### 1st July

Bag A contains $5x$ coins.
Bag B contains $3x$ coins.
8 coins are taken from Bag B and put into Bag A
The ratio of coins in Bag A to Bag B is now 11:5
Work out the total number of coins.

<table>
<thead>
<tr>
<th>Bag A</th>
<th>Bag B</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>$5x$</td>
<td>$3x$</td>
<td>$8x$</td>
</tr>
</tbody>
</table>

Find the height of the cone.

The volume of the cone is $200\text{cm}^3$

A company employs 400 people.
25% of the employees earn under £27,000.
50% of the employees earn over £35,000.
The interquartile range of the earnings is £10,000.
The person who earns the most is paid £60,000.
The range of the earnings is £50,000.

Draw a box plot to show this information

Find $x$ and $y$

Find the area of the rectangle

<table>
<thead>
<tr>
<th>Base</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>$10\sqrt{3}$ cm</td>
<td>$5\sqrt{3}$ cm</td>
</tr>
</tbody>
</table>
**2nd July**

**Use the quadratic formula to solve** \(3x^2 + 2x - 7 = 0\)

Give your solutions correct to 2 significant figures.

**A block of ice loses 10% of its volume every minute.**

What percentage will be left after 5 minutes?

---

Work out angle BCD

Work out angle BOD

Work out angle OBD
### 3rd July

<table>
<thead>
<tr>
<th>Equation</th>
<th>Circle the equation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\begin{align*}
(x + 4)^2 & \equiv x^2 + 8x + 16 \\
(x + 4)^2 & < 10 \\
(x + 4)^2 & = x - 3 \\
\end{align*}

<table>
<thead>
<tr>
<th>A biology textbook has mass 1.1kg to the nearest 100g.</th>
<th>A shelf can safely hold 30kg of books.</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the greatest possible mass of 10 books?</td>
<td>How many books can safety be held by the shelf?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Write down the equation of the line that is perpendicular to ( y = 2x + 1 ) that passes through (0, 4)</th>
<th>Use the information in the histogram to complete the frequency table.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Write down the equation of the line that is perpendicular to \( y = 2x + 1 \) that passes through (0, 4) |

<table>
<thead>
<tr>
<th>Use the information in the histogram to complete the frequency table.</th>
</tr>
</thead>
</table>
| \begin{tabular}{|c|c|}
| weight \((w \text{ kg})\) & Frequency \hline
| 0 < \( w \leq 10 \) & 34 \hline
| 10 < \( w \leq 15 \) & 33 \hline
| 15 < \( w \leq 20 \) & \hline
| 20 < \( w \leq 40 \) & \hline
| 40 < \( w \leq 55 \) & 6 \hline
| \end{tabular} |

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4th July

Expand fully.

\[ x(x + 1)(x - 2) \]

Give your answer in terms of \( \pi \)

Find the volume of this sphere.

Henry has 20 apples in a crate. The masses of the apples are shown in the table.

<table>
<thead>
<tr>
<th>Mass, m grams</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 &lt; m ≤ 70</td>
<td>2</td>
</tr>
<tr>
<td>70 &lt; m ≤ 80</td>
<td>3</td>
</tr>
<tr>
<td>80 &lt; m ≤ 85</td>
<td>6</td>
</tr>
<tr>
<td>85 &lt; m ≤ 90</td>
<td>5</td>
</tr>
<tr>
<td>90 &lt; m ≤ 110</td>
<td>4</td>
</tr>
</tbody>
</table>

Draw a histogram to represent the data.

Henry takes two apples from the crate at random, without replacement.

Work out the probability that both apples are over 90g.
**5th July**

What is the probability of rolling a six, three times in a row on an ordinary dice?

---

Find the equation of the red line.

---

Find the area of the sector

---

Mr. Dixon is building a toy boat for his son. He has three different planks of wood to choose from.

If wood has a density under 1g/cm³, it will float.

Which plank of wood is the most suitable?

Explain your answer.

<table>
<thead>
<tr>
<th>Plank A</th>
<th>Plank B</th>
<th>Plank C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume = 750cm³&lt;br&gt;Mass = 900g</td>
<td>Volume = 0.0152m³&lt;br&gt;Mass = 7.6kg</td>
<td>Volume = 1000cm³&lt;br&gt;Mass = 1.02kg</td>
</tr>
</tbody>
</table>
6th July

Timothy is taking part in an archery competition.

The probability of windy weather is 0.2

If it is windy, the probability of Timothy hitting the target is 0.35
If it is not windy, the probability of Timothy hitting the target is 0.8

Find the probability of Timothy hitting the target.

Find x and y

ABCDEF and GHIJKL are regular hexagons with centre O.
GHIJKL is an enlargement of ABCDEF, with scale factor 2.

Write down a vector for \( \overrightarrow{OE} \)

Write down a vector for \( \overrightarrow{LI} \)
Simplify fully
\[
\frac{x^2 - 4}{2x^2 - x - 6}
\]

A varies indirectly to \( C^3 \).

When \( A = 4 \), \( C = 2 \).

Find \( A \) when \( C = 3 \).

Find \( C \) when \( A = 10 \).

Describe fully the single transformation that maps shape A onto shape B.

The line passing through (1, \( p \)) and (5, 1) has a gradient of \( \frac{3}{4} \).

Find the value of \( p \).
Lenny is drawing a histogram.
Calculate each frequency density.

<table>
<thead>
<tr>
<th>length, L, cm</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 &lt; L ≤ 10</td>
<td>21</td>
</tr>
<tr>
<td>10 &lt; L ≤ 20</td>
<td>11</td>
</tr>
<tr>
<td>20 &lt; L ≤ 30</td>
<td>31</td>
</tr>
<tr>
<td>30 &lt; L ≤ 40</td>
<td>12</td>
</tr>
<tr>
<td>40 &lt; L ≤ 50</td>
<td>25</td>
</tr>
</tbody>
</table>

Calculate the area of this sector.

Simplify fully
\[ \sqrt[5]{\frac{50\pi a^5}{2\pi a^3}} \]
Find x, y and z

M is directly proportional to the square of A.

When M = 200, A = 2.

Find M when A = 4.

Simplify

\[
\frac{a^{\frac{1}{5}} \times a^{\frac{2}{3}}}{a^{\frac{3}{5}}}
\]
A rectangle is drawn inside of a circle with centre O. The rectangle is 4cm by 3cm. Find the shaded area.

Write down the value of the interquartile range

Construct the angle bisector of angle ABC

Shade the region which satisfies the conditions:
- Closer to AB than BC
- Closer to A than B.
The ages of golfers in two golf clubs, A and B, are shown above.

Make a comparison between the two clubs.

<table>
<thead>
<tr>
<th>What is the median of ages in golf club A?</th>
<th>What is the interquartile range of the ages in golf club B?</th>
</tr>
</thead>
</table>

Solve, giving your answers to 2 decimal places.

\[ x^2 - 10x + 3 = 0 \]

Make a the subject of:

\[ \frac{w(a + 4)}{a - 3} = 4 \]
### 12th July

#### Factorise fully.

\[ 36a^2 - 4y^2 \]

#### Sketch

\[ y = \frac{4}{x} \]

#### An online retailer normally sells clothes at 50% more than the cost price. In a sale the price of all clothes are reduced until they are only 5% more than the cost price. By what percentage of the original selling price have the price of the clothes been reduced?

#### Find x and y

A cube has the same volume as the cone shown. Find the side length of the cube.
<table>
<thead>
<tr>
<th>13th July</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simplify ((\sqrt{2})^5)</td>
</tr>
<tr>
<td>A item in a shop is increased in price by 20% and then decreased in price by 20% a month later. Is there an overall increase or decrease in price and by how much?</td>
</tr>
<tr>
<td>The length of a 80m running track is correct to the nearest metre. The time taken for Nicole to run the distance is 13.6 seconds measured to the nearest one-tenth of a second. What is the slowest possible average speed?</td>
</tr>
<tr>
<td>A helicopter takes off from town A and travels 10 miles on a bearing of 090° and then 15 miles on a bearing of 180° to land at town B. What is the bearing of B from A?</td>
</tr>
<tr>
<td>A football team obtains 3 points for a win, 1 point for a draw and no points for a loss. The team plays 3 matches. What is the probability of the team obtaining exactly 7 points?</td>
</tr>
</tbody>
</table>

For any match
- \(P(\text{win}) = 0.6\)
- \(P(\text{draw}) = 0.3\)
- \(P(\text{loss}) = 0.1\)
### 14th July

<table>
<thead>
<tr>
<th>Work out ((9.5 \times 10^6)^{-3})</th>
<th>Give your answer correct to 2 significant figures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make (m) the subject of (a(c + m) = 2(c + 3m))</td>
<td></td>
</tr>
</tbody>
</table>

\(\xi = \{\text{multiple of 3 between 1 and 29}\}\)

- \(A = \{3, 9, 21, 27\}\)
- \(B = \{3, 6, 9, 12, 15\}\)
- \(C = \{6, 9, 15, 18, 21\}\)

<table>
<thead>
<tr>
<th>Complete the Venn diagram</th>
</tr>
</thead>
</table>

A number is chosen at random from \(\xi\)

Find \(P(B \cup C)\)

Shane says the sine of an angle is 1.2

Explain why he is incorrect.
<table>
<thead>
<tr>
<th>15th July</th>
<th>5-a-day Higher</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Simplify</strong> $\sqrt{180}$</td>
<td></td>
</tr>
<tr>
<td>Find an estimate of how many girls scored under 30 marks.</td>
<td></td>
</tr>
<tr>
<td>Find an estimate of the percentage of boys who scored between 20 and 40 marks</td>
<td></td>
</tr>
<tr>
<td>Find $x$.</td>
<td></td>
</tr>
<tr>
<td>A logo is formed from 3 smaller triangles. What is the perimeter of the logo?</td>
<td></td>
</tr>
</tbody>
</table>

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16th July

A helicopter flies 15 miles north-east and then 25 miles south-east. How far, in a straight line, is the helicopter from its starting position?

Solve, giving your answers to one decimal place.

2x² − x − 9 = 0

Find the length of CE

\[ B = \frac{(x + 2)(x - 2)}{(x - 3)(x - 5)} \]

Find B when x = −2

When 0 < x < 2 decide if B is:

- B is positive
- B is negative
- B is zero
- B could be negative or positive
<table>
<thead>
<tr>
<th>17th July</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the size of each exterior angle of a regular 40 sided polygon?</td>
</tr>
<tr>
<td>What is the size of each interior angle of a regular 40 sided polygon?</td>
</tr>
</tbody>
</table>

**Simplify**

\[ \frac{4^3 \times 4^6}{4^2} \]

**Work out the size of angle CAB**

![Diagram of a triangle with sides 20 cm, 12 cm, and 7 cm.]

**Expand** \( \sqrt{5} (3\sqrt{2} - \sqrt{5}) \)
### 18th July

Triangles ABC and DEF are similar.

<table>
<thead>
<tr>
<th>Find the length of EF</th>
<th>Find the size of angle EDF</th>
</tr>
</thead>
</table>

What percentage of a distribution lies between the highest value and the upper quartile?

How is the interquartile range calculated?

The cost of a trip is directly proportional to the square root of the distance.

The cost is £600 when the distance is 900 miles.

Find a formula connecting the cost, C, and the distance, d.

Find the cost of a 400 mile trip.
19th July

Simplify

\[
\frac{2a + 12}{a^2 - 36}
\]

Tom is calculating the perimeter of the sector.
Can you spot any mistakes?

There are red, green, pink and white counters in a box.
There are an equal number of red and white counters.
There are ten times more green than white counters.
There are twice as many red than pink counters.

Jim takes a counter at random from the box.
Work out the probability than Jim takes a green counter.

A cylinder has radius \( y \) cm and height \( 2y \).
Write an expression for the volume of the cylinder.
20th July

Simplify $(\sqrt{5})^2$

Find $x$

Find $y$

Find $z$

Simplify $\sqrt{10} \times \sqrt{7} \times \sqrt{3}$

Mr Jones is an estate agent on the Isle of Man.

He has created this table to show information about the prices of houses he has sold. Explain how you know he has made a mistake.

<table>
<thead>
<tr>
<th>Median</th>
<th>£375,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>£235,000</td>
</tr>
<tr>
<td>Interquartile Range</td>
<td>£590,000</td>
</tr>
</tbody>
</table>

Find $x$
Write 0.3434343434... as a fraction

A group of students complete a puzzle.
Work out how many students took part?

A number is increased by 30% and then decreased by 25%. What is the overall percentage change?

A plant is 30cm tall when planted in a garden. It grows by 10% a week.
How long will it take to reach 1m tall?

Prism A has a cross-sectional area of 25cm²
Work out the volume of prism B.
### 22nd July

<table>
<thead>
<tr>
<th>length</th>
<th>width</th>
<th>Find the maximum possible perimeter</th>
</tr>
</thead>
<tbody>
<tr>
<td>14cm</td>
<td>5cm</td>
<td></td>
</tr>
</tbody>
</table>

A rectangle has a length of 14cm and width of 5cm, both to nearest centimetre.

<table>
<thead>
<tr>
<th>A maths textbook has mass 800g to the nearest 100g.</th>
<th>A shelf can safely hold 30kg of books.</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the greatest possible mass of 10 books?</td>
<td>How many books can safety be held by the shelf?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Simplify $\sqrt{75}$</th>
<th>Simplify $\sqrt{1000}$</th>
</tr>
</thead>
</table>

| Make $u$ the subject | |
|----------------------| |
| $v^2 = u^2 + 2as$    | |

<table>
<thead>
<tr>
<th>Harry invests £4000 in a savings account for 2 years at a rate of $X%$ interest per annum. At the end of the 2 years, Harry pays tax on the interest at a rate of 25%. After paying tax he gets £121.20</th>
<th>Work out the value of $X$</th>
</tr>
</thead>
</table>

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23rd July

\[ (4.2 \times 10^3) \times (3 \times 10^5) \]

\[ 2 \times 10^{11} \]

Find the equation of the straight line that would pass through AB.

Find x

Shown are the lengths of red and grey squirrels.

Compare the distributions.
### 24th July

**Without using a calculator, state if the answer is positive or negative**

\[
\frac{\sqrt[3]{500} - 60^2}{0.7 - 2}
\]

**Factorise**

\[
2x^2 + 3x - 2
\]

**Describe fully the single transformation that maps shape A onto shape B.**

A biased dice is rolled 3 times. The probability of a six is 0.8.

**What is the probability of 3 sixes?**

**What is the probability of at least 1 six?**
### 25th July

A football team plays two matches

A win is worth 3 points, a draw 1 point and a loss 0 points

Calculate the probability that the team scores at least 3 points over the two matches.

<table>
<thead>
<tr>
<th>first match</th>
<th>second match</th>
</tr>
</thead>
<tbody>
<tr>
<td>Win</td>
<td>Win</td>
</tr>
<tr>
<td>Draw</td>
<td>Draw</td>
</tr>
<tr>
<td>Lose</td>
<td>Lose</td>
</tr>
</tbody>
</table>

The cylinder and cube below have the same surface area. Find the side length of the cube, \( x \).

Find the length of \( AC \)

\( w \) is inversely proportional to \( c \) squared.

When \( w = 100 \), \( c = 5 \).

Find \( w \) when \( c = 4 \).
26th July

A recipe for a drink says “mix 3 parts orange juice with 8 parts lemonade.”

Victoria has 100ml of orange juice and 300ml of lemonade.

What is the maximum amount of the drink that she can make?

Find $x$

Enlarge $A$ by scale factor $-2$, centre $(2, 0)$ and label your shape $B$.

Make $a$ the subject of the formula

$10(a - 3c) = 4(w + a)$
<table>
<thead>
<tr>
<th>27th July</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Solve</strong> $2x^2 - 5x - 1 = 0$ using the quadratic formula.</td>
</tr>
<tr>
<td><strong>Find x.</strong></td>
</tr>
<tr>
<td><strong>Find the perimeter.</strong></td>
</tr>
<tr>
<td><strong>Find the area.</strong></td>
</tr>
<tr>
<td>Two ordinary fair dice are rolled.</td>
</tr>
<tr>
<td>Work out the probability that at least one of the dice does not land on a 2.</td>
</tr>
<tr>
<td>The distance of the moon to the Earth is 384,400 km.</td>
</tr>
<tr>
<td>The speed of light is $2.998 \times 10^8$ m/s.</td>
</tr>
<tr>
<td>Work out how long it will take light to travel from the moon to the Earth. Include suitable units.</td>
</tr>
</tbody>
</table>
There are 5 red and 5 green counters in a bag.

Kellie takes out a counter, replaces it and takes out another.

What is the probability of two reds?

On the grid, clearly label the region which satisfies all three inequalities below:

- $x > 0$
- $y \geq \frac{1}{2}x$
- $x + 2y < 4$

A is a point on two circles. The smaller circle is inside the larger circle.

The difference between the area of the smaller circle and the larger circle is $20\text{cm}^2$

The radius of the smaller circle is given by $r = \frac{5}{\pi} - 1 \text{ cm}$

The radius of the larger circle is $2\text{cm}$ greater than the radius of the smaller circle.
29th July

AB and AC are tangents. Find x.

Simplify
\[ \frac{x^2 + 3x - 4}{x^2 - 8x + 7} \]

Here is a rectangle and a regular octagon.

The length of the rectangle is 12cm longer than the width of the rectangle. The perimeter of the rectangle is equal to the perimeter of the octagon. 5 of the regular octagons are used to make a shape.

The perimeter of this shape is 132cm
Work out the area of the rectangle

Simplify
\[ 2\sqrt{3} \times 3\sqrt{300} \]
30th July

Factorise

4y² − 81

Calculate the distance XZ.

What is the bearing of Z from X?

What is the bearing of X from Z?

Expand and simplify

(x + 2)³

Write down a vector for \( \overrightarrow{BC} \)

AB and DC are parallel.

DC = 3AB
<table>
<thead>
<tr>
<th>31st July</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>168°</strong></td>
<td>How many sides does it have?</td>
</tr>
<tr>
<td>Shown is one angle from a regular polygon.</td>
<td></td>
</tr>
<tr>
<td>A is inversely proportional to $N^2$</td>
<td></td>
</tr>
<tr>
<td>When $A = 9$, $N = 2$.</td>
<td></td>
</tr>
<tr>
<td>Find $A$ when $N = 4$.</td>
<td></td>
</tr>
<tr>
<td>The length of a 200m running track is correct to the nearest metre.</td>
<td>What is the fastest possible average speed?</td>
</tr>
<tr>
<td>The time taken for Jenna to run the distance is 25.8 seconds measured to the nearest one-tenth of a second.</td>
<td></td>
</tr>
<tr>
<td>M is the midpoint of AB</td>
<td>Find the vector $\mathbf{AB}$</td>
</tr>
<tr>
<td>Find the vector $\mathbf{AM}$</td>
<td>Find the vector $\mathbf{OM}$</td>
</tr>
</tbody>
</table>