

# Glossary

Term	Definition	Notes
°C	Degrees Celsius, a unit of measurement for temperature. To convert to degrees Fahrenheit, $^{\circ}\text{F} = ^{\circ}\text{C} \times \frac{9}{5} + 32$	
absolute or global extrema	The highest or lowest value that a function can take	
acceleration	Rate of change of velocity	
accepted value	A value used when the exact value is not known	
acute	An acute angle has a measurement of less than 90 degrees	
adjacent ( <i>a</i> )	The side in a right-angled triangle next to a given angle	
algebra	The study of operations and relations	
algebraic function	A function consisting of variables and rational coefficients	
alternate	Equal angles formed on opposite sides of a line that crosses two parallel lines, for example the inner angles of a Z	
alternative ( $H_1$ ) hypothesis	This is what you accept if the observed value is a rare event when the null hypothesis is true	
altitude	Height. In a triangle, this is the perpendicular distance from the base to the apex	
ambiguous case (of triangles)	Given the size of one angle and the lengths of two sides a unique triangle can not be drawn	
amplitude	Half the distance between the minimum and maximum values of the range of a periodic function	
angle of depression	The angle formed below the horizontal to an object	
angle of elevation	The angle formed above the horizontal to the top of an object	
antecedent	The initial part, or cause, of an argument	

Term	Definition	Notes
antiderivative	See integral	
antidifferentiation	See integration	
apex	Point, for example of a triangle or cone	
approximated value	An estimate of an exact value. This involves an error which can be calculated as a percentage	
area of a triangle	In any triangle $ABC$ with angles $A$ , $B$ and $C$ , and opposite sides $a$ , $b$ and $c$ respectively, the area is given by $\frac{1}{2} ab \sin C$	
area under the curve	The area bound by a curve and the horizontal axis. This area can be found by differentiating the function	
Argand diagram	A geometric representation of the complex number $z = x + iy$ by the point with co-ordinates $(x, y)$ . The horizontal axis is the real axis and the vertical axis is the imaginary axis	
argument	A compound statement that includes implication	
arguments (in equations)	An angle $\theta$ between the line $OP$ and the positive real axis, where $P$ represents $z$	
arithmetic mean	The mean, or average, found by dividing the sum of all the values by the number of values	
arithmetic progression	Another name for an arithmetic series	
arithmetic sequence	A sequence generated by the same constant or common difference being added onto the previous term	
arithmetic series	The sum of terms in an arithmetic sequence	
associative law	A law which states that changing the association of operations does not change the result. For example $(1 + 6) + 2 = 1 + (6 + 2)$	
asymptote	A straight line that a curve approaches but never meets	

Term	Definition	Notes
at a constant rate	With no change in speed. The gradient of a graph representing constant rate is a straight diagonal line	
average	The result of adding two or more quantities and then dividing this sum by the number of quantities	
average acceleration	Average acceleration = $\frac{\text{change in velocity}}{\text{time}}$	
average rate of change	The slope, or gradient, of a secant line	
average value	A value that has been calculated by taking the sum of all of the values and dividing by the number of values. The result is not exact, and may not even be one of the original values	
average velocity	Average velocity = $\frac{\text{change in displacement}}{\text{time}}$	
$ax^2 + bx + c = 0$	The general form of a quadratic equation	
axiom	A rule or statement that is accepted to be true	
axiomatic	Self-evident	
axis of revolution	An axis in a plane, about which the area bound by a curve and the axis is revolved to form a solid of revolution	
axis of symmetry	A line dividing a shape such that the two parts on either side of the line are identical	
bar chart	A chart which uses bars to give a visual representation of data	
base	A number associated with a power	
base units	Accurately defined units, independent from each other. The seven base units are length (metre), mass (kilogram), time (second), electric current (ampere), temperature (Kelvin), amount of substance (mole) and intensity of light (candela)	

Term	Definition	Notes
base vectors	In three dimensions, the base vectors in the direction of the $x$ -, $y$ -, and $z$ - axes are $\mathbf{i} = (1\ 0\ 0)$ , $\mathbf{j} = (0\ 1\ 0)$ and $\mathbf{k} = (0\ 0\ 1)$ respectively	
bearings	The position of an object, with reference to the angle it makes with a set point or pole	
Bernoulli experiment	An experiment based on the binomial distribution. There are a fixed number of independent trials done under the same conditions, each trial has two possible outcomes; success or failure with the probability of success $p$ and the probability of failure $q = 1 - p$	
biased sample	A sample in which certain groups are over- or under-estimated	
biconditional	Cases where two statements are either true together or false together - they are equivalent to each other	
bimodal	A distribution with two modal values	
binomial distribution	$X$ follows a binomial distribution if $P(X = x) = (n\ r)p^r q^{n-r}$ for $r = 0, 1, 2, \dots, n$	
binomial experiment	An experiment in which the sample is based on the binomial distribution	
bisect	In geometry, to cut an angle in half	
bivariate	Data concerning two variables ( $x, y$ )	
bivariate analysis	Bivariate analysis is concerned with the relationship between pairs of variables ( $x, y$ ) in a data set	
boundary condition	A known value which is used to find the particular solution of a differential equation	
box and whisker graph	A graphical representation of a distribution using only the minimum, maximum, median and the lower and upper quartiles of the data	
Cartesian equation	The equation of a line or curve expressed only in terms of the variables $x$ and $y$	
Cartesian equation of a plane	The equation of a plane expressed in the variables $x, y$ and $z$	

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Celsius	A unit of measurement for temperature. To convert to degrees Fahrenheit, $^{\circ}\text{F} = ^{\circ}\text{C} \times \frac{9}{5} + 32$	
chain rule of differentiation	The rule which allows you to differentiate a function of a function	
chi-squared test ( $\chi^2$ )	A statistical test used to determine if sets of data are independent	
circumference	The perimeter or distance around the edge of a circle	
class boundaries	Upper and lower limits of a class of data in a set of grouped data	
cm	A metric measure of length, centimetre	
cm <sup>2</sup>	A metric measure of area, square centimetre	
cm <sup>3</sup>	A metric measure of volume, cubic centimetre	
coefficient of determination	An indication of how much of the variation in one set of data can be explained by the variation in the other set of data	
co-function identities	Equations giving a relationship between the functions sin and cosine	
coincident vectors	For coincident vectors, $\mathbf{a} \cdot \mathbf{a} = a^2$	
collinear	Collinear points all lie on a straight line	
column vector form	A vector represented in the form $(x \ y)$ , where $x$ represents a movement in the positive $x$ direction and $y$ a movement in the positive $y$ direction	
combinations	Choices. The number of possible arrangements when order is not important	
common difference	The constant difference between consecutive terms in an arithmetic progression	
common fraction	Fractions in which both the numerator and denominator are integers	
common ratio	The constant multiplier used to form each consecutive term in a geometric series	

Term	Definition	Notes
commutative law	A law that states that the order of the terms does not affect the result of the operation. For example $2 + 3 = 3 + 2$	
compass points	The directions on a compass. The four cardinal compass points are North (N), South (S), East (E) and West (W)	
complement	If $A$ is a set, then the subset of the sample space $U$ containing all elements not in $A$ is the complement of $A$ , denoted $A'$	
completing the square	Rearranging a function into the form $(ax + b)^2 + c$ where $c$ is a constant	
complex $n$ th roots of the unity	Complex numbers $z$ that are solutions of the equation $z^n = r\cos\theta$	
component	The part of a vector which gives the movement of the vector parallel to one of the coordinate axes	
composite function	The resultant function when two or more functions are combined	
compound interest	Interest which is not calculated only on the original sum, but on the accumulated sum	
compound statement	A statement made up of simple statements joined together by connectives	
concave down	If $f'(x) < 0$ for all $x$ in $(a, b)$ then $f$ is concave down on $(a, b)$	
concave up	If $f'(x) > 0$ for all $x$ in $(a, b)$ then $f$ is concave up on $(a, b)$	
conclusion	What you believe to be true at the end of an experiment	
concurrent	Lines that all pass through a certain point	
conditional probability	The likelihood of an event after taking account of what is known about another event	
cone	A solid figure with a circular base connected to a point or vertex	
confounding factor	An additional variable that may have an affect on the data	
congruent	With the exact same form	

Term	Definition	Notes
conjecture	A rule which generalizes findings made by observing patterns	
conjugate	If $z = a + ib$ then its complex conjugate is $z^* = a - ib$	
conjunction	In logic, meaning 'and', represented by the symbol $\wedge$ . The equivalent to intersection in set theory	
connectives	Terms linking simple statements to produce a compound statement. The five connectives commonly used are NOT, AND, OR, OR and IF... THEN	
consequent	The effect in a compound statement	
constant function	A function taking only one fixed value. The graph of a constant function is a straight horizontal or vertical line	
constant multiple rule of differentiation	The derivative of a constant times a function is the constant times the derivative of the function	
constant multiple rule of integration	The integral of a constant times a function is the constant times the integral of the function	
constant of integration	When a constant is differentiated it goes to zero. When integrating you need to assume that there was a constant in the original function and include this in the result	
constant rule of differentiation	The derivative of any constant is zero	
constant rule of integration	The integral of a constant $k$ is $kx$ plus a constant of integration, $C$	
constraint	Known limits used to solve an optimization problem	
contingency table	A table containing observed data	
continuous	A quantitative continuous variable can be measured and its accuracy depends on the accuracy of the measuring instrument used	
continuous	A continuous function is able to have all values within a given range	
continuous random variable	A random variable that can take on any value in some interval	

Term	Definition	Notes
contradiction	A (logical) contradiction is a compound statement which is false whatever the truth values of its simple statement	
contrapositive	For the direct statement $p \rightarrow q$ , the contrapositive is the statement $\neg q \rightarrow \neg p$	
convergent series	The sum of the series tends towards a specific value as the number of terms in the series increases	
convergent, converging	A series is converging if, as $n$ gets very large, the values of the series approaches a limit, the sum to infinity	
converse	For the direct statement $p \rightarrow q$ , the converse is the statement $q \rightarrow p$	
conversion graph	A graph used to estimate the value of the dependent variable at a known value of the independent variable	
correct to one decimal place	When a value is rounded to the nearest tenth	
correct to three decimal places	When a value is rounded to the nearest thousandth	
correct to two decimal places	When a value is rounded to the nearest hundredth	
correlation	A measure of linear association between two variables. It takes values between 1 and -1, and is independent of any linear change of scale of the variables	
corresponding coefficients	Coefficients of the same power of a variable	
cosine	One of the trigonometric ratios. For an angle in a right angled triangle, $\cos \theta = \text{adjacent/hypotenuse}$	
cosine rule	In any triangle $ABC$ , $a^2 = b^2 + c^2 - 2bc \cos A$	
counterexample	An integer that makes the converse a false statement	
critical number	A critical number of $f$ is a point where $f'(x) = 0$ or is undefined	
critical value	The first value at either end for which $H_0$ would be rejected	



Term	Definition	Notes
cross-section	A slice through a three-dimensional solid figure. The cross section of a right prism is the same shape and size throughout the solid	
cube roots of unity	Complex numbers $z$ that are solutions of the equation $z^3 = r\cos\theta$	
cubic function	A function in which the highest power of the variable is 3	
cubic metre	A measure of volume, $\text{m}^3$ . $1\text{m}^3$ is a cube which has lengths all equal to 1m	
cumulative distribution function (CDF)	$F(x) = P(X \leq x)$ is the cumulative distribution function for the random variable $X$	
cumulative frequency	The sum of all of the frequencies up to and including the new value	
cumulative frequency curve (or graph)	A graph with the upper class boundary on the $x$ -axis and the cumulative frequency on the $y$ -axis	
cylinder	A solid figure with two congruent and parallel circular faces	
das	Decasecond, a unit of time	
data	Collected information	
decimal expansion of a rational number	A representation of a rational number using decimals. This may be finite or not	
decimal fraction	A number represented as a fraction	
decreasing function	A function $f(x)$ is decreasing for $a < x < b$ if the graph of $y = f(x)$ has a negative gradient, or $f'(x) < 0$ , for all values of $x$ in the interval $a < x < b$	
definite integral	Integration between given limits $a$ and $b$	
definite integration	Integration evaluated with numerical limits, giving an exact value	
degree mode	A setting on a GDC. By choosing this setting, all angles are given in degrees	
degrees	An angle measure. 1 degree is equal to $\frac{1}{360}$ of a whole circle	

Term	Definition	Notes
degrees of freedom	In a chi-squared test, degrees of freedom = (number of rows – 1) × (number of columns – 1)	
density	$\text{density} = \frac{\text{mass}}{\text{volume}}$	
dependent events	The outcome of one event has no affect on the outcome of another event being considered	
dependent variable	A variable affected by a change in another variable	
depreciation	When a value decreases over time	
derivative	The result when a function has been differentiated. The derivative with respect to $x$ is denoted by $\frac{dy}{dx}$ or $f'(x)$	
derivative of $e^x$	If $f(x) = e^x$ then $f'(x) = e^x$	
derivative of $\ln x$	If $f(x) = \ln x$ then $f'(x) = \frac{1}{x}$	
derivatives of sin, cos and tan	The derivatives of $\sin(x)$ , $\cos(x)$ and $\tan(x)$ are $\cos(x)$ , $-\sin(x)$ and $\sec^2(x)$ respectively	
derived units	Units expressed in terms of the base units	
Descartes' rule of signs	The number of positive real roots of a polynomial $f(x)$ is equal to the number of variations in sign (from + to – or from – to +) of the coefficients, or an even number less. Also the number of negative real roots of a polynomial $f(x)$ is equal to the number of variations in sign of the coefficients of $f(-x)$ , or an even number less.	
deviation	Difference between two values	
difference	If $a - b = c$ , then $c$ is the difference of $a$ and $b$	
difference quotient	The expression $f(x + h) - \frac{f(x)}{h}$ , which gives the gradient of the secant line	
differentiable	A function which can be differentiated	

Term	Definition	Notes
differentiation	Process used to find the gradient of the tangent to a curve at a particular point	
dilation	A stretch or compression of a graph. The result of multiplying the variable $x$ (horizontal dilation) or $y$ (vertical dilation) by a constant $a$	
directed line segment	A vector with direction used to describe the effect of a translation	
direction of a vector	If vector $OP = r\cos\theta\mathbf{i} + r\sin\theta\mathbf{j}$ , where $\mathbf{i}$ and $\mathbf{j}$ are unit vectors in the $x$ - and $y$ -directions, then the direction of the vector, $\tan\theta = \frac{y}{x}$	
discontinuity	A point where a function is undefined, and the graph of the function is broken at that point	
discontinuous	A function that is not continuous	
discrete	Able to have only certain values	
discrete random variable	A random variable where all of the outcomes can be listed	
discriminant	In a quadratic equation $ax^2 + bx + c = 0$ the discriminant is $b^2 - 4ac$	
disjoint	separate	
disjunction	Inclusive or. The disjunction of any two statements $p$ and $q$ is written $p \vee q$ . Disjunction corresponds to union in set theory, where if $x$ is an element of $P \cup Q$ , then $x$ can be placed in either set $P$ or set $Q$ or in the intersection $P$ and $Q$	
displacement	The distance of a moving body from the original point after time $t$ . This is a vector quantity	
displacement function	A function that models the position of an object from an origin at any time $t$	
displacement vector	A vector which represents the movement from one point to another	
distance	A scalar quantity describing length	
distance from a point to a plane	The distance along the perpendicular to the plane that contains the point	

Term	Definition	Notes
distinct	different	
distribution function	A function which models the cumulative frequencies of the outcomes of an experiment. The cumulative distribution (CDF), $F$ , of a discrete random variable $X$ is defined by: $F(x) = P(X \leq x) = \sum P(X = t)$	
distributive law	Used to expand brackets and factorize expressions. $a(b + c) = ab + ac$	
divergent	Without a limit	
dm	decimetre, a unit of length	
domain	A set of values which define the elements of the independent variable (the $x$ -values)	
dot product	The scalar product of two vectors	
double angle identities	Formulae involving $\sin 2\theta$ , $\cos 2\theta$ and $\tan 2\theta$	
double-angle identity	Standard trigonometric identity involving the angles $A$ and $2A$	
dynamic	involving movement	
dynamical system	A system generated by a recurrence relation where $z_{n+1}$ is defined in terms of $z_n$	
edge	The line at which two faces meet	
elementary function	A function that is algebraic, transcendental, or a sum, difference, product, quotient or composition of algebraic and transcendental functions	
elimination method	A method used to solve simultaneous equations. One of the variables is eliminated by expressing it in terms of another variable	
empty set	A set containing no elements	
end behavior	The appearance of a graph as it is followed further and further in either direction	
equal	Two complex numbers are equal if both their real and imaginary parts are equal	

Term	Definition	Notes
equal roots	When the solutions of a quadratic function are the same factor twice	
equal vectors	Two vectors are equal if they have the same direction and the same magnitude; their <b>i</b> , <b>j</b> , <b>k</b> components are equal too, and so their column vectors are equal	
equation	A mathematical expression involving an equality	
equivalent (logically)	With the same meaning or effect	
equivalent fractions	Fractions that are equal in value, but represented by different values of numerators and denominators	
error	The difference between an estimated value and the exact value	
estimate	An approximation of an actual value	
estimate of a quantity	An approximation that is usually used to check the reasonableness of an answer	
estimate of the mean	To calculate the mean from a grouped frequency table, an estimate of the mean is total of $f_i x$ / total frequency where $f_i$ is the frequency and $x_i$ is the corresponding midpoint of each class	
estimated value	An approximation of an exact value	
even function	A function for which $f(x) = f(-x)$ for all values of $x$	
event	An outcome from an experiment	
exact value	A numerical value which is exact	
exchange rate	A rate used to convert between two units of currency	
exclusive disjunction	One or the other but not both	
exclusive or	One or the other but not both	
expected frequencies	An estimation of the frequency. When testing for independence, the formula for probability of independent events can be used	
expected value	The mean or expected value of a random variable is defined as $E(X) = \sum p x$	

Term	Definition	Notes
experiment	The process by which we obtain an observation	
exponent	A number showing how many times the base number is multiplied by itself	
exponential	A function of the form $a^x$ where $a$ is a positive constant	
exponential growth and exponential decay	Growth and decay which result from changes over time given by $y = Ae^{kt}$ and $y = Ae^{-kt}$ respectively, where $k > 0$	
extrapolation	Prediction for values of $x$ which lie outside the range of values used to construct the line of regression	
factorial (!)	The product of all integers up to and including that number	
Fahrenheit	A measure of temperature	
failure	The opposite of success	
fallacy of the converse	When the converse of a valid argument is not valid	
family of curves	The collection of all curves whose equations satisfy the differential equation	
field of complex numbers	A structure containing complex numbers in which addition and multiplication satisfy certain rules	
field of real numbers	A structure containing real numbers in which addition and multiplication satisfy certain rules	
finite	A value with a limit	
finite set	A set with a finite number of elements	
first derivative	A function differentiated once. If the function is differentiated with respect to $x$ the first derivative is denoted $\frac{dy}{dx}$ or $f'(x)$	
first derivative test	A test used to locate relative extrema of a function $f$	
first quartile	The value one-quarter of the way into the data. One quarter of the data lies below the first quartile and three-fourths lies above	

Term	Definition	Notes
five statistical summary	A list of information from which you can get a sense of a data set's distribution	
frequency density	Used, instead of frequency, for histograms with intervals of varying width. Frequency density = $\frac{\text{frequency}}{\text{interval width}}$	
frequency histogram	A visual representation of data using the class boundaries and the frequencies	
frequency polygon	A graphical representation of data. It plots the midpoints of each class of a frequency diagram against the frequency on a graph. It is formed by joining the midpoints of each class by straight lines	
frequency table	A table used to record statistical data, giving an easy way to view the data quickly and see any patterns	
function	A mapping in which each $x$ -value maps onto one and only one $y$ -value	
fundamental theorem of algebra	A theorem referring to the existence of the complex zeroes of a polynomial	
fundamental theorem of calculus	If $f$ is a continuous function on the interval $a \leq x \leq b$ , and $F$ is an antiderivative of $f$ on $a \leq x \leq b$ , then $\int_a^b f(x) \, dx = [F(x)]_a^b = F(b) - F(a)$	
g	An abbreviation of gram, a measure of mass	
Gaussian plane	The plane model of complex numbers, sometimes called an Argand diagram	
general form	The general form of a straight line is $ax + by + c = 0$ where $a$ , $b$ , and $c$ are constants	
general formula for the $n$ th term	Denoted by $u_n$ . By substituting values for $n$ the general term becomes a specific term	
general formula for the solutions of a quadratic equation	A formula used to find the solutions of a quadratic equation given in the general form	

Term	Definition	Notes
general solution	A solution of a differential equation which contains an arbitrary constant. It defines a family of curves	
geometric progression	See geometric sequence	
geometric sequence	A sequence in which the next term is always formed by multiplying the previous term by the same constant. Sometimes called a Geometric Progression	
geometric series	The sum of the terms of a geometric sequence	
geometric vector	A vector represented by an arrow or directed line segment	
geometry	The study of the size and shape of points, lines, angles, surfaces and solid figures	
golden ratio	The length-to-width ratio of a golden rectangle	
googol	The number one followed by one hundred zeros	
gradient	The slope of a straight line which includes its direction or sign. Positive gradient is + and negative gradient is -	
gradient function	A function expressing the gradient of a function	
gradient-intercept	$y = mx + c$ is the gradient-intercept form of the straight line equation, where $m$ is the gradient of the line and $c$ is the point at which the line intercepts the $y$ -axis	
group	When data is spread over a wide range, the data can be treated in groups rather than individual values	
grouped frequency table	A table used to organise large sets of data by recording the data in groups rather than by individual data values	
harmonic series	The series $1 + \frac{1}{2} + \frac{1}{3} + \dots + \frac{1}{r}$ where $r \in \mathbb{Z}$ and $\frac{i}{r}$ is the general term	
height (of a prism)	The distance between the two faces of a prism	



Term	Definition	Notes
hemisphere	A solid figure with two faces, one plane and one curved. Half a sphere	
hence	A command term that is frequently used in exams. It tells you to use the preceding work to find the required result	
hg	hectogram, a unit of mass	
higher order derivatives	The derivative of a derivative, or the derivative of the derivative of a derivative, etc	
highest common factor	The largest factor common to the terms being considered	
histogram	A frequency diagram where the area of each bar is proportional to the frequency of the observations in that class interval	
horizontal	A line that has zero gradient	
horizontal asymptote	A horizontal line that the graph of a function approaches but never meets as $x$ tends to infinity	
horizontal component	The amount of movement in the direction of the horizontal axis	
horizontal stretch of scale factor	A value which shows the extent of a horizontal stretch or compression	
horizontal translation	A movement of a graph in the direction (positive or negative) of the horizontal axis	
hyperbola	A curve with equation $ax^2 - by^2 = c^2$ where $a$ , $b$ and $c$ are constant	
hypotenuse ( $h$ )	The longest side in a right-angled triangle. The side opposite the right angle	
hypotheses	An idea to be accepted or rejected following an experiment	
identical (sets)	Sets which contain identical elements	
identity	A statement involving a variable which is true for all values of the variable	
identity function	A function which has no affect on the input value	

Term	Definition	Notes
image	The resulting values when all values in the range are input into a function	
imaginary part	$b$ , the coefficient of $i$ in the complex number $a + ib$	
imaginary unit	The imaginary unit $i$ is equal to the square root of $-1$ , so $i^2 = -1$	
implication	The connective IF... THEN. Represented by the symbol $\Rightarrow$	
implicit	Differentiating a function of one variable with respect to another variable	
impossible	An event is impossible if it has the probability 0	
improper fraction	A fraction where the numerator has a greater value than the denominator	
included angle	The angle between two two sides of known length	
inclusive disjunction	Inclusive or. For two statements $p$ and $q$ , it is written $p \vee q$ . Disjunction corresponds to union in set theory, where if $x$ is an element of $P \cup Q$ , then $x$ can be placed in either set $P$ or set $Q$ or in the intersection of $P$ and $Q$	
inclusive or	Inclusive disjunction. For two statements $p$ and $q$ , it is written $p \vee q$ . Disjunction corresponds to union in set theory, where if $x$ is an element of $P \cup Q$ , then $x$ can be placed in either set $P$ or set $Q$ or in the intersection of $P$ and $Q$	
increasing function	A function $f(x)$ is increasing for $a < x < b$ if the graph of $y = f(x)$ has a positive gradient, or $f'(x) > 0$ , for all values of $x$ in the interval $a < x < b$	
increment	A small increase in value	
indefinite integral	The opposite of differentiation, denoted by the symbol $\int f(x) dx$	
indefinite integration	The opposite of differentiation, with the symbol $\int f(x) dx$ . The integral is given in terms of $x$ with a constant of integration, $C$ , without being evaluated for specific values of $x$	

Term	Definition	Notes
independent events	$A$ and $B$ are independent events if the outcome of $A$ does not affect the outcome of $B$ and vice versa	
independent variable	A variable which is not affected by other variables	
index	The power to which a number or variable is raised	
induction	A form of proof of a hypothesis	
infinite	With no limit	
infinite set	A set with an unlimited number of elements	
inflation	An increase in monetary value	
inflexion points	The points on a graph where the concavity changes	
initial condition	A boundary condition when $t$ is zero	
initial point	The starting point of a position vector	
initial position	The position of an object when $t = 0$	
initial side	The side of an angle that lies along the positive $x$ -axis	
initial velocity	The velocity of an object at the starting point	
inner product	Given two non-zero vectors $\mathbf{u}$ and $\mathbf{v}$ , $\mathbf{u} \cdot \mathbf{v} =  \mathbf{u}  \mathbf{v} \cos\theta$ , where $\theta$ is the angle between $\mathbf{u}$ and $\mathbf{v}$ . Otherwise $\mathbf{u} \cdot \mathbf{v} = 0$ . The result is always a number	
instantaneous acceleration	Acceleration at a specific point	
instantaneous rate of change	The slope of a tangent line at a specific point on the graph of a function	
instantaneous velocity	Velocity at a specific point	
integer zero theorem	A theorem stating that a root of a polynomial is a factor of the constant term of that polynomial	
integers	The set of whole numbers, positive and negative	
integrable	A function which can be integrated	

Term	Definition	Notes
integral with linear composition	An integral of the form $\int f(ax + b) dx = \frac{1}{a} F(ax + b) + C$ , where $F'(x) = f(x)$	
integrals of $\frac{1}{x}$ and $e^x$	The integrals of $\frac{1}{x}$ and $e^x$ are $\ln(x) + c$ and $e^x + c$ respectively, where $c$ is a constant of integration	
integrals of sin and cosine	The integrals of $\sin(x)$ and $\cos(x)$ are $-\cos(x) + c$ and $\sin(x) + c$ respectively, where $c$ is a constant	
integrand	The function to be integrated	
integration	The opposite of differentiation	
integration by parts	A method of integration whereby an integral is transformed into another integral which is easier to find	
interest	A percentage of an amount paid to you by a bank for a savings account	
interpolation	Prediction for values of $x$ which lie inside the range of values used to construct the line of regression. Where the line is a good fit to the data, these predictions are generally viewed as quite reliable	
interquartile range	The difference between the lower and upper quartiles. It therefore represents the spread of the 'middle half' of the distribution	
intersect (of lines)	The point where two or more lines meet	
intersection	The intersection of subsets $A$ and $B$ , denoted $A \cap B$ , includes the elements that lie in both $A$ and $B$	
invalid	If the compound statement that represents an argument is not a tautology, then the argument is invalid	
invariant	A term that is unchanged by an operation or process	
inverse	The inverse of a function $f(x)$ is $f^{-1}(x)$ . It reverses the action of that function	
inverse	For an original statement, $p \Rightarrow q$ , the inverse is $\neg p \Rightarrow \neg q$	

Term	Definition	Notes
irrational	A number that cannot be expressed as a fraction	
Kelvin	A temperature scale. The freezing point of water is 273.15K, and the boiling point of water is 373.15K	
kilogram per cubic metre	A derived unit used for density or mass density	
kinematics	The study of the motion of objects	
legs (of a triangle)	The two shortest sides of a right angled triangle	
Leibniz's formula	A general case of the product rule for differentiation giving $f''(x)$	
lemma	A theorem which is proved and then used in the proof of another theorem	
level of significance	The level at which a $\chi^2$ test is conducted	
limit	A fixed value that the terms of a sequence approach	
line of best fit	A line drawn on a scatter diagram to find the direction of an association between two variables and to show the trend. This line can be used to estimate values or make predictions	
linear	A linear relationship can be represented by a straight line	
linear combination	A summation of functions which are multiplied by constants	
linear correlation	When the relationship between two sets of data can be represented by a straight diagonal line	
linear function	A function given in terms of a linear expression	
linear space	A system in which vectors and operations satisfy certain axioms	
local maximum	The name given to a maximum point of a curve which has more than one of these points	
local minimum	The name given to a minimum point of a curve which has more than one of these points	

Term	Definition	Notes
logarithm	The logarithm is the power to which the base must be raised to give that number	
logarithmic function	If $b = a^x$ , then $\log_a b = x$	
lower boundary	Calculated by finding the mean of the lower value from the class being considered and the upper value of the previous class	
lower control limit	A lower limit determined from historical data	
lower limit	The lower value at which an integral is evaluated. It represents the $x$ coordinate of the vertical line at the lower boundary of the area bounded by the graph	
lower quartile	Quartiles separate large ordered sets of data into quarters. The lower quartile $Q_1$ can be found by reading the value on the cumulative frequency curve, corresponding to $n + \frac{1}{4}$ on the cumulative frequency axis, where $n$ is the total frequency	
lowest common multiple	The lowest multiple shared by two or more values	
lowest terms (of a fraction)	A fraction given in its most basic form	
magnitude of a vector	The size of a vector. If vector $\mathbf{OP} = r\cos\theta\mathbf{i} + r\sin\theta\mathbf{j}$ , where $\mathbf{i}$ and $\mathbf{j}$ are unit vectors in the $x$ - and $y$ - directions, then the magnitude, $ \mathbf{OP}  = r = (\sqrt{x^2 + y^2})$	
many-to-one function	A function which maps all elements in its domain onto one value in its range	
mathematically independent	When the occurrence of one event does not affect in any way the occurrence of the other	
maximum point	The point at which the gradient of the curve changes from positive to negative	
mean	An average. Calculated by all of the values together, and then dividing the total by the number of values	

Term	Definition	Notes
mean point	A point used to draw a line of best fit. It is calculated by finding the mean of the $x$ values and the mean of the $y$ values	
mean value	Average value to be expected over many trials of the experiment	
measured	A value that can be recorded physically	
median	The middle number when a set is put in ascending or descending order. When there are two numbers in the middle, it is the average of the two middle numbers	
metre per second	A derived unit used for speed or velocity	
midpoint of a class interval	The middle value of the interval. Used to work out an estimate of the mean of a set of data	
minimum point	The point at which the gradient of a curve changes from negative to positive	
minutes	A unit of time. 1 minute is equal to 60 seconds	
mixed number	A number that is expressed as a whole number and a fraction	
ml	An abbreviation of millilitre, a measure of volume	
modal class	The class to which the modal value belongs	
mode	The value which appears most often in a set of data	
modulus	<b>a</b> The magnitude or absolute value of a number $x$ , denoted by $ x $ <b>b</b> The magnitude (or length) of a vector	
modulus-argument form	A complex number in the form $z = r(\cos\theta + i\sin\theta)$ , where $r =  z $ and $\theta$ is an argument of $z$	
multiplicative probability Law	A formula stating that, for two events $A$ and $B$ , $P(A \cap B) = P(A B) \times P(B)$	
multiplicity	A description of a factor that appears more than once	

Term	Definition	Notes
mutually exclusive events	$A$ and $B$ are mutually exclusive events if they can not occur at the same time	
natural logarithm	A logarithm in base $e$ , written as either $\log_e x$ or $\ln x$	
natural numbers	The set of whole numbers, greater than and equal to 1	
necessarily (true or false)	Without doubt or question	
negation	The connective NOT, with the symbol $\neg$ . For the statement $p$ , negation is represented by $\neg p$ . This corresponds to the complement in set theory	
negative correlation	A general downward trend shown on a graph. The dependent variable decreases as the independent variable increases	
negative vector	A vector with equal magnitude but in the opposite direction to the original vector	
non-included angle	An angle that is not between two sides of known length	
non-linear	A relationship that can not be represented graphically by a straight line	
non-linear correlation	When the relationship between two sets of data can not be represented by a straight line. The data sets do not have a visible correspondence	
non-trivial vector	A vector with magnitude greater than zero	
Norm (command)	A function on some GDC calculators which calculates the magnitude of a vector	
normal (line)	The normal to a point on a curve is the straight line perpendicular to the tangent at that point	
normal curve	The graph of a Normal Probability Function (PDF)	



Term	Definition	Notes
normal distribution	A commonly occurring distribution in the natural world and in manufacturing processes. It is symmetric with a single peak at the centre, and often described as 'bell-shaped'	
normal variable	A random variable $X$ described by a PDF which follows a normal distribution with mean $\mu$ and variance $\sigma^2$ . We write $X \sim N(\mu, \sigma^2)$	
not defined	Taking no value	
null ( $H_0$ ) hypothesis	This provides the probability basis under which the test is to be considered - the observed value of the statistic is compared with the sampling distribution if the null hypothesis was true	
null vector	A vector with zero magnitude	
number of elements	The number of objects in a set. This can be evaluated using a Venn diagram	
number sequence	A pattern of numbers arranged in a particular order according to a rule	
number sets	Sets used to classify different types of numbers	
numerical	Considering numbers	
observed data	Data values recorded from an experiment	
odd function	A function where $f(-x) = -f(x)$ for all values of $x$	
ogive	A cumulative frequency diagram	
one-to-one function	A function which maps each element in the domain onto a unique value in the range	
opposite ( $o$ )	The side in a right-angled triangle which lies opposite the angle being considered	
opposite vectors	Vectors which are equal in magnitude, but have opposite direction	
optimization problems	Practical problems involving finding maximum or minimum values	
optimized	minimized or maximized	

Term	Definition	Notes
ordered pairs	The $x$ and $y$ values giving the location of a point on the coordinate grid	
origin	The point where the axes of a coordinate grid meet	
orthogonal	At right angles, perpendicular	
outliers	Extreme values in a distribution. Sometimes outliers are unimportant for the purposes of analysis, but sometimes they are the most important values	
parabola	A smooth $\cup$ or $\cap$ shaped curve. The corresponding function is quadratic	
parallel	Two lines are parallel if they never meet or intersect in a given plane	
parallel vectors	Two vectors are parallel if one is a scalar multiple of the other	
parallelogram law	A law used to find the sum of two vectors	
parameter	<b>a</b> The variable $t$ in a parametric equation $x = f(t)$ , $y = g(t)$ of a curve <b>b</b> The variable $t$ associated with the points on a line used to determine the vector equation of the line	
parametric equation of a plane	The equation of a plane expressed using parameters	
parametric equations	A curve can be defined by expressing $x$ and $y$ in terms of a third variable, called a parameter	
particular solution	A function satisfying the differential equation and which does not include an arbitrary constant	
Pearson product-moment correlation coefficient ( $r$ )	A measure of the correlation between two variables, giving a value between +1 and -1	
percentage	Part of one hundred	
percentage error	A value giving the accuracy of an estimation. Percentage error = $ (v_A - \frac{V_E}{V_E})  \times 100\%$ , where $v_A$ represents approximated value or estimated value, and $v_E$ represents exact value	

Term	Definition	Notes
percentiles	Percentiles separate large ordered sets of data into hundredths. To find the percentiles, $p\%$ , read the value on the curve corresponding to $\frac{p(n+1)}{100}$ on the cumulative frequency axis	
perfect correlation	When all plotted points lie on a straight line	
perimeter	The distance around the outside of a closed figure	
period of a decimal	The digits or group of digits that is repeated after the decimal point	
period of a function	The interval in which a periodic function repeats itself	
periodic function	A function which repeats itself after a given interval	
permutation	An arrangement in which the order of items is important	
perpendicular	Two lines are perpendicular if they form a right angle at their intersection	
perpendicular vectors	Vectors at right angles to each other. Two vectors are perpendicular if and only if their scalar product is zero	
phase shift	A translation of the graph of a trigonometric function along the $x$ -axis	
Pi Approximation Day	July 22, or in day/month format $\frac{22}{7}$ , which is an approximation to the value of $\Pi$	
Pi Day	March 14, or in month/day format 3/14. This is because 3, 1 and 4 are the three most significant digits of $\Pi$	
pictogram	A chart that uses pictures to represent information	
pie chart	A circle divided into sectors. The sector angles are proportional to the quantities they represent	
plane	A flat surface that extends infinitely	
plot	Indicate a pair of coordinates on a graph	

Term	Definition	Notes
Poisson distribution	A probability distribution used to describe independent events with probability within a small fixed interval and where there is no chance of two events occurring at precisely the same moment or at the same place	
polar coordinates	A system in which a point $A$ is specified by its distance $r$ from the pole $O$ and the angle $\theta$ which the line $OA$ makes with the initial line	
polygon	A closed geometric figure with at least three sides	
population	The entire group of people or objects which is of interest, from which samples are drawn or on which a census will be conducted	
position vector	The vector which represents the movement from the origin to a given point	
positive	Greater than zero	
positive correlation	A general upward trend shown on a graph. The dependent variable increases as the independent variable increases	
power	The same as index	
power rule of differentiation	If $f(x) = x^n$ , then $f'(x) = nx^{n-1}$ , where $n \in \mathbb{R}$	
power rule of integration	$\int x^n dx = \frac{1}{n+1} x^{n+1} + C, n \neq -1$	
Power set	The set in a sample space that contains all possible events, denoted $P(U)$	
prefixes	Used to avoid writing very small or very large quantities	
present value	The amount of money that you put in the bank at the start	
prime	A number that is only divisible by one and itself	
probability	A measure of belief, on a scale of 0 to 1, of the likelihood that an event will happen	

Term	Definition	Notes
probability <i>a posteriori</i>	A probability calculated after the event	
probability axioms	The first three probabilities in probability theorem	
probability density function (PDF)	$f(x)$ is the probability density function (pdf) for $X$ if $P(a < x < b) = \int_a^b f(x)dx$ for all values of $a, b$ and certain conditions are satisfied	
probability distribution	A set of possible values, with associated probabilities, for the outcome of a random experiment	
probability distribution function	A formula which expresses the probability that the random variable $X$ takes a value, $k$ , as a function of $k$	
product	The result of a multiplication	
product rule for independent events	$P(A \cap B) = P(A) \times P(B)$	
product rule of differentiation	$\frac{d}{dx} x(uv) = \frac{udv}{dx} + \frac{vdu}{dx}$ , where $u$ and $v$ are functions of $x$	
proper fraction	A fraction where the numerator is smaller than the denominator	
proper subset	A subset that is not identical to the original set	
properties of limits as $x \rightarrow \pm \infty$	Properties to find the limits of a function as $x \rightarrow \infty$ algebraically	
properties of polynomial addition	Properties showing how to combine polynomials under addition and when multiplying with real constants	
properties of polynomial multiplication	Properties showing how to combine polynomials under multiplication	
properties of vector addition	Properties showing how to combine vectors under addition	
proportion	If two properties $a$ and $b$ are in proportion, then the ratio $a:b$ is fixed	
pyramid	A solid figure with a polygon base and triangular sides	
Pythagorean identities	Identities involving $\sin^2 \theta$ , $\cos^2 \theta$ and $\tan^2 \theta$	

Term	Definition	Notes
quadratic equation	An equation in which the highest power of the variable is 2. A quadratic in the variable $x$ has the general form $ax^2 + bx + c = 0$ where $a$ , $b$ and $c$ are constant and $a \neq 0$	
quadratic formula	The formula used to solve a quadratic equation if the equation does not factorise easily. For the equation $ax^2 + bx + c = 0$ , the formula is $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	
quadratic function	A function given in terms of a quadratic expression	
qualitative	Data seen as categories, sometimes called categorical data	
quantitative	Information that can be counted or measured	
quartic function	A function in which the highest power of the variable is 4	
quartiles	The data values which divide the distribution into quarters. They are called the minimum, lower quartile, median, upper quartile and maximum	
quintic function	A function in which the highest power of the variable is 5	
quotient	The result of a division	
quotient rule of differentiation	The derivative of the quotient of two factors is the denominator times the derivative of the numerator minus the numerator times the derivative of the denominator, all divided by the denominator squared	
radian mode	A setting on a GDC. By choosing this setting, all angles are given in radians	
radians (rad)	A unit of angle measurement, $\pi$ radians = $180^\circ$	
random	A random sample must have two characteristics: every individual has an equal opportunity of selection, and the sample has essentially the same characteristics as the population	

Term	Definition	Notes
random experiment	An experiment in which there is uncertainty over which event may occur	
random sample	A sample in which each element has the same chance of being included	
random variable	A quantity that can take any value determined by the outcome of a random event.	
range	The difference between the highest and lowest value recorded	
range	A set of values which define the elements of the dependent variable (the $y$ -values)	
rate (of interest)	A percentage charged on an amount of money	
rate of change (of $f$ with respect to $x$ )	The rate at which a variable changes over time. The instantaneous rate of change applies to an instant of time. The average rate of change applies over a period of time	
ratio	The comparison of two values, using division	
rational function	A function of the form $f(x) = \frac{g(x)}{h(x)}$ , where $g(x)$ and $h(x)$ are polynomials	
rational numbers	The set of numbers of the form $\frac{a}{b}$ where $a$ and $b$ are integers and $b \neq 0$	
real numbers	Numbers which exist and can be shown on the number line	
real part	The value of $a$ in the complex number $a + ib$	
reciprocal	The reciprocal of a number is 1 divided by that number	
reciprocal function	A function of the form $y = \frac{1}{(x-a)}$	
recurring decimal	A decimal in which a digit or a group of digits repeats itself after the decimal point	

Term	Definition	Notes
recursive	In a recursive formula, the value of a term depends on the value of the previous term	
recursive equation	A recursive equation has the form $u_n = u_{n-1} + d$ such that you can work out any term using this equation only if you know or can generate the previous term	
regression	Fitting a line of best fit to data shown in a scatter graph	
regression line	The straight line which provides the best fit to a set of bivariate data, using the criteria which give the minimum sum of squares of the residuals	
regression line for $y$ on $x$	A more accurate version of a line of best fit, also known as the least squares regression line. It is the line drawn through a set of points such that the sum of the squares of the distance of each point from the line is a minimum	
relation	A set of ordered pairs $(x, y)$	
relationship	The relationship between two perpendicular lines is that the product of their gradients is $-1$	
relative extrema	Local minimum and maximum points	
relative frequency	The number of successes divided by the number of trials. This ratio can be used as an estimate of probability. The larger the number of trials, the closer the relative frequency is to the probability	
relative maximum point	A function has a relative maximum point when the function changes from increasing to decreasing	
relative minimum point	A function has a relative maximum point when the function changes from decreasing to increasing	
remains constant	There is no change in the variable	
representative	An unbiased, random understanding of a population	



Term	Definition	Notes
residual	The difference between an observed $y$ value and the value predicted by the regression line	
restrict the domain	A restriction given to the domain so that the relation is a function	
resultant vector	The result when two or more vectors are added and/or subtracted. Also known as the 'resultant'	
right cone	A cone in which the apex is vertically above the centre of the base	
right prism	A prism in which the end faces are the same shape and size and are parallel	
right pyramid	A pyramid in which the apex is vertically above the centre of the base	
right-angled triangle	A triangle containing a right angle	
root	If $x$ is a number, then the square root of $x$ is the number $a$ such that $a^2 = x$	
roots of an equation	The roots, or solutions, of an equation $f(x) = 0$ are the values of $x$ which satisfy the equation. In other words when a root is substituted for $x$ in $f(x)$ the answer is zero	
same degree	Two functions have the same degree if the highest power of the variable in each function is equal	
sample	A subset of a population	
sample space	A list containing all the units or elements which are the members of the population to be sampled	
satisfy (an equation)	A value of $x$ satisfies an equation if it is a solution of the equation	
scalar	A quantity defined only by its magnitude	
scalar multiplication	Multiplication of a vector by a scalar	
scalar product	The result of combining two vectors into a single numerical (scalar) quantity	
scatter diagram (or scatter plot)	A set of points on a coordinate grid. The coordinates of the points represent the values of two variables	

Term	Definition	Notes
secant line	A line that intersects a circle at exactly two points	
second derivative	The result when a function has been differentiated twice	
second derivative test	A method of finding relative extrema of a function by considering its second derivative	
second quartile	The median of the entire set of data	
self-inverse function	A function such that $f(f(x)) = x$	
sequence (of numbers)	A set of terms which are derived using a general rule	
series	The sum of the terms in a sequence	
set builder notation	Mathematical notation used to describe the properties of the elements of a set	
SI	The international abbreviation for the International System of Units	
sigma notation	Notation used to express a sum	
significant figures	The numbers of significant figures in a result is the number of figures that are known with some degree of reliability	
similar triangles	Triangles with the same three angles, and in which their corresponding sides are in the same proportions	
simple	Statements that can easily be determined to be true (T) or false (F)	
simultaneous equations	Several equations in several variables which you can solve to give a common solution	
sin	One of the trigonometric ratios. For an angle in a right angled triangle, $\sin\theta = \text{opposite/hypotenuse}$	
sin rule	In any triangle $ABC$ , $\frac{a}{\sin A} = \frac{b}{\sin B}$ $= \frac{c}{\sin C}$	
size of a vector	Length, or magnitude	
skew	A measure of the lack of symmetry of a distribution	

Term	Definition	Notes
skew lines	Non-parallel straight lines in 3D space which pass each other without intersecting	
slant height	The distance from the apex to any point on the circumference of the base	
SOHCAHTOA	An acronym used to remember the trigonometric ratios in a right-angled triangle	
solid of revolution	A solid figure formed by rotating a plane figure about an axis of revolution	
solution	For the function $f(x)$ , $a$ is a solution if $f(a) = 0$	
solving (triangles)	Finding unknown angles and sides	
speed	Rate of change of distance	
sphere	A solid figure where each point on the surface is an equal distance from the centre	
square	When a value is multiplied by itself	
square metre	A measure of area. 1 square metre is a square with length of 1 metre	
standard deviation	A measure of spread of a set of data. It is the square root of the variance	
standard form	A way of writing very large or very small numbers without writing a lot of zeros. A number is written in standard form if it is in the form $a \times 10^k$ where $1 \leq a < 10$ and $k$ is an integer	
standard normal distribution	If $X \sim N(\mu, \sigma^2)$ then the transformed random variable $Z = X - \mu/\sigma$ has a standard normal distribution	
standard position	An angle with its vertex at the origin and its initial side along the positive $x$ -axis	
standardized normal variable	A method of standardizing a normal variable of unknown mean and variance into the normal variable $Z \sim N(0, 1)$	
statement	A sentence or phrase with a precise mathematical meaning	

Term	Definition	Notes
stationary point	A point where the gradient of the function is zero. It can be a maximum or minimum point or a point of inflexion	
straight line	The shortest distance between two points	
strong correlation	A very visible correspondence between two variables	
structure of an argument	When the argument is a tautology, the structure of the argument is considered to be perfect	
subset	If every element in a given set, $M$ , is also an element of another set, $N$ , then $M$ is a subset of $N$ , denoted $M \subseteq N$	
substitution method	Replace a variable in a formula by a particular value. Often used to solve simultaneous equations	
subtended	A central angle subtended by an arc is an angle with its vertex at the centre of the circle and its sides passing through the endpoints of the arc	
subtraction	The arithmetic operation of taking one value away from another value	
success	A desired outcome	
sum	The result of an addition	
sum or difference rule of differentiation	The derivative of a function that is the sum or difference of two or more terms is the sum or difference of the derivatives of the terms	
sum or difference rule of integration	The integral of a function that is the sum or difference of two or more terms is the sum or difference of the integrals of the terms	
surface area	The sum of the areas of all the faces of a solid	
symmetric difference	The equivalent in set theory of exclusive or	
Tails	The standard name given to one side of a coin	

Term	Definition	Notes
$\tan \theta$	One of the trigonometric ratios. For an angle in a right angled triangle, $\tan \theta = \text{opposite/adjacent}$	
tangent	A line which touches a curve and is parallel to the curve at this point of contact	
tangent identity	An equation showing the relationship between $\tan \theta$ , $\sin \theta$ and $\cos \theta$	
tangent line	A tangent line to a circle intersects the circle once	
tangential	At a tangent to the point of intersection of a circle	
tautology	A compound statement which is true whatever the truth values of the simple statements it is made up from	
term	An individual number or element of a sequence	
terminal point	The end point of a vector	
terminal side	The side of an angle that does not lie along the positive horizontal axis	
terminating decimal	A decimal number with a finite number of digits after the decimal point	
theorem	An idea that has been proved to be true	
theoretical probability	The theoretical probability of an event $A$ is $P(A) = n(A)/n(U)$ where $n(A)$ is the number of ways that event $A$ can occur and $n(U)$ is the total number of possible outcomes	
third quartile	The value three-quarters of the way into the data. Three quarters of the data lies below the third quartile and one quarter lies above	
three-figure bearings	A direction expressed as an angle measured clockwise from north	
transcendental function	Functions that can not be expressed as sums, differences, products, quotients and radicals involving $x^n$	
transformation	In geometry, the means whereby a shape changes its position or shape or both	

Term	Definition	Notes
trial	An experiment conducted a number of times under the same conditions	
triangle law	A method of adding two vectors	
triangular prism	A prism with triangular faces	
trigonometry	The study of angles and lengths of triangles	
truth table	A table in which the truth values associated with a simple statement are tabulated. Each connective has its own truth table associated with it	
truth value	Whether a statement is true (T) or false (F)	
turning point	The point at which the gradient of a curve changes direction. It can be a maximum or minimum point	
unbiased	All outcomes have an equal probability	
undefined	Without a solution	
union	The union of subsets $A$ and $B$ , denoted $A \cup B$ , includes the elements that lie in $A$ , or in $B$ , or in both $A$ and $B$	
unit	A quantity used as a standard	
unit circle	A circle with centre at the origin and radius 1	
unit fraction	A fraction with numerator 1	
unit vector	A vector with a magnitude of 1	
unit vector form	A vector expressed in terms of the base vectors $\mathbf{i}$ and $\mathbf{j}$	
unitary ratio	A ratio in which one of the terms is 1	
univariate	Concerning a single variable	
univariate analysis	Analysis involving a single variable	
universal set	The set including all elements being considered	
upper boundary	Calculated by finding the mean of the upper value from the class being considered and the lower value of the following class	
upper control limit	An upper limit determined from historical data	

Term	Definition	Notes
upper limit	The upper value at which an integral is evaluated. It represents the $x$ coordinate of the vertical line at the upper boundary of the area bounded by the graph	
upper quartile	Quartiles separate large ordered sets of data into quarters. The upper quartile $Q_3$ can be found by reading the value on the cumulative frequency curve corresponding to $3(n + 1)/4$ on the cumulative frequency axis, where $n$ is the total frequency	
valid	An argument is valid if the compound statement that represents the argument is a tautology	
variable	A letter which can take various numerical values. Not a constant	
variable of integration	The variable with respect to which a function is integrated	
variance	The average squared distance from the mean for a set of data	
vector	A quantity with both magnitude and direction	
vector (cross) product	Given $\mathbf{u} = u_1\mathbf{i} + u_2\mathbf{j} + u_3\mathbf{k}$ and $\mathbf{v} = v_1\mathbf{i} + v_2\mathbf{j} + v_3\mathbf{k}$ , the vector (cross) product of $\mathbf{u}$ and $\mathbf{v}$ is the vector $\mathbf{u} \times \mathbf{v} = (u_2v_3 - u_3v_2)\mathbf{i} + (u_3v_1 - u_1v_3)\mathbf{j} + (u_1v_2 - u_2v_1)\mathbf{k}$	
vector equation of a line	The equation of a straight line expressed in terms of vectors and a parameter	
vector equation of a plane	When a plane has a point with position vector $\mathbf{a}$ and two non-collinear vectors $\mathbf{u}$ and $\mathbf{v}$ parallel to the plane are known, then any point on the plane with position vector $\mathbf{r}$ satisfies the vector equation of the plane $\mathbf{r} = \mathbf{a} + \alpha\mathbf{u} + \beta\mathbf{v}$	
vector space	A set whose elements satisfy certain properties under addition and multiplication	
velocity	Rate of change of displacement	
velocity function	The instantaneous rate of change of displacement	
Venn diagram	A diagram showing the relationship between events represented as sets, with associated probabilities	

Term	Definition	Notes
vertex	A point where two lines intersect	
vertical	Perpendicular, or at 90 degrees, to the horizontal	
vertical asymptote	A vertical asymptote occurs when the value of $y$ tends to infinity as $x$ tends to 0	
vertical axis	In the Cartesian coordinate system, this is the $y$ -axis	
vertical component	The amount of movement in the direction of the vertical axis	
vertical height	The distance from the apex to the centre of the base	
vertical stretch of scale factor	A value which shows the extent of a vertical stretch or compression	
vertical translation	A movement parallel to the vertical axis	
volume of a cuboid	Volume of a cuboid is $V = l \times w \times h$ where $l$ is the length, $w$ is the width and $h$ is the height	
volume of a prism	Volume of a prism is $V = \text{area of cross-section} \times \text{height}$	
weak correlation	When the connection between the data sets is questionable	
whole population	The entire group of people or objects which is of interest, from which samples are drawn or on which a census will be conducted	
$x$ -intercept	The coordinates of the point where a line intersects the $x$ -axis. The $y$ coordinate of this point is always zero	
Yates' continuity correction	A method to work out the $\chi^2$ value when the number of degrees of freedom is 1	
$y$ -intercept	The coordinates of a point where a line intersects the $y$ -axis. The $x$ coordinate of this point is always zero	
zero (or no) correlation	No correspondence between variables. Shown by the absence of a trend in the scatter diagram	
zero polynomial	The function $\theta(x) = 0$ . The graph is the $x$ -axis itself	
zero product property	If $xy = 0$ then either $x = 0$ or $y = 0$ or both	
zero vector	All the elements in the vector are zero	