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WJEC EDUQAS GCSE (9-1) MATHEMATICS

FORMULA, METHODS & EXACT VALUES HANDBOOK

Current exam-aid regime | selection, use, checks and common traps

Qualification	Eduqas C300QS Foundation C300PF Higher C300PH
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FORMULAE • METHODS • CHECKS

Current exam-aid regime

Eduqas states that an Additional Formulae Sheet is integrated into GCSE Mathematics examination papers from summer 2026. The qualification page identifies separate Foundation and Higher sheets. Students still need to recognise when a relationship applies, substitute accurately, rearrange when needed and interpret the result.

Formula selection protocol

1. Name the quantity you are trying to find.
2. List the quantities you know, with units.
3. Choose a relationship containing those quantities and no unnecessary unknowns.
4. Substitute before calculating; rearrange symbolically when it reduces error risk.
5. Check units, scale and sign; then round only to the requested accuracy.

01. Area of trapezium

Tier	Foundation
Relationship	$A = \frac{1}{2}(a+b)h$
Conditions / symbols	a,b are parallel sides; h is perpendicular separation
Selection & method	Add parallel sides, multiply by perpendicular height, halve.
Common trap	Forgetting that h must be perpendicular.
Check	Substitute the result back where possible; verify dimensions/units and whether the magnitude is plausible.

Independent worked example: Parallel sides 8 cm and 14 cm, height 5 cm: $A = \frac{1}{2}(22)(5) = 55 \text{ cm}^2$.

02. Volume of a prism

Tier	Foundation
Relationship	$V = \text{area of cross-section} \times \text{length}$
Conditions / symbols	Use a constant cross-section
Selection & method	Find the cross-sectional area first, then multiply by prism length.
Common trap	Using surface area instead of cross-section.
Check	Substitute the result back where possible; verify dimensions/units and whether the magnitude is plausible.

Independent worked example: Create a fresh practice example using sensible values and complete the full substitution, units and check.

03. Circle circumference

Tier	Foundation
Relationship	$C = 2\pi r = \pi d$
Conditions / symbols	r radius, d diameter
Selection & method	Choose whichever form matches the information given.
Common trap	Using area formula for circumference.
Check	Substitute the result back where possible; verify dimensions/units and whether the magnitude is plausible.

Independent worked example: Create a fresh practice example using sensible values and complete the full substitution, units and check.

04. Circle area

Tier	Foundation
Relationship	$A = \pi r^2$
Conditions / symbols	r radius
Selection & method	Square the radius before multiplying by π .
Common trap	Squaring πr rather than r.
Check	Substitute the result back where possible; verify dimensions/units and whether the magnitude is plausible.

Independent worked example: Create a fresh practice example using sensible values and complete the full substitution, units and check.

05. Pythagoras

Tier	Foundation
Relationship	$a^2 + b^2 = c^2$
Conditions / symbols	c is hypotenuse in a right triangle
Selection & method	Identify hypotenuse first; rearrange only after substituting known sides.
Common trap	Using on a non-right triangle.
Check	Substitute the result back where possible; verify dimensions/units and whether the magnitude is plausible.

Independent worked example: Legs 6 cm and 8 cm: $c = \sqrt{(36+64)} = 10$ cm.

06. Right-angle trigonometry

Tier	Foundation
Relationship	$\sin A = \text{opp/hyp}$; $\cos A = \text{adj/hyp}$; $\tan A = \text{opp/adj}$
Conditions / symbols	Right-angled triangle and angle A
Selection & method	Label O/A/H relative to the chosen angle, select ratio, solve.
Common trap	Labels not relative to working angle.
Check	Substitute the result back where possible; verify dimensions/units and whether the magnitude is plausible.

Independent worked example: Create a fresh practice example using sensible values and complete the full substitution, units and check.

07. Compound growth

Tier	Foundation
Relationship	Total = $P(1+r/100)^n$
Conditions / symbols	P initial amount, r percentage per period, n periods
Selection & method	Convert percentage to multiplier and raise to number of periods.
Common trap	Using simple interest repeatedly.
Check	Substitute the result back where possible; verify dimensions/units and whether the magnitude is plausible.

Independent worked example: £800 grows by 3% for 4 years: $800(1.03)^4 \approx \text{£}900.41$.

08. Probability addition

Tier	Foundation
Relationship	$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$
Conditions / symbols	General union rule
Selection & method	Add both probabilities and subtract overlap once.
Common trap	Double-counting intersection.
Check	Substitute the result back where possible; verify dimensions/units and whether the magnitude is plausible.

Independent worked example: Create a fresh practice example using sensible values and complete the full substitution, units and check.

09. Quadratic formula

Tier	Higher
Relationship	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
Conditions / symbols	For $ax^2 + bx + c = 0$
Selection & method	Rearrange to zero, identify a,b,c including signs, substitute carefully.
Common trap	Forgetting $\pm$ or incorrect sign for b.
Check	Substitute the result back where possible; verify dimensions/units and whether the magnitude is plausible.

Independent worked example: $2x^2 + 3x - 2 = 0$: $x = \frac{-3 \pm \sqrt{9 + 16}}{4} = \frac{-3 \pm 5}{4}$, so $x = 0.5$ or -2 .

10. Sine rule

Tier	Higher
Relationship	$a/\sin A = b/\sin B = c/\sin C$
Conditions / symbols	Opposite side-angle pairs
Selection & method	Choose two matching opposite pairs; rearrange for unknown.
Common trap	Pairing a side with a non-opposite angle.
Check	Substitute the result back where possible; verify dimensions/units and whether the magnitude is plausible.

Independent worked example: $a=8$ opposite 40° , $B=65^\circ$: $b=8 \sin 65^\circ / \sin 40^\circ \approx 11.3$.

11. Cosine rule

Tier	Higher
Relationship	$a^2 = b^2 + c^2 - 2bc \cos A$
Conditions / symbols	SAS or SSS triangles
Selection & method	Match angle A opposite side a, substitute, then solve.
Common trap	Using wrong opposite side.
Check	Substitute the result back where possible; verify dimensions/units and whether the magnitude is plausible.

Independent worked example: Create a fresh practice example using sensible values and complete the full substitution, units and check.

12. Area of any triangle

Tier	Higher
Relationship	$A = \frac{1}{2}ab \sin C$
Conditions / symbols	a,b enclose angle C
Selection & method	Use two sides and included angle.
Common trap	Using a non-included angle.
Check	Substitute the result back where possible; verify dimensions/units and whether the magnitude is plausible.

Independent worked example: Create a fresh practice example using sensible values and complete the full substitution, units and check.

13. Surface area of sphere

Tier	Higher
Relationship	$A=4\pi r^2$
Conditions / symbols	r radius
Selection & method	Square radius, multiply by 4π .
Common trap	Using volume formula.
Check	Substitute the result back where possible; verify dimensions/units and whether the magnitude is plausible.

Independent worked example: Create a fresh practice example using sensible values and complete the full substitution, units and check.

14. Volume of sphere

Tier	Higher
Relationship	$V=\frac{4}{3}\pi r^3$
Conditions / symbols	r radius
Selection & method	Cube radius, multiply by $\frac{4\pi}{3}$.
Common trap	Square rather than cube.
Check	Substitute the result back where possible; verify dimensions/units and whether the magnitude is plausible.

Independent worked example: Create a fresh practice example using sensible values and complete the full substitution, units and check.

15. Volume of cone

Tier	Higher
Relationship	$V=\frac{1}{3}\pi r^2 h$
Conditions / symbols	h perpendicular height
Selection & method	Circle base area $\times$ perpendicular height $\div 3$.
Common trap	Using slant height as h.
Check	Substitute the result back where possible; verify dimensions/units and whether the magnitude is plausible.

Independent worked example: Create a fresh practice example using sensible values and complete the full substitution, units and check.

16. Curved surface area of cone

Tier	Higher
Relationship	$A = \pi r l$
Conditions / symbols	l slant height
Selection & method	Use radius and slant height.
Common trap	Using perpendicular height.
Check	Substitute the result back where possible; verify dimensions/units and whether the magnitude is plausible.

Independent worked example: Create a fresh practice example using sensible values and complete the full substitution, units and check.

17. Direct proportion

Tier	Higher
Relationship	$y = kx^n$
Conditions / symbols	Pattern depends on specification/context
Selection & method	Find k from a known pair, then use model consistently.
Common trap	Assuming $n=1$ without evidence.
Check	Substitute the result back where possible; verify dimensions/units and whether the magnitude is plausible.

Independent worked example: Create a fresh practice example using sensible values and complete the full substitution, units and check.

18. Inverse proportion

Tier	Higher
Relationship	$y = k/x^n$
Conditions / symbols	Inverse relationship
Selection & method	Find k from known values; preserve reciprocal structure.
Common trap	Treating as linear direct proportion.
Check	Substitute the result back where possible; verify dimensions/units and whether the magnitude is plausible.

Independent worked example: Create a fresh practice example using sensible values and complete the full substitution, units and check.

19. Density

Tier	Both
Relationship	$\rho = m/V$
Conditions / symbols	Consistent units
Selection & method	Rearrange triangle/equation and convert units before calculating.
Common trap	Mixing g/cm^3 with kg/m^3 .
Check	Substitute the result back where possible; verify dimensions/units and whether the magnitude is plausible.

Independent worked example: Mass 540 g, volume 200 cm^3 : density $= 540/200 = 2.7 \text{ g/cm}^3$.

20. Pressure

Tier	Both
Relationship	$p = F/A$
Conditions / symbols	Force perpendicular to area
Selection & method	Use consistent force/area units.
Common trap	Using length instead of area.
Check	Substitute the result back where possible; verify dimensions/units and whether the magnitude is plausible.

Independent worked example: Create a fresh practice example using sensible values and complete the full substitution, units and check.

Exact trigonometric values to know/use

Function	0°	30°	45°	60°	90°
sin	0	$1/2$	$\sqrt{2}/2$	$\sqrt{3}/2$	1
cos	1	$\sqrt{3}/2$	$\sqrt{2}/2$	$1/2$	0
tan	0	$1/\sqrt{3}$	1	$\sqrt{3}$	undefined

References and source basis

- S1:** WJEC Eduqas GCSE Mathematics Specification C300QS, especially FG18–FG19 and HG20–HG23 plus Appendix A formula guidance.
- S2:** Eduqas GCSE Mathematics qualification page: Additional Formulae Sheet integrated into papers from summer 2026.
- S3:** Eduqas Foundation Tier Additional Formulae preview (January 2026 support publication).

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