1 (a) Strawberries cost $4.20 per kilogram and cream costs $8.56 per litre.
Venus buys 1.2 kg of strawberries and 125 ml of cream.

Work out the total cost.

$ ................................................. [3]

(b) Ravi has $20.
A pineapple costs $1.45.

Work out the largest number of pineapples Ravi can buy and the change he receives.

Number of pineapples .................................................
Change $ ................................................. [3]

(c) Abraham has a box of 72 biscuits.
He gives \( \frac{2}{9} \) of the biscuits to his grandmother.
He then gives \( \frac{3}{7} \) of the biscuits that are left to his cousin.

Work out how many biscuits Abraham has now.

................................................. [3]
(d) Flo makes 84 cakes.
She sells 35 of these cakes.

Calculate the percentage of the cakes that she sells.

.............................................  %  [1]

(e) A bag contains 132 sweets.
The sweets are shared between Beatrix and Volker in the ratio  Beatrix : Volker = 5 : 7.

Work out the number of sweets they each receive.

Beatrix .............................................
Volker .............................................  [2]

(f) Jed sells desserts for $24 each.
Each dessert costs $12.80 to make.

(i) Work out his percentage profit.

.............................................  %  [2]

(ii) The cost to make each dessert increases to $13.60.
Jed wants to make the same percentage profit.

Work out the new selling price.

$ .............................................  [2]
Anika asks 15 friends how many marbles they have. The results are shown in the table.

<table>
<thead>
<tr>
<th>Number of marbles</th>
<th>Frequency</th>
<th>Pie chart sector angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>1 to 10</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>11 to 50</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>More than 50</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

(i) Complete the table. [2]

(ii) Complete the pie chart. [2]
Bag $A$ contains 2 black marbles and 3 white marbles.
Bag $B$ contains 5 black marbles and 8 white marbles.

(i) Write down the probability that a marble picked at random from bag $A$ is black.

................................................. [1]

(ii) Toby says,
You are more likely to pick a black marble at random from bag $B$ than from bag $A$
because bag $B$ has more black marbles.’

Is Toby correct?
Give a reason for your answer.

................................................. because ................................................................. [2]

(iii) Toby adds some marbles to bag $B$.
The probability of picking a black marble at random from either bag is now the same.

Work out the smallest number of black marbles and white marbles he adds to bag $B$.

Black ...................................................

White ................................................. [2]
3 The scale drawing shows the position of town $R$ on a map. The scale is 1 centimetre represents 5 kilometres.

![Diagram of town R]

(a) Town $M$ is 36 km from $R$ on a bearing of 163°.

Mark the position of $M$ on the map. [2]
(b) A railway track, 36 km long, is to be built in a straight line from $R$ to $M$.

(i) The track costs $1070 per metre to build.

Work out the cost of building the track.

$ .................................................  \ [2]$

(ii) 15 people can build 60 metres of track per day.

Work out how many days it will take 45 people to build the whole track.

.........................................  days  \ [3]

(c) Trains will travel the 36 km at an average speed of 75 km/h.

Work out the journey time.
Give your answer in minutes.

.........................................  min  \ [2]

(d) Town $K$ is on a bearing of $312^\circ$ from $R$.

Work out the bearing of $R$ from $K$.

.........................................  \ [2]
4 The diagram shows a line $L$ and two points, $A$ and $B$, on a grid.

(a) Write down the coordinates of point $A$. 
\[ (............... , ............. ) \] [1]

(b) (i) Find the gradient of line $L$.
\[ ................................................. \] [1]

(ii) Write down the equation of line $L$ in the form $y = mx + c$.
\[ y = ................................................. \] [2]

(c) (i) Draw a line that is perpendicular to line $L$ and passes through the point $A$. [1]

(ii) This line crosses the $x$-axis at point $C$.

Mark point $C$ on the grid and write down the coordinates of point $C$.
\[ (............... , ............. ) \] [1]

(iii) Find, by measuring, the perimeter of triangle $ABC$.
\[ ................................................. \text{ cm} \] [2]
The diagram shows the graph of $y = \frac{k}{x}$ for $1 \leq x \leq 8$.

(a) Use the graph to find the value of $x$ when $y = 4$.

$$x = \underline{.........................} \quad [1]$$

(b) (i) Show that $k = 8$.

$$[1]$$

(ii) Calculate the value of $y$ when $x = 250$.

$$y = \underline{.........................} \quad [1]$$

(c) (i) Complete this table of values for $y = \frac{8}{x}$.

<table>
<thead>
<tr>
<th>$x$</th>
<th>$-8$</th>
<th>$-4$</th>
<th>$-2$</th>
<th>$-1$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$y$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$$[2]$$

(ii) On the grid, draw the graph of $y = \frac{8}{x}$ for $-8 \leq x \leq -1$.

$$[3]$$

(d) Write down the equation of each line of symmetry of the graph.

$$............... \text{ and } ............... \quad [2]$$
6 The diagram shows three triangles, $A$, $B$ and $C$, on a $1 \text{ cm}^2$ grid.

(a) Describe fully the single transformation that maps

(i) triangle $A$ onto triangle $B$,

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

............................................................................................................................................. [3]

(ii) triangle $A$ onto triangle $C$.

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

............................................................................................................................................. [3]

(b) On the grid, draw the image of

(i) triangle $A$ after a translation by the vector \( \begin{pmatrix} -5 \\ 4 \end{pmatrix} \),

............................................................................................................................................. [2]

(ii) triangle $A$ after a reflection in the line $x = -4.5$.

............................................................................................................................................. [2]
(c) The diagram also shows an angle $b$ in triangle $B$.

Use trigonometry to show that angle $b$ is $63.4^\circ$, correct to 1 decimal place.

(d) Two new triangles, $D$ and $E$, are made from triangle $B$, as shown in the diagram.

Are all three triangles similar?
Give a reason for your answer.

............................. because ........................................................................................................
.....................................................................................................................................................  [2]
7 (a)  Martin, Suki and Pierre make clocks.
In one week
• Martin makes \(x\) clocks.
• Suki makes 3 fewer clocks than Martin.
• Pierre makes twice as many clocks as Suki.

(i) Write an expression for the total number of clocks they make in one week.
Give your expression in its simplest form.

\[ \text{Expression} \] [3]

(ii) The total number of clocks they make in one week is 35.

(a) Work out the value of \(x\).

\[ x = \text{value} \] [3]

(b) Work out how many more clocks Pierre makes than Martin.

\[ \text{value} \] [2]

(b)

(i) Complete the clock diagram to show the time 2.30 pm. [1]

(ii) Calculate the obtuse angle between the hands of the clock at 2.30 pm.

\[ \text{Value} \] [2]
(c) Work out the number of seconds in 10 days.
Give your answer in standard form.

........................................ seconds [2]

(d) A clock is started at 1500.
The clock is not working correctly and is slow.
The clock loses 8 minutes every hour so after one hour the clock shows 1552.

What time will the clock show 3\(\frac{1}{2}\) hours after it is started?

................................................. [2]

(e) The times on two clocks are checked regularly.

One clock is checked every 6 days.
The other clock is checked every 8 days.

Both clocks are checked on 1st January 2021.

Find the number of days during 2021 when both clocks will be checked on the same day.
[There are 365 days in 2021.]

................................................. [4]
A, B and C lie on a circle, centre O, diameter AC.

(i)  Complete this statement.

Angle ABC is 90° because .................................................................................................. [1]

(ii) Work out the area of triangle ABC.

............................................ cm² [2]

(iii) Work out AC.

AC = ............................................ cm [2]

(b) Make r the subject of the formula  $A = \pi r^2$.

$r = ............................................$ [2]
The diagram shows a circle inside a square. The circle touches the four sides of the square. The area of the square is 81 cm$^2$.

Calculate the shaded area.

........................................ cm$^2$ [4]

Question 9 is printed on the next page.
9 (a) \( \mathbb{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\} \)
\( E = \{x: x \text{ is an even number}\} \)
\( M = \{x: x \text{ is a multiple of 3}\} \)

(i) Complete the Venn diagram. [2]

(ii) Write down \( n(E \cup M) \). ................................................. [1]

(iii) A number is chosen at random from the universal set \( \mathbb{E} \).
Write down the probability that the number is in the set \( E \cap M \).

................................................. [2]

(b) Meg says that an even number cannot be a prime number.

Is she correct?
Give a reason for your answer.

............................. because ................................................................. [1]