Notation list

There are various systems of notation in use, and the IB has chosen to adopt a system based on the recommendations of the International Organization for Standardization (ISO). This notation is used in the examination papers for this course without explanation. If forms of notation other than those listed in this guide are used on a particular examination paper, they are defined within the question in which they appear.

Because students are required to recognize, though not necessarily use, IB notation in examinations, it is recommended that teachers introduce students to this notation at the earliest opportunity. Students are **not** allowed access to information about this notation in the examinations.

Students must always use correct mathematical notation, not calculator notation.

SL and HL

$\mathbb{N}$	the set of positive integers and zero, $\{0,\ 1,\ 2,\ 3,\ ...\}$
$\mathbb{Z}$	the set of integers, $\{0,\ \pm 1,\ \pm 2,\ \pm 3,\ ...\}$
$\mathbb{Z}^+$	the set of positive integers, $\{1,\ 2,\ 3,\ ...\}$
$\mathbb{Q}$	the set of rational numbers
$\mathbb{Q}^+$	the set of positive rational numbers, $\{x \mid x\ \ \mathbb{Q},\ x > 0\}$
$\mathbb{R}$	the set of real numbers
$\mathbb{R}^+$	the set of positive real numbers, $\{x \mid x\ \ \mathbb{R},\ x > 0\}$
$\{x_1,\ x_2,\ ...\}$	the set with elements $x_1,\ x_2,\ ...$
$n(A)$	the number of elements in the finite set A
$\{x \mid \quad \}$	the set of all x such that
	is an element of
	is not an element of
	the empty (null) set
U	the universal set
	union
	intersection
A	the complement of the set A
$a^{1/2}, \sqrt{a}$	a to the power $\frac{1}{2}$, square root of a (if $a\ \ 0$ then $\sqrt{a}\ \ 0$)
$a^{1/n}, \sqrt[n]{a}$	a to the power of $\frac{1}{n}$, n^{th} root of a (if $a\ \ 0$ then $\sqrt[n]{a}\ \ 0$)
$a^{-n} = \dfrac{1}{a^n}$	a to the power of $-n$, reciprocal of a^n
$\lvert x \rvert$	the modulus or absolute value of x, that is $\begin{cases} x & \text{for } x\ \ 0,\ x\ \ \mathbb{R} \\ -x & \text{for } x < 0,\ x\ \ \mathbb{R} \end{cases}$

	identity
	is approximately equal to
$>$	is greater than
	is greater than or equal to
$<$	is less than
	is less than or equal to
	is not greater than
	is not less than
	implies
	implies and is implied by
u_n	the nth term of a sequence or series
d	the common difference of an arithmetic sequence
r	the common ratio of a geometric sequence
S_n	the sum of the first n terms of a sequence, $u_1 + u_2 + \ldots + u_n$
S	the sum to infinity of a sequence, $u_1 + u_2 + \ldots$
$\displaystyle\sum_{i=1}^{n} u_i$	$u_1 + u_2 + \ldots + u_n$
$n!$	$n(n-1)(n-2)\ldots 3 \times 2 \times 1$
$_nC_r$	$\dfrac{n!}{r!(n-r)!}$
	the discriminant of a quadratic equation, $= b^2 - 4ac$
$f(x)$	the image of x under the function f
f^{-1}	the inverse function of the function f
$f \circ g$	the composite function of f and g
$\dfrac{\mathrm{d}y}{\mathrm{d}x}$	the derivative of y with respect to x
$f'(x)$	the derivative of $f(x)$ with respect to x
$\dfrac{\mathrm{d}^2 y}{\mathrm{d}x^2}$	the second derivative of y with respect to x
$f''(x)$	the second derivative of $f(x)$ with respect to x
$\displaystyle\int y\,\mathrm{d}x$	the indefinite integral of y with respect to x
$\displaystyle\int_a^b y\,\mathrm{d}x$	the definite integral of y with respect to x between the limits $x = a$ and $x = b$
e^x	the exponential function of x
$\log_a x$	the logarithm to the base a of x
$\ln x$	the natural logarithm of x, $\log_e x$
sin, cos, tan	the circular functions
$A(x, y)$	the point A in the plane with Cartesian coordinates x and y

$[AB]$	the line segment with end points A and B
AB	the length of $[AB]$
(AB)	the line containing points A and B
$\hat{A}$	the angle at A
$C\hat{A}B$	the angle between $[CA]$ and $[AB]$
ABC	the triangle whose vertices are A, B and C
$P(A)$	probability of event A
$P(A')$	probability of the event "not A"
$P(A\|B)$	probability of the event A given B
x_1, x_2, $\ldots$	observations
f_1, f_2, $\ldots$	frequencies with which the observations x_1, x_2, ... occur
$E(X)$	the expected value of the random variable X
μ	population mean
σ^2	population variance
σ	population standard deviation
$\bar{x}$	the sample mean of a set $\{x_1, x_2, ..., x_n\}$ of observations
$P(X = x)$	the probability that the random variable X takes the value x
$B(n, p)$	binomial distribution with parameters n and p
$N(\mu, \sigma^2)$	normal distribution with mean μ and variance σ^2
$X \sim B(n, p)$	the random variable X has a binomial distribution with parameters n and p
$X \sim N(\mu, \sigma^2)$	the random variable X has a normal distribution with mean μ and variance σ^2
r	Pearson's product-moment correlation coefficient

AHL only

$\mathbb{C}$	the set of complex numbers, $\{a + bi \mid a, b \in \mathbb{R}\}$
i	$\sqrt{-1}$ where $i^2 = -1$
z	a complex number
z^*	the complex conjugate of z
$\|z\|$	the modulus of z
$\arg z$	the argument of z
$\text{Re}\,z$	the real part of z
$\text{Im}\,z$	the imaginary part of z
$\text{cis}\,\theta$	$\cos\theta + i\sin\theta$
$e^{i\theta}$	Euler/exponential form of a complex number