

Laws of Indices

$$y^a \times y^b = y^{a+b} \quad y^a \div y^b = y^{a-b} \quad y^0 = 1$$

$$(y^a)^b = y^{a \times b} \quad y^{-n} = \frac{1}{y^n} \quad y^{a/b} = \sqrt[b]{y^a}$$

Congruent Triangles: SSS, SAS, ASA or RHS

Estimating Mean from a table

Create 2 extra columns, one for midpoint and the other for midpoint x frequency. Find the total for mp x f and divide by total frequency.

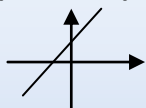
Solving Quadratics:

first rearrange into $ax^2 + bx + c = 0$ then...

- **Factorise** put into 2 brackets and one of the brackets must = 0
- **Complete the Square** $(x + a)^2 - b = 0$
- **Use the Formula**

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

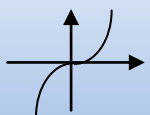
Types of Graph



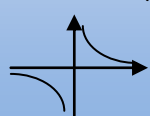
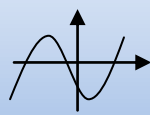
Linear ($y=mx+c$)



Quadratic (contains x^2)



Cubic (contains x^3)



Reciprocal (Look for $1/x$)

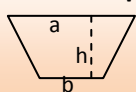


Circle ($x^2+y^2=r^2$)

$y = mx + c$

$m =$ gradient $c =$ y-intercept
 gradient (steepness) = $\frac{\text{change in } y}{\text{change in } x}$

Area of a Trapezium (LEARN this)



Area = $\frac{1}{2} (a + b) h$

Simultaneous Equations

Linear eg $2x + 3y = 1$
 $3x - 5y = 11$

Make y terms (or x) equal
Same Signs Subtract
Different Signs Add

Quadratic and Linear

Make y (or x) the subject in the linear equation
 Substitute into the quadratic equation and solve
Remember to work out the value of both letters

Surds

$$\sqrt{a} \times \sqrt{a} = a \quad \sqrt{a} \times \sqrt{b} = \sqrt{a \times b} \quad \frac{\sqrt{a}}{\sqrt{b}} = \sqrt{\frac{a}{b}}$$

Displaying Statistics:

Histograms – remember that the frequency is given by the **area of each bar** not the height. Use the clues given in the question to label the area or to find frequency densities.

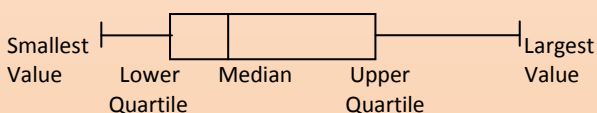
Frequency Density = Frequency ÷ Class Width

Frequency Polygons – plot each frequency against the mid-point of the group and join them with straight lines. Don't forget to join to the horizontal axis.

Scatter Graphs – positive or negative correlation? You must draw a **line of best fit** when asked to estimate a value.

Cumulative Frequency- add up frequencies as you go and plot against the **top** of each group

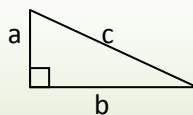
Box Plots



To compare 2 box plots make 1 comment about medians and 1 comment about ranges (or IQR)

Triangles:

Right-angled



3 sides use Pythagoras

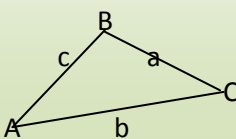
$$a^2 + b^2 = c^2$$

2 sides and an angle use SOHCAHTOA

Area = base x height ÷ 2

Not right-angled

2 sides, 2 angles use **Sine Rule**



3 sides, 1 angle use **Cosine Rule**

$$\text{Area} = \frac{1}{2} ab \sin C$$

Angle Rules:

Angles in the same segment are equal



Angle in a semicircle is 90°



Angle in the centre is double the angle at the circumference

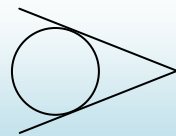
Angle between radius and tangent is 90°



Opposite angles in a cyclic quadrilateral add up to 180°



Alternate Segment Theorem



Tangents meeting at a point are equal in length