IB Math SL AA

Formulas & Laws by topic

Nov. 2024 Edition

EXPONENTIAL

$f(x) = \pm a b^{(x-h)} + k$

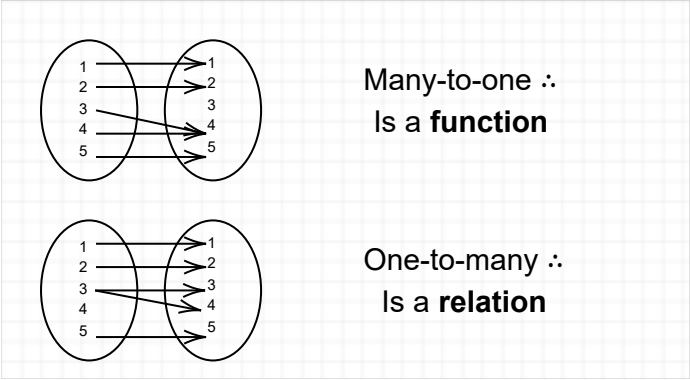
Translations:

h	+ shifts left, − shifts right
k	+ shifts up, − shifts down
a	$a >$ stretches, $a <$ shrinks
$\pm$	relfects over x-axis

FUNCTIONS

Functions can be one-to-one or many-to-one

Relations are one-to-many

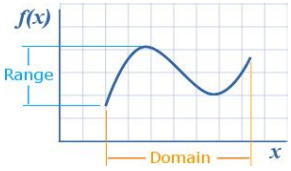


Domain:

All valid x outputs

Range:

All valid y outputs



Notations:

Interval Notation	Set Notation	Number Line
$a \leqslant x < b$	$\{x \mid a \leqslant x < b\}$	a — b

Reciprocal Functions:

For $f(x) = \dfrac{b}{cx+d} + a$ where $b, c \neq 0$

Asymptotes: $x = -\dfrac{d}{c}$ and $y = \dfrac{a}{c}$

REFERENCE

$\pi : 3.1415926535$ $e : 2.7182818284$

$\mathbb{R}$: Real Numbers

QUADRATICS

$$x = \frac{-b \pm \sqrt{\Delta}}{2a}$$

$\Delta = b^2 - 4ac$

$\Delta > 0$ gives you an upwards curve (w/ minimum)

$\Delta = 0$ gives you a straight line

$\Delta < 0$ gives you a downwards curve (w/ maximum)

Function Forms:

$ax^2 + bx + c$	Standard
$a(x + r_1)(x + r_2)$	Factored r being roots
$a(x - h)^2 + k$	Vertex (h, k) is the vertex

$h = \dfrac{-b}{2a}$ To find k, just replace x with 0

LOGS

Addition	$\log_a m + \log_a n = \log_a mn$
Substraction	$\log_a m - \log_a n = \log_a \left(\dfrac{m}{n}\right)$
Powers	$\log_a m^k = k \cdot \log_a m$
Base Change	$\log_a m = \dfrac{\log_b m}{\log_b a}$

Rules:

$\log_a 1 = 0$ $\log_a a = 1$

$a^{\log_a x} = x$ $\log_e x = \ln x$