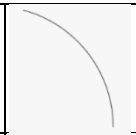
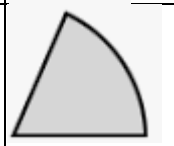
Year 10 Higher Unit Three Knowledge Organiser – Transformations, Construction and Loci and bearings, Solving Quadratic and Simultaneous Equations, Inequalities

| Transformations | | | |
|---|---|---|---|
| 1 | Congruent | Two shapes that are exactly the same size with the same angles. | |
| 2 | Similar | When one shape is an enlargement of another. The angles are the same size. | |
| 3 | Object | The shape that will be transformed. | |
| 4 | Image | The result produced after a shape has been transformed. | |
| 5 | Clockwise | A movement going in the same direction as clock hands. | |
| 6 | Anti-clockwise | A movement going in the opposite direction as clock hands. | |
| 7 | Full turn | $360°$ | |
| 8 | Half turn | $180°$ | |
| 9 | Quarter turn | $90°$ | |
| 10 | Three-quarter turn | $270°$ | |
| 11 | Transformation | An action that is carried out on a shape, like a reflection, rotation, translation, or enlargement. | |
| 12 | Type of transformation | Definition | In order to describe the transformation you need: |
| | a) Reflection | When a shape is reflected in a mirror line or line of symmetry. | Line of reflection |
| | b) Rotation | A turn around a point. | Centre of rotation<br>Angle<br>Direction |
| | c) Translation | A movement left, right, up, or down, on a coordinate grid. | Translation vector |
| | d) Enlargement | The process of making a shape bigger or smaller. | Center of enlargement<br>Scale factor |
| 13 | Column Vector | Is used to describe a translation | |
| | | $\begin{matrix} -Left \\ -Down \end{matrix} \begin{pmatrix} x \\ y \end{pmatrix} \begin{matrix} +Right \\ +Up \end{matrix}$ | |
| 14 | Scale Factor | The multiplying factor applied to an original object, in order to achieve an enlarged image. | |
| 15 | Invariant Points | Co-ordinates of a shape that do mot more under a transformation. | |

| Construction and Loci | | |
|---|---|---|
| 1 | Construct | To draw shapes, lines and angles accurately. |
| 2 | Loci (locus) | A point, line, or curve moving according to mathematically defined conditions. |
| 3 | Protractor | The equipment used to draw and measure angles. |
| 4 | (Pair of) Compass(es) | The equipment used to draw circles and arcs. |
| 5 | Bisect | To cut in half. |
| 6 | Perpendicular | Where two lines meet at 90°. |
| 7 | Equidistant | A point or points, that are the same distance from something at all times. |
| 8 | Region | An area that satisfies mathematical constraints. |
| 9 | Arc | Part of a circumference of a circle.  |
| 10 | Sector | The area between two radiuses and the connecting arc.  |

| Plans and Elevations | | |
|---|---|---|
| 1 | Face | Any flat surface of a 3D shape. |
| 2 | Edge | Where two faces meet. |
| 3 | Vertex | A point where two or more edges meet. |
| 4 | Plan | The view of a 3D object from above. |
| 5 | Elevation | The view of a 3D object from the side or front. |
| 6 | Congruent | Two shapes that are exactly the same size with the same angles. |

| Bearings |
|---|

Year 10 Higher Unit Three Knowledge Organiser – Transformations, Construction and Loci and bearings, Solving Quadratic and Simultaneous Equations, Inequalities

| | | | |
|---|---|---|---|
| 1 | Bearing | An angle measured from north in a clockwise direction. Must be written using 3 digits. | |
| 2 | Compass Points | North | 000° |
| | | East | 090° |
| | | South | 180° |
| | | West | 270° |
| 3 | Scale | The ratio of the length of the model, to the length of the real thing. | |

| Quadratic Equations | | | |
|---|---|---|---|
| 1 | Quadratic Graph | A curved graph. | |
| | | $y = ax^2 + bx + c$ | |
| | | Positive $ax^2$ | ′ ∪′ shape |
| | | Negative $ax^2$ | ′ ∩ ′ shape |
| 2 | Solve a Quadratic Equation | Finds the roots by.<br>1. Factorise<br>2. Complete the square<br>3. Use Quadratic Formula | |
| 3 | Roots of a Quadratic Equation | Were the graph cuts the x axis/ y = 0 | |
| 4 | Factorise a Quadratic | T – times<br>E – end<br>A – add<br>M – middle | |
| 5 | Complete the square | Write a quadratic in the form:<br>$(x + a)^2 + b$ | Finds the co-ordinate of the turning point.<br>$(-a, b)$ |
| 6 | Maximum Turning Point | Where the gradients of a graph changes from positive to negative. | |
| 7 | Minimum Turning Point | Where the gradients of a graph changes from negative to positive. | |
| 8 | Quadratic Formula | $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ | |
| 9 | Y – intercept | The point in which the graph crosses the y axis. (c) | |

| Simultaneous Equations | | |
|---|---|---|
| 1 | Simultaneous equations | Two or more equations that have the same solution to their variables. |
| 2 | Elimination | To remove a variable |
| 3 | Substitute | Replacing a variable with a numerical value. |
| 4 | Process used to eliminate - DASS | If the signs are …<br>D – different<br>A - add<br>S – same<br>S - subtract |

| Inequalities | | | |
|---|---|---|---|
| 1 | Inequality | Comparing two values that are not equal to each other. | |
| 2 | Does not equal | ≠ | |
| 3 | $x$ is less than | $x <$ | Represented by a ○ on a number line. |
| 4 | $x$ is greater than | $x >$ | |
| 5 | $x$ is less than or equal to | $x \leq$ | Represented by a ● on a number line. |
| 6 | $x$ is greater than or equal to | $x \geq$ | |