Pure Mathematics 3

A-Level Mathematics · Vocabulary in context

Word	Example
Pure Mathematics /pjʊə ˌmæθɪˈmætɪks/	**Pure Mathematics** studies numbers, shapes and patterns for their own sake.
partial fractions /ˈpɑːʃl ˈfrækʃnz/	Use **partial fractions** to split 1/[s(s+1)] into 1/s minus 1/(s+1). 1/[s(s+1)] 1/s 1/(s+1)
rational function /ˈræʃənl ˈfʌŋkʃn/	A **rational function** is one polynomial divided by another.
quotient /ˈkwəʊʃənt/	When you divide 12 by 3, the **quotient** is 4. 12 3 4
remainder /rɪˈmeɪndə/	14 divided by 5 leaves a **remainder** of 4. 14 5 4
factor theorem /ˈfæktə ˈθɪərəm/	The **factor theorem** says f(a) = 0 exactly when (x-a) is a factor of f(x). f(a) = 0 (x-a) f(x)
remainder theorem /rɪˈmeɪndə ˈθɪərəm/	By the **remainder theorem**, $x^3 - 2$ divided by x − 1 leaves remainder −1. $x^3 - 2$ x − 1 −1
binomial expansion /baɪˈnəʊmɪəl ekˈspænʃn/	The **binomial expansion** writes $(1 + x)^n$ as a sum of terms. $(1 + x)^n$
sign change /saɪn tʃeɪndʒ/	A **sign change** in f(x) shows a root lies between the two values. f(x)
iterative formula /ˈɪtərətɪv ˈfɔːmjʊlə/	The **iterative formula** $x_{n+1} = \sqrt{(x_n + 2)}$ gives each new value from the last. $x_{n+1} = \sqrt{(x_n + 2)}$
reciprocals /rɪˈsɪprəklz/	2 and ½ are **reciprocals**. 2 ½

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secant /ˈsiːkənt/	The **secant** of x is 1 divided by cos x. x 1 cos x
cosecant /ˈkəʊsekənt/	The **cosecant** of x is 1 divided by sin x. x 1 sin x
cotangent /ˈkəʊtændʒənt/	The **cotangent** of x is cos x divided by sin x. x cos x sin x
converges /kənˈvɜːdʒɪz/	The series 1 + ½ + ¼ + … **converges** to 2. 1 + ½ + ¼ + … 2
gradient /ˈgreɪdɪənt/	The **gradient** of a distance-time graph gives the speed. –
intercept /ˌɪntəˈsept/	The line crosses the y-axis at the **intercept**. y
inverse tangent /ɪnˈvɜːs ˈtændʒənt/	The **inverse tangent** of 1 is 45°. 1 45°
parametrically	A circle can be written **parametrically** as x = cos t, y = sin t. x = cos t, y = sin t
implicitly /ɪmˈplɪsɪtli/	$x^2 + y^2 = 25$ defines y **implicitly**. $x^2 + y^2 = 25$ y
Integration by parts /ˌɪntɪˈgreɪʃn baɪ pɑːts/	**Integration by parts** helps with products like $x \cdot e^x$. $x \cdot e^x$
Integration by substitution /ˌɪntɪˈgreɪʃn baɪ ˌsʌbstɪˈtjuːʃn/	**Integration by substitution** replaces x with a new variable to make the integral easier. x
vector /ˈvektə/	A **vector** describes both size and direction.
magnitude /ˈmægnɪtjuːd/	The **magnitude** of a vector is its length.
modulus /ˈmɒdjʊləs/	The **modulus** of 4 + 3j is 5. 4 + 3j 5
unit vector /ˈjuːnɪt ˈvektə/	A **unit vector** has a magnitude of 1, such as i or j. 1 i j

Word	Example
position vector /pəˈzɪʃn ˈvektə/	The **position vector** of point A tells you where A is from the origin. A A
displacement vector /dɪˈspleɪsmənt ˈvektə/	The **displacement vector** shows the change from start to finish.
scalar /ˈskeɪlə/	Mass is a **scalar** because it has no direction.
parallel /ˈpærəlel/	**Parallel** lines have equal gradients and never meet.
intersect /ˌɪntəˈsekt/	The two lines **intersect** at (2, 3). (2, 3)
skew lines /skjuː laɪnz/	**Skew lines** do not meet and are not parallel.
scalar product /ˈskeɪlə ˈprɒdʌkt/	The **scalar product** of perpendicular vectors is zero.
perpendicular /ˌpɜːpənˈdɪkjələ/	The wall is **perpendicular** to the floor.
differential equation /ˌdɪfəˈrenʃl ɪˈkweɪʒn/	A **differential equation** links a quantity and its rate of change.
separable /ˈsepərəbl/	$dy/dx = xy$ is **separable**. $dy/dx = xy$
general solution /ˈdʒenərəl səˈluːʃn/	The **general solution** includes the constant c. c
initial condition /ɪˈnɪʃl kənˈdɪʃn/	The **initial condition** states the capacitor's starting voltage.
particular solution /pəˈtɪkjələ səˈluːʃn/	Use the starting value to find c and get the **particular solution**. c
complex number /ˈkɒmpleks ˈnʌmbə/	The **complex number** $4 + 3j$ has a real part of 4. $4 + 3j$ 4

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real part /rɪəl pɑːt/	In $3 + 4i$, the **real part** is 3. $3 + 4i$ 3
imaginary part /ɪˈmædʒɪnəri pɑːt/	In $3 + 4i$, the **imaginary part** is 4. $3 + 4i$ 4
Cartesian form /kɑːˈtiːzɪən fɔːm/	In **Cartesian form**, a complex number is written $x + iy$. $x + iy$
conjugate /ˈkɒndʒuːgeɪt/	The **conjugate** of $2 + \sqrt{3}$ is $2 - \sqrt{3}$. $2 + \sqrt{3}$ $2 - \sqrt{3}$
argument /ˈɑːgjuːmənt/	A positive real complex number has **argument** zero.
Argand diagram /ˈɑːgænd ˈdaɪəgræm/	An **Argand diagram** shows a complex number as a point.
polar form /ˈpəʊlə fɔːm/	In **polar form**, a complex number uses its length and angle.
locus /ˈləʊkəs/	The **locus** $\lvert z - 2\rvert = 3$ is a circle. $\lvert z - 2\rvert = 3$