STUDY FORMULA BOOKLET

Edexcel International GCSE Maths A 4MA1 Foundation formulae sheet

The Foundation sheet prints only the trapezium area, prism volume, and cylinder volume and curved surface area. Pythagoras, trigonometry and every other formula you must recall.

IN THE BOOKLET printed in the official booklet LEARN IT not printed: students must recall it

Based on the official **International GCSE Mathematics, Formulae sheet (Foundation Tier), Pearson Edexcel 4MA1, as printed on page 2 of the 2025 question paper (code P78898A)**, with what to learn and exam tips added by CuratedPrep.

Area

Area of a trapezium

a and b are the lengths of the parallel sides. h is the perpendicular height between them, not the sloping side.

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

IN THE BOOKLET

Prisms

Volume of a prism

The cross section is the same all the way along. Works for a cuboid, a triangular prism and any other prism.

$$V = \text{area of cross section} \times \text{length}$$

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Cylinders

Volume of a cylinder

r is the radius of the circular end and h is the height.

$$V = \pi r^2 h$$

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Curved surface area of a cylinder

Only the curved side. The two circular ends are extra: add 2π r^2 for the total surface area.

$$A = 2\pi r h$$

IN THE BOOKLET

Learn these: not in the booklet

Area of a rectangle, triangle and parallelogram

$$A = lw, \quad A = \tfrac{1}{2}bh, \quad A = bh$$

b is the base and h is the perpendicular height. Only the trapezium is printed on the sheet.

Circle: circumference and area

$$C = 2\pi r = \pi d, \quad A = \pi r^2$$

r is the radius and d the diameter. For a semicircle, halve the area, and add the diameter to half the circumference for the perimeter.

Volume of a cuboid

$$V = lwh$$

The prism rule on the sheet also covers it: area of cross section (lw) times length (h).

Total surface area of a cylinder

$$A = 2\pi r h + 2\pi r^2$$

The sheet prints only the curved surface 2πrh, so add the two circular ends, each πr².

Pythagoras' theorem

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

c is the hypotenuse, the side opposite the right angle. Not printed on the Edexcel sheet.

Sine, cosine and tangent in a right-angled triangle

$$\sin\theta = \frac{O}{H}, \quad \cos\theta = \frac{A}{H}, \quad \tan\theta = \frac{O}{A}$$

O is opposite, A is adjacent and H is the hypotenuse. Use $\sin^{-1}$, $\cos^{-1}$ or $\tan^{-1}$ to find an angle, with the calculator in degrees.

Angle facts

$$\text{straight line } 180^\circ, \ \text{point } 360^\circ, \ \text{triangle } 180^\circ, \ \text{quadrilateral } 360^\circ$$

Also: vertically opposite angles are equal, and alternate and corresponding angles on parallel lines are equal.

Polygons

$$\text{angle sum} = (n-2) \times 180^\circ, \quad \text{exterior angle} = \frac{360^\circ}{n}$$

n is the number of sides. The specification words the sum as (2n - 4) right angles. For a regular polygon, interior angle = 180 degrees minus the exterior angle.

Bearings

Measured clockwise from north and written with three figures, for example 045 degrees. Back bearing = bearing plus or minus 180 degrees.

Speed and density

$$\text{speed} = \frac{\text{distance}}{\text{time}}, \quad \text{density} = \frac{\text{mass}}{\text{volume}}$$

Edexcel states that the formula for pressure will be given in the question, so it is not on this list.

Metric conversions

$$1\text{ m} = 100\text{ cm},\ 1\text{ cm} = 10\text{ mm},\ 1\text{ m}^2 = 10\,000\text{ cm}^2,\ 1\text{ m}^3 = 1\,000\,000\text{ cm}^3,\ 1\text{ litre} = 1000\text{ cm}^3$$

Square the length factor for area and cube it for volume.

Percentage of a quantity and percentage change

$$15\%\text{ of }120 = \frac{15}{100} \times 120, \qquad \text{percentage change} = \frac{\text{new} - \text{old}}{\text{old}} \times 100$$

Percentage multipliers and reverse percentages

$$\text{increase by } r\%: \times\left(1 + \frac{r}{100}\right), \quad \text{decrease by } r\%: \times\left(1 - \frac{r}{100}\right), \quad \text{original} = \frac{\text{new}}{\text{multiplier}}$$

For a sale price after a 30 percent reduction, the multiplier is 0.7.

Compound interest and depreciation

$$\text{amount} = P\left(1 + \frac{r}{100}\right)^n$$

P is the starting amount, r the percentage per period and n the number of periods. For depreciation use (1 - r/100). Not printed on the sheet.

Index laws

$$x^m \times x^n = x^{m+n},\ x^m \div x^n = x^{m-n},\ (x^m)^n = x^{mn},\ x^0 = 1,\ x^{-n} = \frac{1}{x^n}$$

Standard form

$$a \times 10^n, \quad 1 \le a < 10,\ n \text{ an integer}$$

Example: 150 000 000 = 1.5 × 10^8.

Ratio and direct proportion

$$y = kx$$

Share an amount in a ratio by finding the value of one part: total divided by the sum of the ratio parts.

Straight line graphs

$$y = mx + c, \qquad m = \frac{\text{increase in } y}{\text{increase in } x}$$

m is the gradient and c the y-intercept. On a distance-time graph the gradient is the speed.

Midpoint of a line segment

$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

nth term of an arithmetic sequence

$$n\text{th term} = dn + c$$

d is the common difference. Find c by working back one step from the first term, so c = first term minus d. Example: 5, 9, 13 has nth term 4n + 1.

Mean, median, mode and range

$$\bar{x} = \frac{\sum x}{n}, \quad \text{range} = \text{largest} - \text{smallest}$$

The median is the middle value of the ordered list; the mode is the most common value.

Estimated mean from grouped data

$$\bar{x} \approx \frac{\sum fx}{\sum f}$$

x is the midpoint of each class and f its frequency.

Probability

$$P(\text{not } A) = 1 - P(A), \quad P(A \text{ or } B) = P(A) + P(B)\ (\text{mutually exclusive})$$

All probabilities lie from 0 (impossible) to 1 (certain).

Expected frequency and relative frequency

$$\text{expected frequency} = P(\text{event}) \times \text{number of trials}, \quad \text{relative frequency} = \frac{\text{times it happened}}{\text{number of trials}}$$

Example: a probability of 0.4 over 300 tries gives about 120.

Similar shapes

Corresponding lengths are in the same ratio (the scale factor) and corresponding angles are equal. Scale factor = new length divided by original length.

Using the booklet in the exam

- The sheet has no Pythagoras or trigonometry, so write down $a^2 + b^2 = c^2$ and SOH CAH TOA as soon as a right-angled triangle appears.
- For the trapezium, h is the perpendicular distance between the parallel sides. Do not use the slanted edge.
- The sheet gives the curved surface area of a cylinder only. For a closed cylinder, add two circle areas.
- Check whether the question gives the pressure formula before you try to recall it: Edexcel says it will be given.
- A calculator is allowed. Keep the full calculator value until the last step, then round as the question asks.

Based on: Pearson Edexcel International GCSE Mathematics (Specification A) 4MA1, Foundation Tier formulae sheet printed in the question paper; Pearson Edexcel International GCSE Mathematics (Specification A) specification, Issue 2, Appendix 4: Foundation Tier formulae sheet, and the Foundation Tier subject content. Statistical tables are calculated by CuratedPrep to the same layout. Updated 31 October 2026. Always practise with the version of the official booklet your exam uses. More free sheets and topic worksheets at curatedprep.com.