Pure Mathematics 1

A-Level Mathematics · Vocabulary in context

Word	Example
Pure Mathematics /pjʊə ˌmæθɪ'mætɪks/	**Pure Mathematics** studies numbers, shapes and patterns for their own sake.
quadratic /kwɒ'drætɪk/	$x^2 + 3x - 4$ is a **quadratic** expression. $x^2 + 3x - 4$
complete the square /kəm'pliːt ðə skweə/	To **complete the square**, write $x^2 + 6x$ as $(x + 3)^2 - 9$. $x^2 + 6x$ $(x + 3)^2 - 9$
vertex /'vɜːteks/	The **vertex** of $y = (x - 2)^2 + 3$ is (2, 3). $y = (x - 2)^2 + 3$ (2, 3)
discriminant /dɪ'skrɪmɪnənt/	A positive **discriminant** gives two distinct real roots.
real roots /rɪəl ruːts/	$x^2 = 4$ has two **real roots**: 2 and -2. $x^2 = 4$ 2 -2
distinct /dɪ'stɪŋkt/	The equation has two **distinct** roots, so the roots are different.
quadratic equation /kwɒ'drætɪk ɪ'kweɪʒn/	$x^2 - 5x + 6 = 0$ is a **quadratic equation**. $x^2 - 5x + 6 = 0$
quadratic inequality /kwɒ'drætɪk ɪniː'kwɒlɪti/	$x^2 - 4 < 0$ is a **quadratic inequality**. $x^2 - 4 < 0$
simultaneous equations /ˌsɪməl'teɪnɪəs ɪ'kweɪʒnz/	Solve the **simultaneous equations** to find both x and y. x y
substitution /ˌsʌbstɪ'tjuːʃn/	Use **substitution**: put $y = 2x$ into the second equation. $y = 2x$
function /'fʌŋkʃn/	A **function** returns a value.

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composition of functions /ˌkɒmpə'zɪʃn ɒv 'fʌŋkʃnz/	In a **composition of functions** fg(x), do g first and then f. fg(x) g f
domain /də'meɪn/	Leave zero out of the **domain** when x is on the bottom of a fraction. x
range /reɪndʒ/	The **range** of $f(x) = x^2$ is all values greater than or equal to zero. $f(x) = x^2$
one-one /wʌn wʌn/	A **one-one** function never gives the same output for two inputs.
inverse function /ɪn'vɜːs 'fʌŋkʃn/	The **inverse function** undoes the original function.
composition /ˌkɒmpə'zɪʃn/	The **composition** fg(x) means apply g, then f. fg(x) g f
reflection /rɪ'flekʃn/	**Reflection** in a mirror lets you see yourself.
transformations /trænsfɔː'meɪʃnz/	Translations and reflections are **transformations** of a graph.
translation /træn'sleɪʃn/	A **translation** moves every point two units to the left.
stretch /stretʃ/	A **stretch** by factor 2 parallel to the y-axis doubles every y-value. y 2 y
Coordinate geometry /kəʊ'ɔːdɪnət dʒi'ɒmətri/	**Coordinate geometry** uses x and y to study lines and circles. x y
gradient /'greɪdɪənt/	The **gradient** of a distance-time graph gives the speed. –
equation of a straight line /ɪ'kweɪʒn əvə streɪt laɪn/	$y = 2x + 1$ is the **equation of a straight line**. $y = 2x + 1$

Word	Example
parallel /'pærəlel/	**Parallel** lines have equal gradients and never meet.
perpendicular /ˌpɜːpən'dɪkjʊlə/	The wall is **perpendicular** to the floor.
circle /'sɜːkl/	Every point on a **circle** is equally far from its centre.
centre /'sentə/	The **centre** of a circle is the same distance from every point on it.
radius /'reɪdɪəs/	The **radius** of a circle is the distance from the centre to the edge.
tangent /'tændʒənt/	Draw a **tangent** to the curve to find the gradient at one point.
diameter /daɪ'æmɪtə/	Measure the **diameter** of the wire with a micrometer.
radian /'reɪdɪən/	One full turn is an angle of 2π **radians**. 2π
arc /ɑːk/	The **arc** is part of the edge of a circle.
degrees /dɪ'griːz/	Set the calculator to **degrees** before entering a degree angle.
sector /'sektə/	A **sector** is a slice of a circle, like a piece of pizza.
chord /kɔːd/	A **chord** is a straight line joining two points on a circle.
circular segment /'sɜːkjələ 'segmənt/	A **circular segment** lies between a chord and its arc.
sine /saɪn/	**Sine** is opposite divided by hypotenuse.

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Word	Example
cosine /'kəʊsaɪn/	**Cosine** is adjacent divided by hypotenuse.
tangent function /'tændʒənt 'fʌŋkʃn/	The **tangent function** tan x equals sin x divided by cos x. $\tan x \quad \sin x \quad \cos x$
principal value /'prɪnsɪpl 'vælju:/	A calculator gives only the **principal value**, such as $\sin^{-1}(0.5) = 30°$. $\sin^{-1}(0.5) = 30°$
identity /aɪ'dentɪti/	$2(x + 1) = 2x + 2$ is an **identity**: it is true for every x. $2(x + 1) = 2x + 2 \quad x$
trigonometric equation /ˌtrɪgənəʊ'metrɪk ɪ'kweɪʒn/	Solve the **trigonometric equation** $\sin x = 0.5$. $\sin x = 0.5$
binomial expansion /baɪ'nəʊmɪəl ek'spænʃn/	The **binomial expansion** writes $(1 + x)^n$ as a sum of terms. $(1 + x)^n$
binomial coefficient /baɪ'nəʊmɪəl ˌkəʊɪ'fɪʃənt/	The **binomial coefficient** ${}^5C_2$ equals 10. ${}^5C_2 \quad 10$
progression /prə'greʃn/	2, 5, 8, 11 is an arithmetic **progression**. 2, 5, 8, 11
arithmetic progression /ə'rɪθmətɪk prə'greʃn/	An **arithmetic progression** adds the same amount at each step.
common difference /'kɒmən 'dɪfrəns/	In the sequence 3, 7, 11, 15, the **common difference** is 4. 3, 7, 11, 15 4
term /tɜːm/	In $3x + 2$, $3x$ is a **term**. $3x + 2 \quad 3x$
geometric progression /ˌdʒiːəʊ'metrɪk prə'greʃn/	A **geometric progression** multiplies by the same factor each step.
common ratio /'kɒmən 'reɪʃɪəʊ/	In the sequence 2, 6, 18, 54, the **common ratio** is 3. 2, 6, 18, 54 3

Word	Example
converges /kən'vɜ:dʒɪz/	The series 1 + ½ + ¼ + … **converges** to 2. 1 + ½ + ¼ + … 2
sum to infinity /sʌm tʊ ɪn'fɪnɪti/	The **sum to infinity** of 1 + ½ + ¼ + … is 2. 1 + ½ + ¼ + … 2
Differentiation /ˌdɪfəˌrenʃi'eɪʃn/	**Differentiation** finds the gradient of a curve.
gradient of a curve /'greɪdɪənt əvə kɜ:v/	The **gradient of a curve** changes from point to point.
limit /'lɪmɪt/	The terms of 1, ½, ¼, … get closer and closer to a **limit** of 0. 1, ½, ¼, … 0
derivative /dɪ'rɪvətɪv/	Use the **derivative** to find the curve's slope at this point.
chain rule /tʃeɪn ru:l/	Use the **chain rule** for a function inside another function.
second derivative /'sekənd dɪ'rɪvətɪv/	The **second derivative** tells us how the gradient changes.
normal /'nɔ:ml/	The **normal** is a line at 90° to the surface. 90°
increasing function /ɪn'kri:sɪŋ 'fʌŋkʃn/	$y = 2x + 1$ is an **increasing function**: y goes up as x goes up. $y = 2x + 1$ x y
decreasing function /'di:kri:sɪŋ 'fʌŋkʃn/	$y = -x$ is a **decreasing function**: y goes down as x goes up. $y = -x$ x y
rate of change /reɪt ɒv tʃeɪndʒ/	The **rate of change** is 5 metres per second. 5 metres per second
stationary point /'steɪʃənəri pɔɪnt/	The tangent is horizontal at a **stationary point**.
minimum point /'mɪnɪməm pɔɪnt/	The curve $y = x^2$ has a **minimum point** at (0, 0). $y = x^2$ (0, 0)

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Word	Example
maximum point /'mæksɪməm pɔɪnt/	The curve $y = -x^2$ has a **maximum point** at (0, 0). $y = -x^2$ (0, 0)
Integration /ˌɪntɪ'greɪʃn/	**Integration** finds the total change.
constant of integration /'kɒnstənt ɒv ˌɪntɪ'greɪʃn/	The **constant of integration** c is there because every curve $y = x^2 + c$ has the same gradient 2x. $y = x^2 + c$ 2x c
definite integral /'defɪnət 'ɪntɪgrəl/	A **definite integral** has limits and gives a number, such as an area.
region /'ri:dʒn/	The inequality $y > x^2$ describes a **region** above the curve. $y > x^2$
improper integral /ɪm'prɒpə 'ɪntɪgrəl/	The integral of $1/x^2$ from 1 to infinity is an **improper integral**. $1/x^2$ 1
volume of revolution /'vɒlju:m ɒv ˌrevə'lu:ʃn/	Find the **volume of revolution** by rotating this region about an axis.
algebra /'ældʒɪbrə/	In **algebra**, letters stand for numbers.
calculus /'kælkjʊləs/	**Calculus** includes differentiation and integration.
coefficient /ˌkəʊɪ'fɪʃənt/	The number in front of the letter is the **coefficient**.
parabola /pə'ræbələ/	A thrown ball follows a **parabola**.
midpoint /'mɪdpɔɪnt/	The **midpoint** of (0, 0) and (4, 6) is (2, 3). (0, 0) (4, 6) (2, 3)
perpendicular bisector /ˌpɜ:pən'dɪkjʊlə baɪ'sektə/	Every point on the **perpendicular bisector** is the same distance from both ends.

Word	Example
arc length /ɑːk leŋθ/	Measure the **arc length** along the curved edge.
reference angle /ˈrefrəns ˈæŋgl/	Find the **reference angle** before choosing the sign of sine.
amplitude /ˈæmplɪtjuːd/	Loud sounds have a large **amplitude**.
period /ˈpɪərɪəd/	The **period** of the wave is 0.02 s. 0.02 s

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