

Mathematics 30-1 Formula Sheet

For $ax^2 + bx + c = 0$,

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Relations and Functions

Graphic Calculator Window Format

$$x : [x_{\min}, x_{\max}, x_{\text{sc1}}]$$

$$y : [y_{\min}, y_{\max}, y_{\text{sc1}}]$$

Laws of Logarithms

$$\log_b (M \times N) = \log_b M + \log_b N$$

$$\log_b \left(\frac{M}{N} \right) = \log_b M - \log_b N$$

$$\log_b (M^n) = n \log_b M$$

$$\log_b c = \frac{\log_a c}{\log_a b}$$

Growth/Decay Formula

$$y = ab^{\frac{t}{p}}$$

General Function

$$y = af [b(x-h)] + k$$

Permutations, Combinations, and the Binomial Theorem

$$n! = n(n-1)(n-2)\dots 3 \times 2 \times 1,$$

where $n \in N$ and $0! = 1$

$${}_n P_r = \frac{n!}{(n-r)!}$$

$${}_n C_r = \frac{n!}{(n-r)!r!} \quad {}_n C_r = \binom{n}{r}$$

In the expansion of $(x+y)^n$,

the general term is $t_{k+1} = {}_n C_k x^{n-k} y^k$

Trigonometry

$$\theta = \frac{a}{r}$$

$$\tan x = \frac{\sin x}{\cos x}$$

$$\cot x = \frac{\cos x}{\sin x}$$

$$\csc x = \frac{1}{\sin x}$$

$$\sec x = \frac{1}{\cos x}$$

$$\cot x = \frac{1}{\tan x}$$

$$\sin^2 x + \cos^2 x = 1$$

$$1 + \tan^2 x = \sec^2 x$$

$$1 + \cot^2 x = \csc^2 x$$

$$\sin(A+B) = \sin A \cos B + \cos A \sin B$$

$$\sin(A-B) = \sin A \cos B - \cos A \sin B$$

$$\cos(A+B) = \cos A \cos B - \sin A \sin B$$

$$\cos(A-B) = \cos A \cos B + \sin A \sin B$$

$$\tan(A+B) = \frac{\tan A + \tan B}{1 - \tan A \tan B}$$

$$\tan(A-B) = \frac{\tan A - \tan B}{1 + \tan A \tan B}$$

$$\sin(2A) = 2 \sin A \cos A$$

$$\cos(2A) = \cos^2 A - \sin^2 A$$

$$\cos(2A) = 2 \cos^2 A - 1$$

$$\cos(2A) = 1 - 2 \sin^2 A$$

$$\tan(2A) = \frac{2 \tan A}{1 - \tan^2 A}$$

$$y = a \sin [b(x-c)] + d$$

$$y = a \cos [b(x-c)] + d$$