

National 5 Maths formula sheet (SQA)

Scotland: what is on the SQA formulae list and what to learn · Checked 21 October 2026

An original MathsDaily revision sheet for SQA National 5 Mathematics in Scotland, not the official formulae list. SQA prints a short formulae list in both question papers. Each formula below is labelled to show whether it is on that list or one you must learn.

On the SQA list: Printed on the formulae list in both National 5 Mathematics question papers.

Learn: not on the list: Not printed in the exam. You are expected to know it.

Number and algebra

Surds

LEARN: NOT ON THE LIST

$\sqrt{ab} = \sqrt{a} \times \sqrt{b}$; $\sqrt{a/b} = \sqrt{a} / \sqrt{b}$; rationalise: $a/\sqrt{b} = a\sqrt{b} / b$

Simplify by taking out square factors, for example $\sqrt{48} = \sqrt{16 \times 3} = 4\sqrt{3}$.

Indices

LEARN: NOT ON THE LIST

$a^m \times a^n = a^{m+n}$; $a^m \div a^n = a^{m-n}$; $(a^m)^n = a^{mn}$; $a^0 = 1$; $a^{-n} = 1/a^n$; $a^{m/n} = (\sqrt[n]{a})^m$

Scientific notation

LEARN: NOT ON THE LIST

$a \times 10^n$, where $1 \leq a < 10$ and n is an integer

Factorising

LEARN: NOT ON THE LIST

Common factor; difference of two squares $a^2 - b^2 = (a + b)(a - b)$; trinomials such as $x^2 + 5x + 6 = (x + 2)(x + 3)$

Completing the square

LEARN: NOT ON THE LIST

$x^2 + bx + c = (x + b/2)^2 - (b/2)^2 + c$

Percentages

LEARN: NOT ON THE LIST

Appreciation or depreciation over n years: value = original $\times (1 \pm r/100)^n$

For a reverse percentage, divide by the multiplier: original = new value $\div (1 \pm r/100)$.

Quadratics and graphs

Roots of a quadratic

On the SQA list

The roots of $ax^2 + bx + c = 0$ are $x = (-b \pm \sqrt{b^2 - 4ac}) / 2a$

Discriminant and nature of roots

LEARN: NOT ON THE LIST

$b^2 - 4ac > 0$: two real distinct roots; $= 0$: equal roots; < 0 : no real roots

Turning point and axis of symmetry

LEARN: NOT ON THE LIST

$y = (x + p)^2 + q$ has turning point $(-p, q)$ and axis of symmetry $x = -p$

For $y = k(x + p)^2 + q$ the turning point is still $(-p, q)$; it is a minimum if $k > 0$ and a maximum if $k < 0$.

Straight lines

LEARN: NOT ON THE LIST

Gradient $m = (y_2 - y_1) / (x_2 - x_1)$; $y = mx + c$; $y - b = m(x - a)$

Parallel lines have equal gradients.

Geometry and measurement

Volume of a sphere

On the SQA list

$$V = (4/3)\pi r^3$$

Volume of a cone

On the SQA list

$$V = (1/3)\pi r^2 h$$

Volume of a pyramid

On the SQA list

$$V = (1/3)Ah$$

A is the area of the base and h the perpendicular height.

Prisms and cylinders

LEARN: NOT ON THE LIST

$$\text{Prism: } V = Ah; \text{ cylinder: } V = \pi r^2 h$$

Circles: arcs and sectors

LEARN: NOT ON THE LIST

$$C = \pi d; A = \pi r^2; \text{ arc length} = (\theta/360) \times \pi d; \text{ sector area} = (\theta/360) \times \pi r^2$$

Pythagoras' theorem and its converse

LEARN: NOT ON THE LIST

$$a^2 + b^2 = c^2; \text{ if } a^2 + b^2 = c^2, \text{ the triangle is right-angled}$$

Angles and circles

LEARN: NOT ON THE LIST

The angle in a semicircle is 90° ; a tangent meets the radius at 90° ; interior angles of a polygon add up to $(n - 2) \times 180^\circ$

Similar shapes

LEARN: NOT ON THE LIST

$$\text{Length scale factor } k \Rightarrow \text{area scale factor } k^2, \text{ volume scale factor } k^3$$

Vectors

LEARN: NOT ON THE LIST

$$\text{Magnitude: } |u| = \sqrt{a^2 + b^2} \text{ in 2D, } \sqrt{a^2 + b^2 + c^2} \text{ in 3D}$$

Add vectors component by component to find a resultant.

Trigonometry

Sine rule

On the SQA list

$$a/\sin A = b/\sin B = c/\sin C$$

Side a is opposite angle A.

Cosine rule

On the SQA list

$$a^2 = b^2 + c^2 - 2bc \cos A \text{ or } \cos A = (b^2 + c^2 - a^2) / 2bc$$

Use the second form to find an angle.

Area of a triangle

On the SQA list

$$A = \frac{1}{2}ab \sin C$$

Right-angled triangles (SOHCAHTOA)

LEARN: NOT ON THE LIST

$$\sin x = \text{opp/hyp}; \cos x = \text{adj/hyp}; \tan x = \text{opp/adj}$$

Trigonometric identities**LEARN: NOT ON THE LIST**

$$\sin^2 x + \cos^2 x = 1; \tan x = \sin x / \cos x$$

Trig graphs**LEARN: NOT ON THE LIST**

$y = a \sin bx + c$: amplitude a , b cycles in 360° , period $360^\circ/b$, moved up by c

Statistics

Standard deviation**On the SQA list**

$$s = \sqrt{(\Sigma(x - \bar{x})^2 / (n - 1))} \text{ or } s = \sqrt{(\Sigma x^2 - (\Sigma x)^2/n) / (n - 1)}, \text{ where } n \text{ is the sample size}$$

Mean, median and quartiles**LEARN: NOT ON THE LIST**

Mean $\bar{x} = \Sigma x \div n$; median = middle value; Q_1, Q_2, Q_3 split ordered data into quarters

See the mean, median, mode and range guide.

Semi-interquartile range**LEARN: NOT ON THE LIST**

$$SIQR = (Q_3 - Q_1) / 2$$

Compare data sets using an average (mean or median) and a measure of spread (standard deviation or SIQR).

Line of best fit**LEARN: NOT ON THE LIST**

Find the gradient and y-intercept from two points on the line, then write $y = mx + c$

Checklist: formulae to learn

None of these is on the SQA formulae list. Tick each one when you can write it from memory.

Number and algebra

- ☐ Surds
- ☐ Indices
- ☐ Scientific notation
- ☐ Factorising
- ☐ Completing the square
- ☐ Percentages

Quadratics and graphs

- ☐ Discriminant and nature of roots
- ☐ Turning point and axis of symmetry
- ☐ Straight lines

Geometry and measurement

- ☐ Prisms and cylinders
- ☐ Circles: arcs and sectors
- ☐ Pythagoras' theorem and its converse
- ☐ Angles and circles
- ☐ Similar shapes
- ☐ Vectors

Trigonometry

- ☐ Right-angled triangles (SOHCAHTOA)
- ☐ Trigonometric identities
- ☐ Trig graphs

Statistics

- ☐ Mean, median and quartiles
- ☐ Semi-interquartile range
- ☐ Line of best fit

Official sources

[SQA: National 5 Mathematics Paper 1 formulae list \(X847/75/01, 2022\)](#)

[SQA: National 5 Mathematics Paper 2 formulae list, 2026](#)

[SQA: past papers and marking instructions](#)

Always check the formulae list printed in a recent SQA National 5 Mathematics past paper.