Formula List

Area, $A$, of triangle, base $b$, height $h$.  \[ A = \frac{1}{2}bh \]

Area, $A$, of circle, radius $r$.  \[ A = \pi r^2 \]

Circumference, $C$, of circle, radius $r$.  \[ C = 2\pi r \]

Curved surface area, $A$, of cylinder of radius $r$, height $h$.  \[ A = 2\pi rh \]

Curved surface area, $A$, of cone of radius $r$, sloping edge $l$.  \[ A = \pi rl \]

Curved surface area, $A$, of sphere of radius $r$.  \[ A = 4\pi r^2 \]

Volume, $V$, of prism, cross-sectional area $A$, length $l$.  \[ V = Al \]

Volume, $V$, of pyramid, base area $A$, height $h$.  \[ V = \frac{1}{3}Ah \]

Volume, $V$, of cylinder of radius $r$, height $h$.  \[ V = \pi r^2h \]

Volume, $V$, of cone of radius $r$, height $h$.  \[ V = \frac{1}{3}\pi r^2h \]

Volume, $V$, of sphere of radius $r$.  \[ V = \frac{4}{3}\pi r^3 \]
1. Work out.

\[5 \times 20 \div 4\]

\textit{Answer} \hspace{1cm} \text{.................................} \hspace{1cm} [1]

2. (a) Shape \(A\) is drawn on a 1 cm square grid.

Find the \textbf{perimeter} of shape \(A\).

\textit{Answer}(a) \hspace{1cm} \text{.................................} \hspace{1cm} \text{cm} \hspace{1cm} [1]

(b) On the grid below, draw a different shape which has the same \textbf{area} as shape \(A\).
3  (a) Write down the value of \((-2)^3\).

\[ \text{Answer(a)} \] ........................................................................... \[1\]

(b) Simplify.

\[ \frac{-2 - (-8)}{2 + 8} \]

Give your answer as a fraction in its lowest terms.

\[ \text{Answer(b)} \] ........................................................................... \[2\]

4  A farmer picks a bunch of grapes. He writes down

A  the colour of the grapes
B  the number of grapes
C  the weight of the grapes
D  which plant the grapes were picked from.

(a) Which one of A, B, C or D is discrete data?

\[ \text{Answer(a)} \] ........................................................................... \[1\]

(b) Which one of A, B, C or D is continuous data?

\[ \text{Answer(b)} \] ........................................................................... \[1\]
Niki began a race at 10:05.
She finished the race at 16:05.

(a) How many hours did Niki take to complete the race?

Answer (a) ........................................................... h [1]

(b) The distance of the race was 42 km.

Work out Niki’s average speed.

Answer (b) ........................................................... km/h [1]

6 From this list write down the irrational number.

\[ \frac{2}{9}, \sqrt{7}, \sqrt{9}, 7 \]

Answer ........................................................... [1]
Write down the equations of the two asymptotes of the graph.

Answer .......................................................... .......................................................... [2]
The total cost of a holiday was $720.

The pie chart shows how this money was spent.

Find the amount of money spent on

(a) food,

\[ \text{Answer (a)} \$ \] \hspace{1cm} \hspace{1cm} [2]

(b) other items.

\[ \text{Answer (b)} \$ \] \hspace{1cm} \hspace{1cm} [2]
The diagram shows the graph of \( y = x^2 - 4x + 8 \) for \( 0 \leq x \leq 4 \).

Write down the equation of the line of symmetry of this graph.

Answer: \( x = 2 \) [1]

Draw the tangents from \( P \) to the circle. [1]
11 (a) Simplify.

(i) \(3x - 5 + 2x - 12\)

\[\text{Answer(a)(i)} \quad \frac{x}{3} - \frac{x}{6} \quad [2]\]

(ii) \(4 \times d \times 2 \times d\)

\[\text{Answer(a)(ii)} \quad \frac{x}{3} - \frac{x}{6} \quad [1]\]

(iii) \(\frac{x}{3} - \frac{x}{6}\)

\[\text{Answer(a)(iii)} \quad \frac{x}{3} - \frac{x}{6} \quad [2]\]

(b) Factorise completely.

\(6ab - 8a^2\)

\[\text{Answer(b)} \quad \frac{x}{3} - \frac{x}{6} \quad [2]\]

(c) Solve the following equation.

\(x + 8 = 15\)

\[\text{Answer(c)} \quad x = 7 \quad [1]\]

(d) Solve the inequality.

\(6x < 4x + 11\)

\[\text{Answer(d)} \quad x < \frac{11}{2} \quad [2]\]
Data has been collected about the age (years) and the value (to the nearest $100) of the cars owned by a class of University students.

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>1</th>
<th>2</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>4</th>
<th>5</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value ($)</td>
<td>8000</td>
<td>6400</td>
<td>5200</td>
<td>4000</td>
<td>3000</td>
<td>2100</td>
<td>1700</td>
<td>1200</td>
<td>800</td>
</tr>
</tbody>
</table>

(a) Complete the scatter diagram.
The first five points have been plotted for you.  [2]

(b) What type of correlation is shown on the scatter diagram?

Answer (b)  
………………………………………………...  [1]

(c) The mean age is 4 years.
The mean value is $3600.

Draw the line of best fit on your diagram.  [2]
13 The base of this pyramid is a square of side 5 m. It has perpendicular height 12 m.

Work out the volume of the pyramid.

Answer ........................................... m$^3$ [3]

14 A rectangle has sides 6 cm and 8 cm.

Work out the length of a diagonal of this rectangle.

Answer ........................................... cm [2]