3 | M1 for 154500 × $^4/_{100}$ or 6180 **or** 12360 **or** 160680 **or** 166860 **or** 1.04 × 154500<br>M1 (dep) for (154500 + '6180') × $^4/_{100}$ or 6427.2(0) or ' 160680' × 1.04<br>A1 for 167107.2(0) as final answer<br>**OR**<br>M2 for $154500 \times 1.04^2$<br>(M1 for 154500 × 1.04)<br>A1 167107.2(0) as final answer |

**Q29.**

| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| (a) | | $(x+13)(x-13)$ | B1 | cao |
| (b) | | $6x^2 + x - 2$ | M1 | for all 4 terms (and no additional terms) correct with or without signs or 3 out of no more than 4 terms correct with signs |
| | | | A1 | $6x^2 + x - 2$ |

**Q30.**

| | | Working | Answer | Mark | Notes |
|---|---|---|---|---|---|
| | | cos $y$ = 2.25 ÷ 6<br>$y = \cos^{-1}(2.25 \div 6)$<br>OR<br>6cos 75 = 1.55… | The ladder is not safe because $y$ is not near to 75 | 3 | M1 for cos $y$ = 2.25 ÷ 6 oe<br>M1 for $\cos^{-1}(2.25 \div 6)$<br>C1 for sight of 67-68 and a statement eg this angle is<br>NOT (near to) 75° and so the ladder is not steep enough and so not safe.<br>OR<br>M1 for cos 75 = $x$ ÷ 6<br>M1 for 6cos 75<br>C1 for sight of 1.55(29…) and a statement eg that 2.25<br>NOT (near to) 1.55 and so the ladder is not steep enough and so not safe. |

**Q31.**

| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| | | $\frac{1}{2}$, 3 | M1 | for a correct method to eliminate one variable (condone one arithmetic error) |
| | | | M1 | (dep) for substituting found value in one of the equations or correct method after starting again (condone one arithmetic error) |
| | | | A1 | cao |

**Q32.**

| Question | Answer | Mark | Mark scheme | Additional guidance |
|---|---|---|---|---|
| | 7 | P1 | process to use gradient eg $y = 3x + c$ **or** $c = -6$ **or** $\frac{15-9}{d-5}$ **or** $(15-9) \div 3$ **or** (6, 12) | Condone use of a letter other than $d$, for $d$ |
| | | P1 | (dep) full process to rearrange equation formed to isolate $d$ eg rearrangement of $15 = 3d - 6$ or $3 = \frac{15-9}{d-5}$ **or** for $5 + \frac{15-9}{3}$ | Must show processes to get as far as $d =$<br>Award P2 for an answer of (7, 15) |
| | | A1 | cao | |

**Q33.**

| PAPER: 1MA0_2H | | | | |
|---|---|---|---|---|
| **Question** | **Working** | **Answer** | **Mark** | **Notes** |
| | | 1.25 | 3 | M1 $100 - 12$ (= 88) or 0.88 or $1.1 \div 88$ (= 0.0125)<br>M1 for complete method, eg $1.1 \div 0.88$<br>A1 cao<br>(SC B2 for 1250 as answer) |

**Q34.**

| Paper 1MA1: 3F | | | |
|---|---|---|---|
| **Question** | **Working** | **Answer** | **Notes** |
| | | *A* and *D* | C1 in any order |

**Q35.**

| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| | | 1.01 | P1 | fruit syrup $15 \times 1.4$ (= 21) or water $280 \times 0.99$ (= 277.2) or apple juice $25 \times 1.05$ (= 26.25) |
| | | | P1 | (dep P1) for complete process to find the total mass e.g. "277.2" + "26.25" + "21" (= 324.45) or a weighted density eg $15 \times 1.4 \div 320$ (= 0.065625) or $280 \times 0.99 \div 320$ (= 0.86625) or $25 \times 1.05 \div 320$ (= 0.08203125) |
| | | | P1 | (dep P2) for complete process to find the density eg "324.45" ÷ 320 (=1.01..) or "0.065625" + "0.86625" + "0.08203125" (= 1.0139..) |
| | | | A1 | 1.01 to 1.014 |