Kemnal Technology College

Year 11 Kemnal Keys: Term 2

ambitious minds

Interpretation of Graphs (H/F)

1. **Distance time graphs –** provide information about how far someone or something has travelled over a given period of time

2. **Average speed** can be calculated from a distance time graph:

   Average speed = Total distance travelled / Total time taken

3. **Speed** is given by the gradient of the line: the steeper the gradient the faster the speed.

4. **Velocity time graphs** - provide information about the change in speed over **time.**

5. **A positive** gradient means speed is **increasing** a horizontal line (**zero** gradient) means speed is **constant** and a **negative** gradient means speed is decreasing

6. You can work out **Distance travelled** by calculating the area under the graph.

Transformations (H/F)

1. **Translation - congruent**
   Enlargement – not congruent
   Reflection - congruent
   Rotation - congruent
   You can have more than one!
2. **Translation:** means to move a shape. The shape does not change size or orientation.
   - **Column Vector**: In a column vector, the top number moves left (-) or right (+) and the bottom number moves up (+) or down (-)
3. **Enlargement:** Changes the size of a shape making it bigger or smaller (determined by the scale factor), therefore not congruent
   - It always has **a Centre of Enlargement**: the distance of each point on the enlarged shape to the **CoE** is equal to the original distance multiplied by the scale factor.
   - A **negative scale factor** will result in the shape being inverted and moved to the opposite side of the CoE **(H)**
4. **Reflection :** from a mirror line. The original and reflected shapes are equal distance to the mirror line. Reflected shape are perpendicular to the mirror line.
5. **Rotation:** Turning a shape about a fixed point; the centre of rotation; a direction and degrees must be given.

Transforming Functions (H)

In general f(x + a) gives a translation by the vector $\begin{pmatrix} -a \\ 0 \end{pmatrix}$

In general f(x) + a gives a translation by the vector $\begin{pmatrix} 0 \\ a \end{pmatrix}$

In general f(x + a) + b gives a translation by the vector $\begin{pmatrix} -a \\ b \end{pmatrix}$

The graph of kf(x) gives a stretch of f(x) by scale factor k in the y direction.

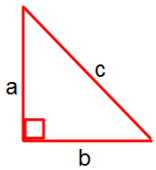
The graph of f(kx) gives a stretch of f(x) by scale factor 1/k in the x direction.

Pythagorus (H/F)

1. **Use pythagorus theorem** to find **missing sides** in right-angle triangles.

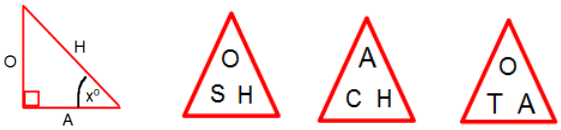
   $a^2 + b^2 = C^2$

   $a^2 = C^2 - b^2$
   $b^2 = C^2 - a^2$



2. **Use pythagorus theorem** to find the height of an isosceles triangle.

SOHCAHTOA (H/F)



1. **Use SOHCAHTOA** to find **missing angles and sides** in Right-angle triangles

Sin x = opposite / hypotenuse **cosine x = Adjacent / hypotenuse** **tan x = opposite / adjacent**

To find the **angle x°** you must use the **inverse function:**

Sin $^{-1}$ x: cosine^{-1} x: tan^{-1} x

Other Trig rules (H)

1. To find the area of a triangle:

Area = ½ ab sin C

2. To find sides or angles in any triangle use:

Cosine rule: Cos C = $\frac{a^2 + b^2 - c^2}{2ab}$

Sine rule:

$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$