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 $h$.  

\[ V = \pi r^2 h \]

Volume, $V$, of cone of radius $r$, height $h$.  

\[ V = \frac{1}{3} \pi r^2 h \]

Volume, $V$, of sphere of radius $r$.  

\[ V = \frac{4}{3} \pi r^3 \]
Answer all the questions.

1. Write down

(a) a factor of 84 which is greater than 10,

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

(b) a multiple of 12,

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

(c) a prime number between 20 and 30,

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

(d) the value of \( 8^0 \),

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

(e) the cube root of 64,

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

(f) an example of an obtuse angle,

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

(g) the order of rotational symmetry of a parallelogram.

\[ \text{Answer(g)} \] ................................................................. \[1\]
2  (a) Write 3648 correct to the nearest 100.

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

(b) Write 2.6351 correct to 2 decimal places.

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

(c) Write 3.0865 correct to 3 significant figures.

Answer(c) ................................................................. [1]

(d) Simplify.

\[6a + 3b - 2a - b\]

Answer(d) ................................................................. [2]

(e) Find the value of \(3p - 2q\) when \(p = -1\) and \(q = 2\).

Answer(e) ................................................................. [2]
3 (a) Work out.

(i) \( \sqrt{183} \)

\[ \text{Answer(a)(i)} \]

(ii) \( (0.34 + 1.27)^2 \)

\[ \text{Answer(a)(ii)} \]

(iii) \( \frac{2}{7} \times 105 \)

\[ \text{Answer(a)(iii)} \]

(iv) \( \frac{7}{8} - \frac{1}{4} \)

\[ \text{Answer(a)(iv)} \]

(v) 45\% of 63.8

\[ \text{Answer(a)(v)} \]

(vi) \( \frac{3.84}{5 \times 2.16} \)

\[ \text{Answer(a)(vi)} \]

(b) Divide 52 in the ratio 6 : 7.

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

(c) Dragon fruit cost $1.79 each.

Calculate the maximum number of dragon fruit Sian can buy for $20.

How much change should she receive from $20?

\[ \text{Answer(c)} \]

Number of dragon fruit

Change $
Dave has 3 cats, 2 dogs and 4 rabbits. He shows this information in a pie chart.

(a) Calculate the sector angle for the 3 cats.

Answer(a) 

(b) Construct and label the pie chart.
5 (a) Colin invests $600 at a rate of 2.1% per year simple interest.

Calculate how much interest he receives at the end of 3 years.

Answer (a) $ .............................................. [2]

(b) Ryan invests $600 at a rate of 2% per year compound interest.

Calculate how much interest Ryan receives at the end of 3 years.

Answer (b) $ .............................................. [4]
To make 10 cupcakes, Nadia uses 250 g flour, 125 g sugar, 100 g butter and 3 eggs.

Write this ratio in its simplest form.

\[ \text{Answer (a)} \quad \frac{\text{flour}}{\text{sugar}} : \frac{\text{sugar}}{\text{butter}} = \frac{250}{125} : \frac{125}{100} \]

(b) The table shows the cost of ingredients.

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>500 g flour</td>
<td>1.20</td>
</tr>
<tr>
<td>500 g sugar</td>
<td>1.40</td>
</tr>
<tr>
<td>250 g butter</td>
<td>2.00</td>
</tr>
<tr>
<td>6 eggs</td>
<td>0.90</td>
</tr>
</tbody>
</table>

(i) Find the total cost of the ingredients which Nadia uses to make 10 cupcakes.

\[ \text{Answer (b)(i)} \quad \$ \quad \text{...........................} \]

(ii) Find the cost of making one cupcake.

\[ \text{Answer (b)(ii)} \quad \$ \quad \text{...........................} \]

(iii) Nadia sells the cupcakes at the school bake sale for $0.50 each.
Find the profit she makes on one cupcake.

\[ \text{Answer (b)(iii)} \quad \$ \quad \text{...........................} \]

(iv) Calculate the percentage profit on one cupcake.

\[ \text{Answer (b)(iv)} \quad \% \quad \text{...........................} \]
This shape is drawn on a 1 cm² grid.

(a) Draw the line of symmetry on this shape. [1]

(b) Find the area of this shape in square centimetres.

Answer(b) ....................................................... cm² [2]

(c) Use Pythagoras’ Theorem to help you calculate the perimeter of this shape.

Answer(c) ....................................................... cm [4]

(d) Write your answer to part (c) in metres.

Answer(d) ....................................................... m [1]
The diagram shows a regular polygon.

(a) Write down the mathematical name for this polygon.

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

(b) Calculate the value of $x$.

Answer(b) ................................................................. [3]

9

15, 11, 7, 3, …

(a) Write down the next two numbers in this sequence.

Answer(a) ...................... , ................................. [2]

(b) Find an expression for the $n$th term of this sequence.

Answer(b) ................................................................. [2]
(a) Plot and label the points $A(-2, 6)$ and $B(3, 1)$ and join them with a straight line. [2]

(b) Calculate the length of $AB$.

Answer(b) ................................................................. [3]

(c) Find the gradient of $AB$.

Answer(c) ................................................................. [2]

(d) Find the equation of the line parallel to $AB$ passing through the point $(0, 1)$.

Give your answer in the form $y = mx + c$.

Answer(d) $y =$ ................................................................. [2]
Sateja tests seven candles to find the time they take to burn. The price, in dollars, and the time, in hours, are shown in the table.

<table>
<thead>
<tr>
<th>Price ($)</th>
<th>1.00</th>
<th>1.50</th>
<th>2.00</th>
<th>2.50</th>
<th>5.00</th>
<th>7.50</th>
<th>10.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time (hours)</td>
<td>15</td>
<td>23</td>
<td>31</td>
<td>42</td>
<td>75</td>
<td>135</td>
<td>170</td>
</tr>
</tbody>
</table>

(a) Complete the scatter diagram. The first 4 points have been plotted for you.
(b) What type of correlation does your scatter diagram show?

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

(c) (i) Find the mean price.

Answer(c)(i) $ ............................................................. [1]

(ii) Find the mean time.

Answer(c)(ii) ............................................................ hours [1]

(iii) Plot the mean point on the scatter diagram. [1]

(iv) On the diagram, draw a line of best fit by eye. [2]

(d) Use your line of best fit to estimate the time taken to burn a candle that costs $6.50.

Answer(d) ................................................................. hours [1]
f(x) = 2x^3 + 5x^2 - 2x - 5

(a) On the diagram, sketch the graph of y = f(x) for −3 ≤ x ≤ 2. [2]

(b) Find the zeros of f(x).

Answer (b)  

x = 

x = 

x = [2]
(c) Find the co-ordinates of the local maximum and local minimum points.

Answer(c) Maximum ( ........................ , ............... )

Minimum ( ........................ , ............... ) [2]

(d) Write down the number of solutions to the equations

(i) \( f(x) = 8 \),

Answer(d)(i) .......................................................... [1]

(ii) \( f(x) = 2 \).

Answer(d)(ii) .......................................................... [1]

Question 13 is printed on the next page.
The diagram shows a quadrilateral $R$.

(a) Reflect $R$ in the line $x = 3$. Label the image $S$. [2]

(b) Translate the image $S$ by the vector $\begin{pmatrix} -2 \\ 4 \end{pmatrix}$. Label the image $T$. [2]

(c) Rotate the image $T$ through $180^\circ$ about the point $(3, 0)$. Label the image $U$. [2]

(d) The three images join $R$ to form one shape.

Write down the mathematical name for this shape.

$Answer(d)$ ................................................................. [1]