

Actual Formula	Test #1	Test #2	Formula
$(a + b)(a^2 - ab + b^2)$			$a^3 + b^3 =$
$(a - b)(a^2 + ab + b^2)$			$a^3 - b^3 =$
$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$			Quadratic Formula
$f(x) = f(-x)$			Test for even functions
$f(-x) = -f(x)$			Test for odd functions
$(x - h)^2 + (y - k)^2 = r^2$			General equation of a circle
$y = \sqrt{r^2 - x^2}$			Equation of a semi-circle
0			$\lim_{x \rightarrow \infty} \frac{1}{x} =$
$\frac{1}{\sqrt{2}}$			$\sin\left(\frac{\pi}{4}\right) =$
$\frac{1}{\sqrt{2}}$			$\cos\left(\frac{\pi}{4}\right) =$
1			$\tan\left(\frac{\pi}{4}\right) =$
$\frac{\sqrt{3}}{2}$			$\sin\left(\frac{\pi}{3}\right) =$
$\frac{1}{2}$			$\sin\left(\frac{\pi}{6}\right) =$
$\frac{1}{2}$			$\cos\left(\frac{\pi}{3}\right) =$
$\frac{\sqrt{3}}{2}$			$\cos\left(\frac{\pi}{6}\right) =$

$\sqrt{3}$			$\tan\left(\frac{\pi}{3}\right) =$
$\frac{1}{\sqrt{3}}$			$\tan\left(\frac{\pi}{6}\right) =$
$\frac{\sin\theta}{\cos\theta}$			$\tan\theta =$
$\frac{\cos\theta}{\sin\theta}$			$\cot\theta =$
1			$\sin^2\theta + \cos^2\theta =$
$1 + \cot^2\theta = \operatorname{cosec}^2\theta$			Other trig identity
$\tan^2\theta + 1 = \sec^2\theta$			Other trig identity
$\frac{\sin A}{a} = \frac{\sin B}{b}$			Sine rule
$a^2 = b^2 + c^2 - 2bc\cos A$			Cosine rule for side
$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$			Cosine rule for an angle
$A = \frac{1}{2} ab \sin C$			Area of a triangle using trig
$\cos x \cos y + \sin x \sin y$			$\cos(x - y) =$
$\cos x \cos y - \sin x \sin y$			$\cos(x + y) =$
$\sin x \cos y + \cos x \sin y$			$\sin(x + y) =$
$\sin x \cos y - \cos x \sin y$			$\sin(x - y) =$
$\frac{\tan x + \tan y}{1 - \tan x \tan y}$			$\tan(x + y) =$

$\frac{\tan x - \tan y}{1 + \tan x \tan y}$			$\tan(x-y) =$
$2\sin x \cos x$			$\sin 2x =$
$\cos^2 x - \sin^2 x$ $1 - 2\sin^2 x$ $2\cos^2 x - 1$			$\cos 2x =$
$\frac{2\tan x}{1 - \tan^2 x}$			$\tan 2x =$
			$\tan\left(\frac{\theta}{2}\right)$ Ratios:
$\frac{2t}{1 - t^2}$			$\tan\theta =$
$\frac{1 - t^2}{1 + t^2}$			$\cos\theta =$
$\frac{2t}{1 + t^2}$			$\sin\theta =$
$r\sin(\theta + \alpha)$			$a\sin\theta + b\cos\theta =$
$r\sin(\theta - \alpha)$			$a\sin\theta - b\cos\theta =$
$r\cos(\theta - \alpha)$			$a\cos\theta + b\sin\theta =$
$r\cos(\theta + \alpha)$			$a\cos\theta - b\sin\theta =$
$r = \sqrt{a^2 + b^2}$ $\tan \alpha = \frac{b}{a}$			Where r = and $\alpha =$

$\theta = \pi \times n + (-1)^n \alpha$			General solution for sine
$\theta = 2\pi \times n \pm \alpha$			General solution for cosine
$\theta = \pi \times n + \alpha$			General solution for tan
			<b>Graphs</b>
$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$			Distance formula
$P = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$			Midpoint Formula
$m = \frac{y_2 - y_1}{x_2 - x_1}$			Gradient Formula
$m = \tan \theta$			Gradient using trig
$y - y_1 = m(x - x_1)$			Point-gradient formula
$\frac{y - y_1}{x - x_1} = \frac{y_2 - y_1}{x_2 - x_1}$			Two-point formula
$m_1 = m_2$			Parallel lines proof
$m_1 m_2 = -1$			Perpendicular lines proof
$d = \frac{ ax_1 + by_1 + c }{\sqrt{a^2 + b^2}}$			Perpendicular distance formula
$\tan \theta = \left  \frac{m_1 - m_2}{1 + m_1 m_2} \right $			Angle between two lines
$x = \frac{mx_2 + nx_1}{m+n}$			Dividing interval in ratio m:n
$y = \frac{my_2 + ny_1}{m+n}$			

$\frac{dy}{dx} = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$			First principle differentiation
$n x^{n-1}$			$\frac{d}{dx} x^n$
$f(x)n [f(x)]^{n-1}$			$\frac{d}{dx} [f(x)]^n =$
$vu' + uv'$			$\frac{d}{dx} uv$
$\frac{vu' - uv'}{v^2}$			$\frac{d}{dx} \frac{u}{v}$
$x = -\frac{b}{2a}$			Axis of symmetry in quadratic
$\Delta = b^2 - 4ac$			The discriminant
$-\frac{b}{a}$			Sum of roots
$\frac{c}{a}$			Sum of roots two at a time
$-\frac{d}{a}$			Sum of roots three at a time
$\frac{e}{a}$			Sum of roots four at a time
$x^2 = 4ay$ $(0, a)$ $(0, 0)$			Equation of basic parabola. Focus Vertex
$(x-h^2) = 4a(y-k)$ $(h, k)$ $(h, k+a)$			General equation of parabola. Focus Vertex
$x = 2at$ $y = at^2$			Parametric form of: $x^2 = 4ay$

$T_n = a + (n - 1)d$			Term of an arithmetic series
$S_n = \frac{n}{2}(a + l)$ $S_n = \frac{n}{2}[2a + (n - 1)d]$			Sum of an arithmetic series
$S = (n - 2) \times 180^\circ$			Sum of interior angles of an n-sided polygon
$A = lb$			Area of rectangle
$A = x^2$			Area of a square
$A = \frac{1}{2}bh$			Area of a triangle
$A = bh$			Area of a parallelogram
$\frac{1}{2}xy$			Area of rhombus
$A = \frac{1}{2}h(a + b)$			Area of trapezium
$A = \pi r^2$			Area of circle
$S = 2(lb + bh + lh)$			Surface area of a rectangular prism
$V = lbh$			Volume of a rectangular prism
$S = 6x^2$			Surface area of a cube
$V = x^3$			Volume of a cube
$S = 2\pi r^2 + 2\pi rh$			Surface area of a cylinder

$V = \pi r^2 h$			Volume of a cylinder
$S = 4\pi r^2$			Surface area of a sphere
$V = \frac{4}{3} \pi r^3$			Volume of a sphere
$S = \pi r^2 + \pi r l$			Surface area of a cone
$V = \frac{1}{3} \pi r^2 h$			Volume of a cone
$\frac{x^{n+1}}{n+1} + c$			$\int x^n dx$
$\frac{h}{2} [(y_0 + y_n) + 2(y_1 + y_2 + \dots + y_{n-1})]$ where $h = \frac{b-a}{n}$			Trapezoidal rule
$\frac{h}{3} [(y_0 + y_n) + 4(y_1 + y_3) + 2(y_2 + y_4)]$ where $h = \frac{b-a}{n}$			Simpson's Rule
$\frac{(ax+b)^{n+1}}{a(n+1)} + c$			$\int (ax+b)^n dx$
$V = \pi \int y^2 dx$			Volume about the x-axis
$V = \pi \int x^2 dy$			Volume about the y-axis
$e^x$			$\frac{d}{dx} e^x$
$f(x) e^{f(x)}$			$\frac{d}{dx} e^{f(x)}$
$e^x + c$			$\int e^x dx$

$\frac{1}{a} e^{ax + b} + c$			$\int e^{ax + b} dx$
$\log_a x + \log_a y$			$\log_a(xy)$
$\log_a x - \log_a y$			$\log_a\left(\frac{x}{y}\right)$
$n \log_a x$			$\log_a x^n$
$\log_a x = \frac{\log_e x}{\log_e a}$			Change of base rule
$\frac{1}{x}$			$\frac{d}{dx} \log_e x$
$\frac{f(x)}{f'(x)}$			$\frac{d}{dx} \log_e f(x)$
$\log_e x + c$			$\int \frac{1}{x} dx$
$\log_e f(x) + c$			$\int \frac{f(x)}{f'(x)} dx$
$180^\circ$			$\pi \text{ radians} =$
$C = 2\pi r$			Circumference of a circle
$l = r\theta$			Length of an arc
$A = \frac{1}{2} r^2 \theta$			Area of a sector
$A = \frac{1}{2} r^2 (\theta - \sin\theta)$			Area of a minor segment
$\sin x \approx x$ $\tan x \approx x$ $\cos x \approx 1$			Small Angles

$f'(x) \cos [f(x)]$			$\frac{d}{dx} \sin [f(x)]$
$-f'(x) \sin [f(x)]$			$\frac{d}{dx} \cos [f(x)]$
$f(x) \sec^2 f(x)$			$\frac{d}{dx} \tan f(x)$
$\frac{1}{a} \sin(ax + b) + c$			$\int \cos(ax + b) dx$
$-\frac{1}{a} \cos(ax + b) + c$			$\int \sin(ax + b) dx$
$\frac{1}{a} \tan(ax + b) + c$			$\int \sec^2(ax + b) dx$
$\frac{1}{2}x + \frac{1}{4a} \sin 2ax + c$			$\int \cos^2 ax dx$
$\frac{1}{2}x - \frac{1}{4a} \sin 2ax + c$			$\int \sin^2 ax dx$
			<b>Exponential Growth &amp; Decay</b>
$kQ$			$\frac{dQ}{dt} =$
$Q = Ae^{kt}$			Quantity
$\frac{dN}{dt} = k(N - P)$ $N = P + Ae^{kt}$			Complex growth and decay
$a = \frac{d}{dx} \left( \frac{1}{2} v^2 \right)$			Special result for acceleration
$x = a \cos(nt + \hat{I})$			Displacement for SHM
$\ddot{x} = -n^2 x$			Acceleration for SHM

$a$			Amplitude of SHM
$\frac{2\pi}{n}$			Period of SHM
$v^2 = n^2(a^2 - x^2)$			Velocity of SHM
$x = V\cos\theta$ $y = V\sin\theta$			Initial Velocity of projectile
$x = 0$ $y = -g$			Acceleration of a projectile
$x = Vt \cos\theta$			Horizontal displacement
$y = Vt \sin\theta - \frac{gt^2}{2}$			Vertical displacement
$y = -\frac{gx^2}{2V^2} (1 + \tan^2\theta) + x\tan\theta$			Cartesian equation of motion
$t = \frac{2V\sin\theta}{g}$			Time of flight
$x = \frac{V^2 \sin 2\theta}{g}$			Range
$x = \frac{V^2}{g}$			Max Range
$h = \frac{V^2 \sin^2\theta}{2g}$			Greatest height
$f^{-1}[f(x)] = f[f^{-1}(x)] = x$			Proof for mutually inverse functions
$-\sin^{-1}x$			$\sin^{-1}(-x) =$
$\pi - \cos^{-1}x$			$\cos^{-1}(-x) =$

$-\tan^{-1}x$			$\tan^{-1}(-x) =$
$\frac{\pi}{2}$			$\sin^{-1}x + \cos^{-1}x =$
$r = \frac{T_2}{T_1}$			Common ratio in geometric series
$T_n = ar^{n-1}$			Term of a geometric series
$S_n = \frac{a(r^n - 1)}{r - 1}$ for $ r  > 1$ $S_n = \frac{a(1 - r^n)}{1 - r}$ for $ r  < 1$			Sum of a geometric series
$S_\infty = \frac{a}{1 - r}$			Sum to infinity of a geometric series
$A = P\left(1 + \frac{r}{100}\right)^n$			Compound interest formula
$If f\left(\frac{a+b}{2}\right) = 0$			Halving the interval method
$a_1 = a - \frac{f(a)}{f'(a)}$			Newton's method of approximation
$\frac{n-k+1}{k} \times \frac{b}{a}$			$\frac{T_{K+1}}{T_K} =$
$\frac{n!}{(n-r)!}$			${}^nP_r =$
$\frac{n!}{s! t! \dots}$			Arrangements where some are alike
$(n-1)!$			Arrangements in a circle