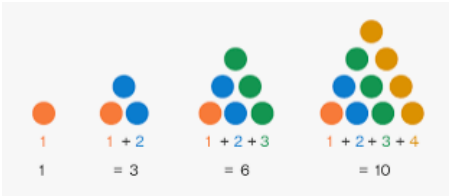
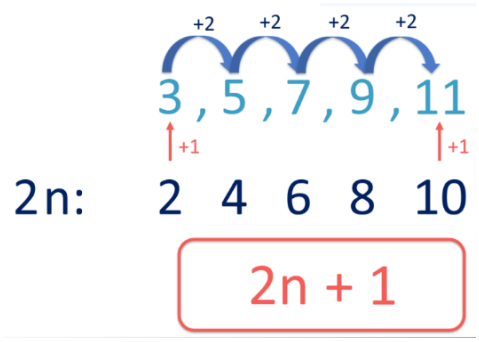
# ‘Sequences’

## The Knowledge for Progression:

- To know that an arithmetic sequence is where the terms increase or decrease by the same number each time.
- To know that “n” is the position of a value in the sequence.
- To know that “n” is always a positive integer.
- To know that a quadratic sequence is linked to square numbers.
- To know that a geometric sequence is where each term is generated by multiplying by a constant amount.
- To know that terms in a triangular sequence are generated by adding consecutive numbers, starting from 1.
- To know that the terms in a Fibonacci sequence are generated by adding the two previous terms.

## Speak Like a Mathematician

| Key Word | Dual Coding | Definition |
|---|---|---|
| **Sequence** | 2, 4, 8, 16 … | A set of values or diagrams that follow a pattern |
| **Term** | Term: 1 2 3 4<br>  <br>Term: 1 2 3 4 5 | The position of a value or diagram in a sequence |
| **Term-to-term rule** | 2, 4, 8, 16, 32<br>X2 X2 X2 X2 | The way that you obtain the next term of a sequence using the previous term |
| **Arithmetic sequence** | 3, 7, 11, 15<br>+4 +4 +4 | Terms are generated by adding or subtracting a constant amount.<br>This can also be called an arithmetic progression. |
| **Geometric sequence** | 3, 12, 48, 194<br>X4 X4 X4 | Terms are generated by multiplying by a constant amount.<br>This can also be called a geometric progression. |
| **Triangular sequence** |  <br> | Terms are generated by adding consecutive numbers, starting from 1 |
| **Fibonacci sequence** | 1, 1, 2, 3, 5, 8, 13<br>+ + + + + + | Terms are generated by adding the two previous terms |

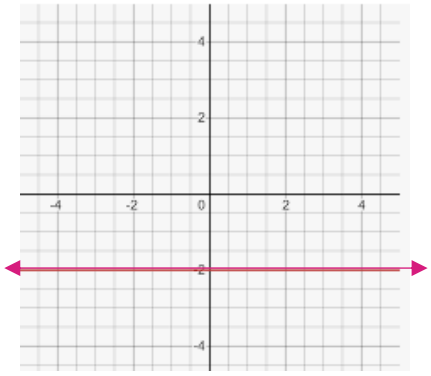
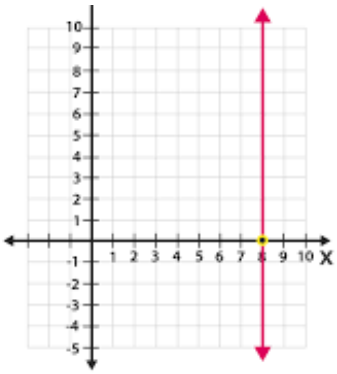
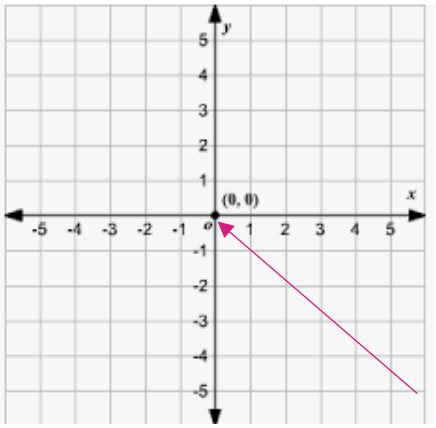
| | | |
|---|---|---|
| **Nth term** |  | Relates to the rule of a sequence where ‘n’ represents the position of the term, starting the count of terms from the first term. |

# ‘Introduction to linear graphs’

## The Knowledge for Progression:

- To know that a coordinate is in the form (X,Y)
- To know that straight lines are continuous

## Speak Like a Mathematician

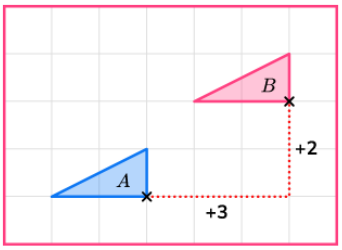
| Key Word | Dual Coding | Definition |
|---|---|---|
| **Horizontal** |  | In a left to right direction. Parallel to the x-axis |
| **Vertical** |  | In a down to up direction. Parallel to the y-axis |
| **Origin** |  | The intersection of the y and x-axis. Taking the coordinate (0,0) |

# ‘Translations’

## The Knowledge for Progression:

- To know that a translation is horizontal and vertical movement of a shape
- To know that a column vector describes a movement e.g. ADD VECTOR
- To know that the top value of a column vector represents the horizontal movement
- To know that the bottom value of a column vector represents the vertical movement
- To know that movements up and down are represented by a positive value
- To know that movements left and down are represented by a negative value

## Speak Like a Mathematician

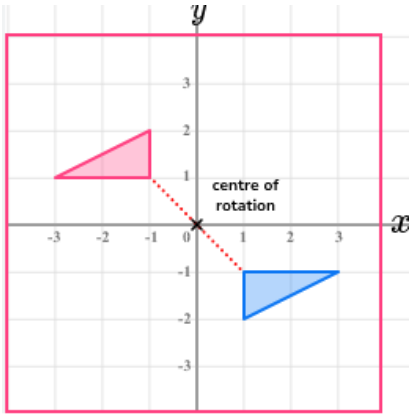
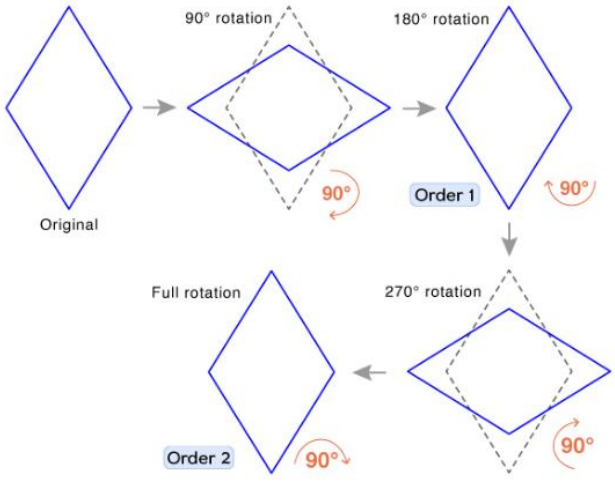
| Key Word | Dual Coding | Definition |
|---|---|---|
| **Translate** |  | To translate means to move every point of an object in the same direction |
| **Column vector** | $\begin{pmatrix} 3 \\ 2 \end{pmatrix}$ $is$ $\begin{pmatrix} 3\ right \\ 2\ up \end{pmatrix}$ | Describes the movement of a translation |

# ‘Rotation’

## The Knowledge for Progression:

- To know that a rotation is the turning of a shape around a centre of rotation
- To know that the centre of rotation is the fixed point which you rotate the shape about
- To know that rotational symmetry is the property a shape has when it looks the same after a partial turn
- To know that the order of rotational symmetry is the number of times the shape fits exactly into itself during a full rotation of 360°

## Speak Like a Mathematician

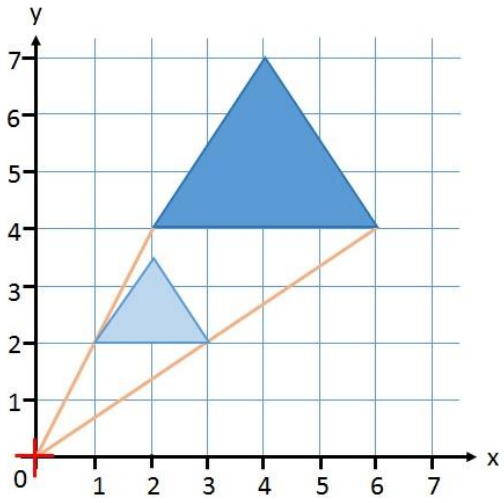
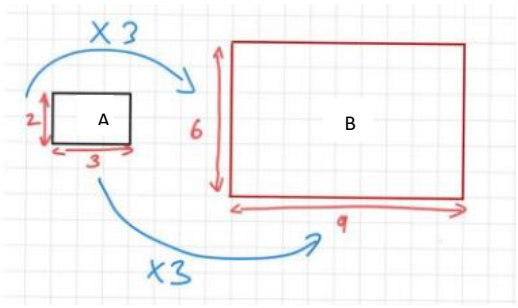
| Key Word | Dual Coding | Definition |
|---|---|---|
| **Rotation** |  | The turning of a shape around a centre of rotation |
| **Centre of rotation** | | The fixed point which you rotate the shape about |
| **Rotational symmetry** |  | A property of a shape when it looks the same after a partial turn |
| **Order of rotational symmetry** | | The number of times the shape fits exactly into itself during a full 360° rotation |

# ‘Enlargements’

## The Knowledge for Progression:

- To know that an enlargement changes the size of a shape in proportion.
- To know that a scale factor describes how much the shape is enlarged by.
- To know that the centre of enlarge is the point from which a shape is enlarged.

## Speak Like a Mathematician

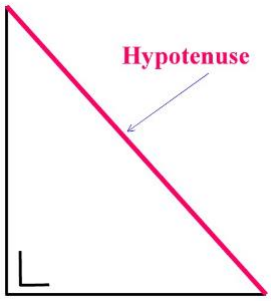
| Key Word | Dual Coding | Definition |
|---|---|---|
| **Enlargement** |  | A transformation in which lengths are multiplied whilst directions and angles remain the same. |
| **Scale Factor** |  Shape A has been enlarged into shape B by a ratio of 1:3 | The ratio of corresponding edge lengths |

# ‘Pythagoras’

## The Knowledge for Progression:

- To know that Pythagoras’ theorem can only be applied to right-angled triangles. It involves all three sides of the triangle
- To know that the hypotenuse of a triangle is opposite the right-angle. This will always be the longest side of the triangle
- To know $a^2 + b^2 = c^2$ where a and b represent the shorter sides of a triangle

## Speak Like a Mathematician

| Key Word | Dual Coding | Definition |
|---|---|---|
| **Hypotenuse** |   | The longest length of a right-angled triangle. Always opposite the right-angle |

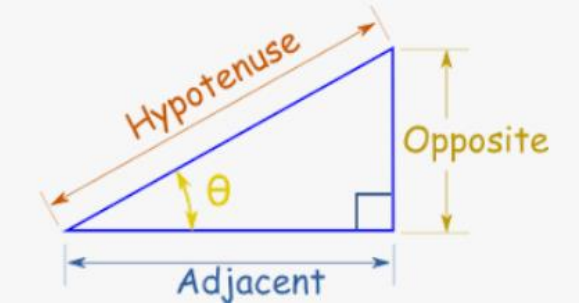
# ‘Trigonometry’

## The Knowledge for Progression:

- To know that trigonometry can only be applied to right-angled triangles where two sides and one angle are involved
- To know that you can label the sides hypotenuse, adjacent and opposite
- To know that the hypotenuse of a triangle is opposite the right-angle. This will always be the longest side of the triangle
- To know that the opposite side is opposite the angle involved (not the right-angle)
- To know that the adjacent side is next to the angle but is not the hypotenuse
- To know that

, $Sin(angle) = \frac{Opposite}{Hyoptenuse}$ $Cos(angle) = \frac{Adjacent}{Hypotenuse}$ $Tan(angle) = \frac{Opposite}{Adjacent}$

## Speak Like a Mathematician

| Key Word | Dual Coding | Definition |
|---|---|---|
| **Hypotenuse** |  | The longest length of a right-angled triangle. Always opposite the right-angle |
| **Opposite** | | The length opposite the angle involved (not the right angle) |
| **Adjacent** | | The length next to the right angle, but not the hypotenuse |