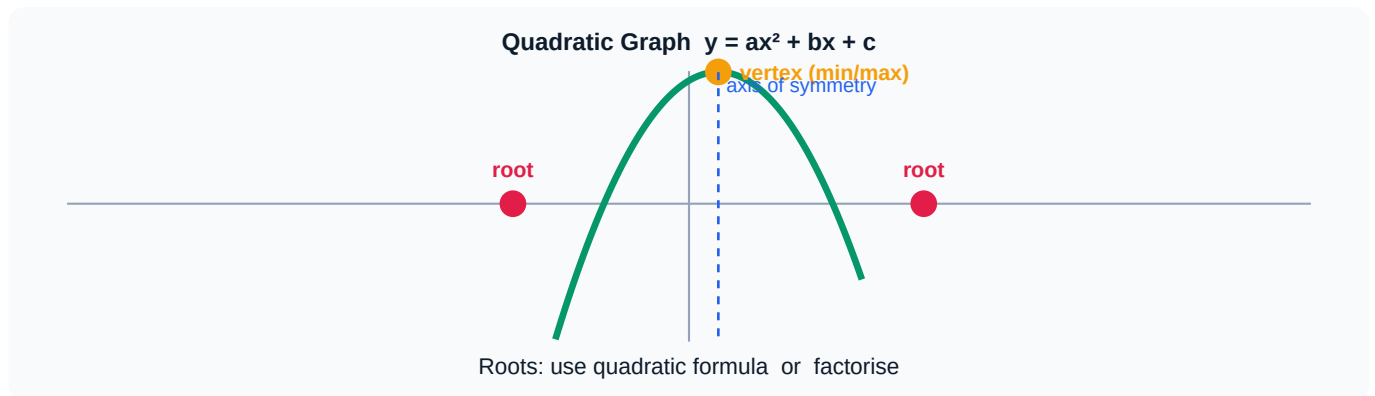


GCSE Maths

Essential Formulas, Diagrams & Exam Tips | StudyVault

■ Algebra

Topic	Formula / Rule	Notes
Quadratic formula	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	$ax^2 + bx + c = 0$
Diff. of squares	$(a+b)(a-b) = a^2 - b^2$	
Complete the square	$x^2 + bx = (x + b/2)^2 - (b/2)^2$	
Index: multiply	$a^m \times a^n = a^{m+n}$	
Index: divide	$a^m \div a^n = a^{m-n}$	
Negative index	$a^{-n} = 1/a^n$	
Fractional index	$a^{1/n} = \text{nth root of } a$	



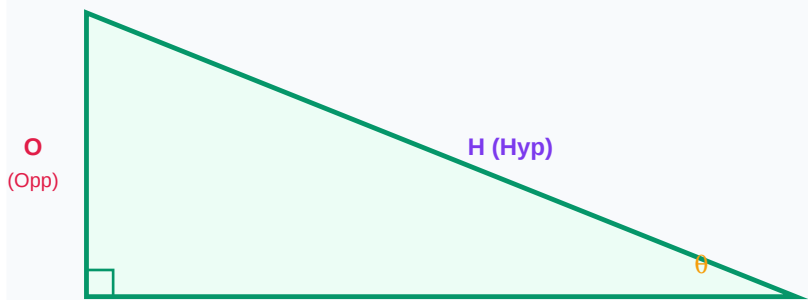
Exam tip: Write the bracket BEFORE filling it in — missing brackets are the #1 mark-losing mistake at GCSE.

■ Geometry & Measures

Shape	Area	Other	Shape	Volume	Notes
Circle	$\pi \times r^2$	$C = 2\pi r$	Sphere	$\frac{4}{3} \times \pi r^3$	$SA = 4\pi r^2$
Triangle	$\frac{1}{2} \times b \times h$	or $\frac{1}{2} \times \text{side} \times \sin(C)$	Cylinder	$\pi r^2 h$	
Trapezium	$\frac{1}{2}(a+b)h$		Cone	$\frac{1}{3}\pi r^2 h$	curved $SA = \pi r l$
Sector	$\frac{\theta}{360} \times \pi r^2$	$\text{arc} = \frac{\theta}{360} \times 2\pi r$	Pyramid	$\frac{1}{3} \times \text{base} \times h$	

■ Trigonometry

SOH-CAH-TOA — Right-Angled Triangle



$\sin\theta = O \div H$
 $\cos\theta = A \div H$
 $\tan\theta = O \div A$

Not right-angled? → Use Sine Rule or Cosine Rule
(Adj)

Rule	Formula	Use when	Rule	Formula	Use when
SOH	$\sin\theta = O/H$	Right-angle	Sine rule	$a/\sin(A) = b/\sin(B)$	Any triangle
CAH	$\cos\theta = A/H$	Right-angle	Cosine rule	$a^2=b^2+c^2-2bc \cos(A)$	Any triangle
TOA	$\tan\theta = O/A$	Right-angle	Pythagoras	$a^2+b^2=c^2$	Right-angled only