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PEARSON EDEXCEL GCSE (9-1) MATHEMATICS 1MA1

1MA1 FORMULA, METHODS & EXACT VALUES HANDBOOK

Foundation + Higher | current Pearson formula-aid regime | original worked examples

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Source set verified: 29 October 2026

How to use this document

A study handbook rather than a one-page formula list. Each relationship includes its tier, conditions, notation, an original worked example, a common trap and a specification reference.

Section	What it gives you
Policy	Current 2026 formula-aid status and what it means for revision.
Formula cards	Mensuration, algebra, trigonometry, finance, probability and compound measures.
Exact values	Exact trigonometric values and exact-form habits.
Method guides	Selection, rearrangement, units, accuracy and checking.
References	Pearson specification and 2026 exam aids.

Reference tags such as [SPEC], [GB-2026] and [ER24H1] are defined in the source register so the factual basis can be audited.

Current formula-aid policy

2026 and beyond

2026: Pearson provides Foundation and Higher formula sheets as exam aids; the 2026 content/format is unchanged from 2025.

Lifetime of specification: Pearson reported Ofqual confirmation/proposals to continue GCSE Mathematics formula sheets for the lifetime of the current specifications, covering exams to approximately 2030/31 including resits/November maths series.

Revision implication: Students still need to identify the correct relationship, substitute accurately, rearrange, manage units and interpret results. A supplied formula does not select itself.

Source: [FORMPOL], [FORM26F], [FORM26H]

Formula and relationship cards

01. Area of trapezium

Area: Geometry

Tier: Both

Formula / relationship: $A = \frac{1}{2}(a+b)h$

Symbols / conditions: a,b parallel sides; h perpendicular distance

When to select it: Use when the structure of the problem matches area of trapezium and the stated conditions are satisfied.

Worked original example: a=8,b=14,h=5 gives A=55 square units

Common trap: Using a sloping side as h

Verification: Estimate magnitude, check units, and substitute back or compare with a simple limiting case where possible.

Pearson mapping: G16

Source: [SPEC]; [FORM26F]; [FORM26H] where applicable

02. Volume of prism

Area: Geometry

Tier: Both

Formula / relationship: $V = \text{cross-sectional area} \times \text{length}$

Symbols / conditions: Use consistent cubic units

When to select it: Use when the structure of the problem matches volume of prism and the stated conditions are satisfied.

Worked original example: Cross-section 18 cm^2 , length 7 cm gives 126 cm^3

Common trap: Using perimeter instead of cross-sectional area

Verification: Estimate magnitude, check units, and substitute back or compare with a simple limiting case where possible.

Pearson mapping: G16

Source: [SPEC]; [FORM26F]; [FORM26H] where applicable

03. Circumference

Area: Circles

Tier: Both

Formula / relationship: $C = 2\pi r = \pi d$

Symbols / conditions: r radius, d diameter

When to select it: Use when the structure of the problem matches circumference and the stated conditions are satisfied.

Worked original example: $r=4$ gives $C=8\pi$

Common trap: Confusing radius and diameter

Verification: Estimate magnitude, check units, and substitute back or compare with a simple limiting case where possible.

Pearson mapping: G17

Source: [SPEC]; [FORM26F]; [FORM26H] where applicable

04. Area

Area: Circles

Tier: Both

Formula / relationship: $A = \pi r^2$

Symbols / conditions: Square radius before multiplying by π

When to select it: Use when the structure of the problem matches area and the stated conditions are satisfied.

Worked original example: $r=6$ gives $A=36\pi$

Common trap: Using πr rather than πr^2

Verification: Estimate magnitude, check units, and substitute back or compare with a simple limiting case where possible.

Pearson mapping: G17

Source: [SPEC]; [FORM26F]; [FORM26H] where applicable

05. Pythagoras

Area: Right triangles

Tier: Both

Formula / relationship: $a^2 + b^2 = c^2$

Symbols / conditions: c is hypotenuse

When to select it: Use when the structure of the problem matches pythagoras and the stated conditions are satisfied.

Worked original example: legs 6,8 give $c=10$

Common trap: Treating any side as c

Verification: Estimate magnitude, check units, and substitute back or compare with a simple limiting case where possible.

Pearson mapping: G20

Source: [SPEC]; [FORM26F]; [FORM26H] where applicable

06. Trigonometric ratios

Area: Right triangles

Tier: Both

Formula / relationship: $\sin A = \text{opp/hyp}$; $\cos A = \text{adj/hyp}$; $\tan A = \text{opp/adj}$

Symbols / conditions: Right-angled triangle only

When to select it: Use when the structure of the problem matches trigonometric ratios and the stated conditions are satisfied.

Worked original example: $\text{opp}=6, \text{hyp}=10 \rightarrow \sin A = 0.6$

Common trap: Choosing sides relative to wrong angle

Verification: Estimate magnitude, check units, and substitute back or compare with a simple limiting case where possible.

Pearson mapping: G20

Source: [SPEC]; [FORM26F]; [FORM26H] where applicable

07. Quadratic formula

Area: Algebra

Tier: Higher

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

Symbols / conditions: $ax^2 + bx + c = 0$, $a \neq 0$

When to select it: Use when the structure of the problem matches quadratic formula and the stated conditions are satisfied.

Worked original example: $x^2 - 5x - 6 = 0 \rightarrow x = 6 \text{ or } -1$

Common trap: Losing the sign of b or missing $\pm$

Verification: Estimate magnitude, check units, and substitute back or compare with a simple limiting case where possible.

Pearson mapping: A18

Source: [SPEC]; [FORM26F]; [FORM26H] where applicable

08. Sine rule

Area: Non-right triangles

Tier: Higher

Formula / relationship: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Symbols / conditions: Opposite side-angle pairs

When to select it: Use when the structure of the problem matches sine rule and the stated conditions are satisfied.

Worked original example: Use when one complete opposite pair is known

Common trap: Pairing a side with the wrong angle

Verification: Estimate magnitude, check units, and substitute back or compare with a simple limiting case where possible.

Pearson mapping: G22

Source: [SPEC]; [FORM26F]; [FORM26H] where applicable

09. Cosine rule

Area: Non-right triangles

Tier: Higher

Formula / relationship: $a^2 = b^2 + c^2 - 2bc \cos A$

Symbols / conditions: A opposite a

When to select it: Use when the structure of the problem matches cosine rule and the stated conditions are satisfied.

Worked original example: Use for SAS or SSS problems

Common trap: Using Pythagoras in non-right triangle

Verification: Estimate magnitude, check units, and substitute back or compare with a simple limiting case where possible.

Pearson mapping: G22

Source: [SPEC]; [FORM26F]; [FORM26H] where applicable

10. Triangle area

Area: Non-right triangles

Tier: Higher

Formula / relationship: $A = \frac{1}{2} ab \sin C$

Symbols / conditions: C included angle between a and b

When to select it: Use when the structure of the problem matches triangle area and the stated conditions are satisfied.

Worked original example: $a=7, b=10, C=30^\circ \rightarrow A=17.5$

Common trap: Using a non-included angle

Verification: Estimate magnitude, check units, and substitute back or compare with a simple limiting case where possible.

Pearson mapping: G23

Source: [SPEC]; [FORM26F]; [FORM26H] where applicable

11. Compound growth

Area: Finance

Tier: Both

Formula / relationship: $\text{Total} = P(1 + r/100)^n$

Symbols / conditions: r percentage per period

When to select it: Use when the structure of the problem matches compound growth and the stated conditions are satisfied.

Worked original example: £800 at 3% for 2 years = $800(1.03)^2$

Common trap: Adding the same percentage of original each year

Verification: Estimate magnitude, check units, and substitute back or compare with a simple limiting case where possible.

Pearson mapping: R16

Source: [SPEC]; [FORM26F]; [FORM26H] where applicable

12. Union rule

Area: Probability

Tier: Both

Formula / relationship: $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$

Symbols / conditions: Subtract overlap

When to select it: Use when the structure of the problem matches union rule and the stated conditions are satisfied.

Worked original example: $0.55 + 0.40 - 0.20 = 0.75$

Common trap: Double-counting intersection

Verification: Estimate magnitude, check units, and substitute back or compare with a simple limiting case where possible.

Pearson mapping: P8

Source: [SPEC]; [FORM26F]; [FORM26H] where applicable

13. Conditional/joint rule

Area: Probability

Tier: Higher

Formula / relationship: $P(A \text{ and } B) = P(A \text{ given } B)P(B)$

Symbols / conditions: Conditional structure

When to select it: Use when the structure of the problem matches conditional/joint rule and the stated conditions are satisfied.

Worked original example: $P(B) = 0.5$, $P(A | B) = 0.3 \rightarrow 0.15$

Common trap: Assuming independence without justification

Verification: Estimate magnitude, check units, and substitute back or compare with a simple limiting case where possible.

Pearson mapping: P9

Source: [SPEC]; [FORM26F]; [FORM26H] where applicable

14. Direct proportion

Area: Proportion

Tier: Both

Formula / relationship: $y=kx$ or $y=kx^n$

Symbols / conditions: Find constant k from known pair

When to select it: Use when the structure of the problem matches direct proportion and the stated conditions are satisfied.

Worked original example: $y \propto x$, $y=12$ at $x=3 \rightarrow k=4$

Common trap: Assuming additive relationship

Verification: Estimate magnitude, check units, and substitute back or compare with a simple limiting case where possible.

Pearson mapping: R10

Source: [SPEC]; [FORM26F]; [FORM26H] where applicable

15. Inverse proportion

Area: Proportion

Tier: Higher

Formula / relationship: $y=k/x$ or $y=k/x^n$

Symbols / conditions: Find constant k

When to select it: Use when the structure of the problem matches inverse proportion and the stated conditions are satisfied.

Worked original example: $y \propto 1/x$, $y=6$ at $x=4 \rightarrow k=24$

Common trap: Using $y=kx$

Verification: Estimate magnitude, check units, and substitute back or compare with a simple limiting case where possible.

Pearson mapping: R10

Source: [SPEC]; [FORM26F]; [FORM26H] where applicable

16. Speed

Area: Compound measures

Tier: Both

Formula / relationship: $\text{speed} = \text{distance} / \text{time}$

Symbols / conditions: Keep units compatible

When to select it: Use when the structure of the problem matches speed and the stated conditions are satisfied.

Worked original example: 150 km in 3 h = 50 km/h

Common trap: Mixing minutes and hours

Verification: Estimate magnitude, check units, and substitute back or compare with a simple limiting case where possible.

Pearson mapping: R11

Source: [SPEC]; [FORM26F]; [FORM26H] where applicable

17. Density

Area: Compound measures

Tier: Both

Formula / relationship: density=mass/volume

Symbols / conditions: Use compatible mass/volume units

When to select it: Use when the structure of the problem matches density and the stated conditions are satisfied.

Worked original example: $540 \text{ g} / 60 \text{ cm}^3 = 9 \text{ g/cm}^3$

Common trap: Inverting the relationship

Verification: Estimate magnitude, check units, and substitute back or compare with a simple limiting case where possible.

Pearson mapping: R11

Source: [SPEC]; [FORM26F]; [FORM26H] where applicable

18. Pressure

Area: Compound measures

Tier: Higher

Formula / relationship: pressure=force/area

Symbols / conditions: Use appropriate area units

When to select it: Use when the structure of the problem matches pressure and the stated conditions are satisfied.

Worked original example: $600 \text{ N} / 0.2 \text{ m}^2 = 3000 \text{ Pa}$

Common trap: Using length instead of area

Verification: Estimate magnitude, check units, and substitute back or compare with a simple limiting case where possible.

Pearson mapping: R11

Source: [SPEC]; [FORM26F]; [FORM26H] where applicable

Exact trigonometric values

Exact value	Result
$\sin 0^\circ$	0
$\sin 30^\circ$	$1/2$
$\sin 45^\circ$	$\sqrt{2}/2$
$\sin 60^\circ$	$\sqrt{3}/2$
$\sin 90^\circ$	1
$\cos 0^\circ$	1
$\cos 30^\circ$	$\sqrt{3}/2$
$\cos 45^\circ$	$\sqrt{2}/2$
$\cos 60^\circ$	$1/2$
$\cos 90^\circ$	0
$\tan 0^\circ$	0
$\tan 30^\circ$	$\sqrt{3}/3$
$\tan 45^\circ$	1
$\tan 60^\circ$	$\sqrt{3}$

Keep exact values in exact form when the question demands an exact answer. Decimal approximations such as 0.707... are not equivalent to $\sqrt{2}/2$ when an exact value is required.

Formula selection method

1. List the known quantities

Action: Include units and identify the unknown.

2. Classify the problem

Action: Right triangle? non-right triangle? proportional relationship? compound measure? probability event?

3. Write the relationship before numbers

Action: This exposes whether the formula actually connects the known quantities to the unknown.

4. Convert units

Action: Do this before substitution unless the formula is explicitly set up for mixed units.

5. Substitute with brackets

Action: Especially negative values, percentages and quadratic coefficients.

6. Calculate without premature rounding

Action: Keep full precision until the final requested accuracy.

7. Check

Action: Use dimensions/units, order of magnitude, substitution or an alternative route.

Rearrangement mini-guide

Speed example

Method: $\text{speed} = \text{distance}/\text{time}$. To make distance the subject: multiply both sides by time $\rightarrow \text{distance} = \text{speed} \times \text{time}$.

Check: Substitute your rearranged expression back into the original relationship.

Density example

Method: $\text{density} = \text{mass}/\text{volume}$. To make volume the subject: $\text{volume} = \text{mass}/\text{density}$.

Check: Substitute your rearranged expression back into the original relationship.

Circle example

Method: $A = \pi r^2$. To make r the subject: $r = \sqrt{A/\pi}$.

Check: Substitute your rearranged expression back into the original relationship.

Pythagoras example

Method: $a^2 + b^2 = c^2$. To find a shorter side: $a = \sqrt{c^2 - b^2}$.

Check: Substitute your rearranged expression back into the original relationship.

References and source register

[SPEC] Pearson Edexcel Level 1/Level 2 GCSE (9-1) Mathematics (1MA1), Specification Issue 2, current Pearson qualification page checked 29 October 2026.

<https://qualifications.pearson.com/content/dam/pdf/GCSE/mathematics/2015/specification-and-sample-assesment/gcse-maths-2015-specification.pdf>

[FORM26F] Pearson Edexcel GCSE Mathematics 1MA1 Foundation Tier Exam Aid, 2026.

<https://qualifications.pearson.com/content/dam/pdf/GCSE/mathematics/2015/exam-materials/2026-exam-aid-foundation.pdf>

[FORM26H] Pearson Edexcel GCSE Mathematics 1MA1 Higher Tier Exam Aid, 2026.

<https://qualifications.pearson.com/content/dam/pdf/GCSE/mathematics/2015/exam-materials/2026-exam-aid-higher.pdf>

[FORMPOL] Pearson Mathematics & Statistics Subject Update, April 2026: 2026 exam aids unchanged from 2025 and formula sheets expected to continue for the lifetime of current specifications.

<https://qualifications.pearson.com/en/news-policy/subject-updates/mathematics/april-2026-maths-and-statistics-update.html>

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