1 Write down a prime number between 20 and 30.

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

2 Write 0.000 038 7 in standard form.

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

3 Write the recurring decimal 0.\overline{63} as a fraction.

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

4 Find the value of $7x + 3y$ when $x = 12$ and $y = -6$.

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

5 The diagram shows two parallel lines $PAQ$ and $SBCT$. $AB = AC$ and angle $QAC = 43^\circ$.

Find the value of $x$.

$x = .............................................. [2]$
6 Calculate the area of a circle with radius 5.1 cm.

\[ \text{Area} = \pi r^2 \]

\[ \text{Area} = \pi (5.1)^2 \]

\[ \text{Area} = 26.31 \text{ cm}^2 \] [2]

7 Calculate the length of \( AC \).

\[ AC = \sqrt{2.5^2 + 4.1^2} \]

\[ AC = \sqrt{6.25 + 16.81} \]

\[ AC = \sqrt{23.06} \]

\[ AC = 4.79 \text{ cm} \] [2]

8 Expand and simplify.

\[ 6(2y - 3) - 5(y + 1) \]

\[ = 12y - 18 - 5y - 5 \]

\[ = 7y - 23 \] [2]

9 \[ 3^{-q} \times \frac{1}{27} = 81 \]

Find the value of \( q \).

\[ 3^{-q} \times \frac{1}{3^3} = 3^4 \]

\[ 3^{-q-3} = 3^4 \]

\[ -q - 3 = 4 \]

\[ -q = 7 \]

\[ q = -7 \] [2]
10  (a) Calculate $\sqrt{2.38 + 6.4^2}$, writing down your full calculator display.

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

(b) Write your answer to part (a) correct to 4 decimal places.

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

11 Find the exact value of $\frac{8^2 \times 49^{-\frac{1}{2}}}{2}$. 

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

12 Solve the inequality.

$3n - 5 > 17 + 8n$

.................................................. [2]
13 **Without using your calculator**, work out \[ \frac{3}{4} \times \frac{6}{35} \].

You must show all your working and give your answer as a fraction in its simplest form.

\[ \text{.............................................. [3]} \]

14

\[ \text{Use the sine rule to find angle } ABC. \]

\[ \text{Angle } ABC = \text{.............................................. [3]} \]
15  $y$ is directly proportional to $(x - 1)^2$.
When $x = 5$, $y = 4$.

Find $y$ when $x = 7$.

\[ y = \ldots \ldots \ldots \ldots \ldots \ldots . \] [3]

16

On the grid, draw the image of shape $R$ after the transformation represented by the matrix $\begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}$. [3]
The speed–time graph shows information about the journey of a tram between two stations.

(a) Calculate the distance between the two stations.

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

(b) Calculate the average speed of the tram for the whole journey.

.......................................... m/s [1]
The cumulative frequency diagram shows information about the time, $m$ minutes, taken by 120 students to complete some homework.

Use the cumulative frequency diagram to find an estimate of

(a) the interquartile range, ....................................... min [2]

(b) the number of students who took more than 50 minutes to complete the homework.

.............................................. [2]
Calculate angle $LMN$.

Angle $LMN$ = ............................................... [4]

20 (a) A box contains 3 blue pens, 4 red pens and 8 green pens only.
A pen is chosen at random from the box.

Find the probability that this pen is green.

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

(b) Another box contains 7 black pens and 8 orange pens only.
Two pens are chosen at random from this box without replacement.

Calculate the probability that at least one orange pen is chosen.

.............................................. [3]
There are four inequalities that define the region $R$. One of these is $y \leq x + 1$.

Find the other three inequalities.

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

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

.............................................. [4]
22 \( f(x) = 5 - 2x \) \( g(x) = x^2 + 8 \)

(a) Calculate \( f(3) \).

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

(b) Find

(i) \( g(2x) \),

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

(ii) \( f^{-1}(x) \).

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

23 40 people were asked how many times they visited the cinema in one month. The table shows the results.

<table>
<thead>
<tr>
<th>Number of cinema visits</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>7</td>
<td>3</td>
<td>6</td>
<td>2</td>
</tr>
</tbody>
</table>

(a) (i) Find the mode.

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

(ii) Calculate the mean.

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

(b) Omar wants to show the information from the table in a pie chart.

Calculate the sector angle for the people who visited the cinema 5 times.

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

Question 24 is printed on the next page.
24  (a) Point $A$ has co-ordinates $(1, 0)$ and point $B$ has co-ordinates $(2, 5)$.

Calculate the angle between the line $AB$ and the $x$-axis.

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

(b) The line $PQ$ has equation $y = 3x - 8$ and point $P$ has co-ordinates $(6, 10)$.

Find the equation of the line that passes through $P$ and is perpendicular to $PQ$.
Give your answer in the form $y = mx + c$.

$y = ............................................. [3]$