# GCSE : Higher Paper : Formulae and Other Things to Learn

$P = 4l$ — Perimeter of a Square

$P = 2l + 2w$ — Perimeter of a Rectangle

$A = l^2$ — Area of a Square

$A = lw$ — Area of Rectangle

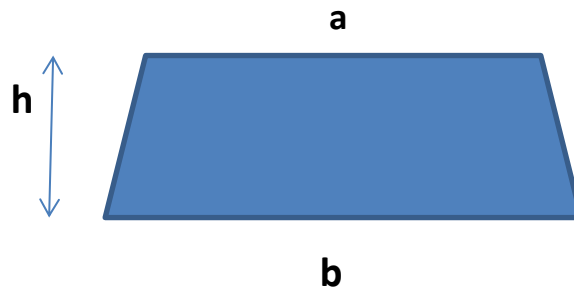$A = \dfrac{bh}{2}$ — Area of a Triangle

$A = \pi r^2$ — Area of Circle

$C = \pi D$ — Circumference of a Circle
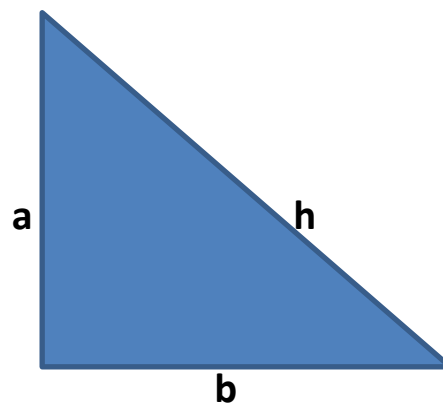
$A = \dfrac{(a+b)h}{2}$ — Area of Trapezium

$A = lh$ — Area of parallelogram

$h^2 = a^2 + b^2$ — Pythagoras' theorem: Right-angled Triangles

$$S = \frac{D}{T}$$ Constant or Average Speed

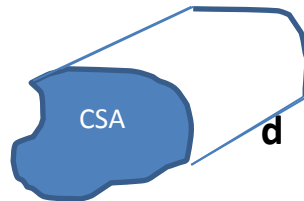**Gradient or slope of Dist/Time graph gives speed.**

$$V = l^3$$ Volume of a Cube

$$V = lbh$$ Volume of a Cuboid

$$V = CSA \times d$$ Volume of a Prism



$$D = \frac{Weight}{Volume}$$ Density

$$V = \pi r^2 h$$ Volume of a Cylinder

$$V = \frac{\pi r^2 h}{3}$$ Volume of a Cone

$$V = \frac{4\pi r^3}{3}$$ Volume of a Sphere

$$A = 4\pi r^2$$ Surface Area of a Sphere

## Quadratic Equations

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$ Quadratic Formula

# Right-Angled Trigonometry

$$Sinx = \frac{o}{h}$$

$$Cosx = \frac{a}{h}$$  <span style="color:red">**SOH\CAH\TOA**</span>

$$Tanx = \frac{o}{a}$$

# Non Right-Angled Trigonometry

**Sine Rule**

$$\frac{a}{SinA} = \frac{b}{SinB} = \frac{c}{SinC}$$

**Cosine Rule**

$$a^2 = b^2 + c^2 - 2bcCosA$$

**Area of a Triangle**

$$A = \frac{abSinC}{2}$$

# Formulae with Graphs

**Slope or Gradient of a Straight Line**

$$m = \frac{height}{base}$$

**Mid-Point of a Line Joining 2 Points**

$$M(\underline{x_1 + x_2}\ ,\ \underline{y_1 + y_2})$$

$$2 \qquad 2$$

# Money Formulae

$$I = \frac{PTR}{100}$$

**Simple Interest**

**Final Total = 500 x 1.07**        **Increase £500 by 7%**

**Final Total = 500 x 1.23**        **Increase £500 by 23%**

**Final Total = 500 x 1.70**         **Increase £500 by 70%**

$$Total = P \times (1 + \frac{x}{100})$$        **Increase £P by x%**

**Final Total = 500 x 0.93**        **Decrease £500 by 7%**

**Final Total = 500 x 0.77**        **Decrease £500 by 23%**

**Final Total = 500 x 0.30**        **Decrease £500 by 70%**

$$Total = P \times (1 - \frac{x}{100})$$        **Decrease £P by x%**

# Bearings
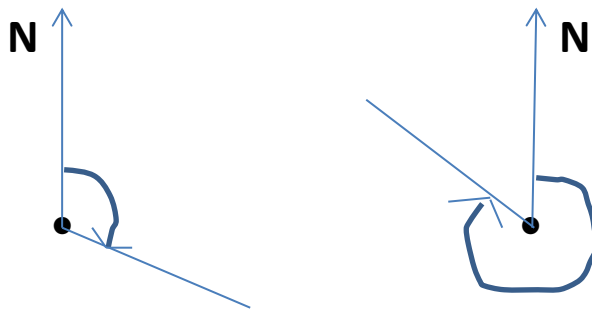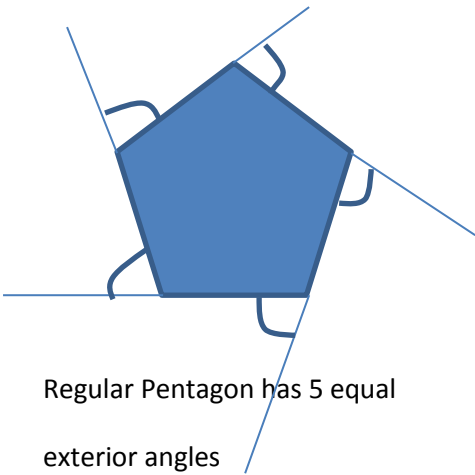
Regular Pentagon has 5 equal

exterior angles

$$\text{Each exterior} = \frac{360}{5}$$

$$= 72°$$
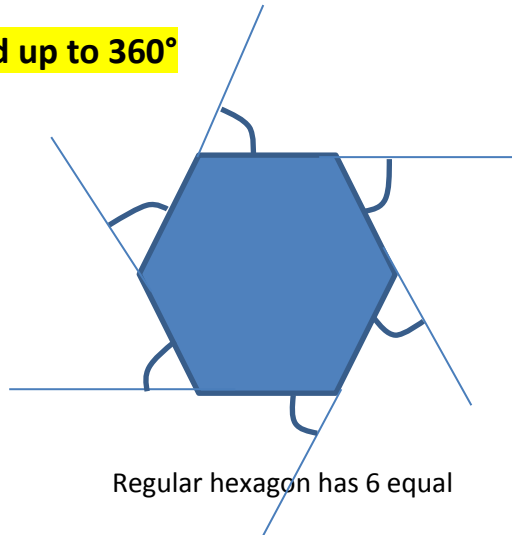
Regular hexagon has 6 equal

$$\text{Each exterior} = \frac{360}{6}$$

$$= 60°$$

**For an x-sided regular shape(polygon)**

$$\text{Each exterior} = \frac{360°}{x}$$

# Averages

Mode is the most common item in the list.

Median: Put numbers in ascending order and then pick out the central one.

$$\textbf{Mean} = \frac{Total}{Number\ of\ things\ added}$$