

PRE-CALCULUS GRADE 12 FORMULA PAGE

The following information may be useful when writing this examination.

Trigonometry	Algebra
$a = r\theta$ $\csc \theta = \frac{1}{\sin \theta} \qquad \sec \theta = \frac{1}{\cos \theta}$ $\cot \theta = \frac{1}{\tan \theta} \qquad \tan \theta = \frac{\sin \theta}{\cos \theta}$ $\cot \theta = \frac{\cos \theta}{\sin \theta}$ $\sin^2 \theta + \cos^2 \theta = 1$ $\tan^2 \theta + 1 = \sec^2 \theta$ $1 + \cot^2 \theta = \csc^2 \theta$ $\sin(\alpha + \beta) = \sin \alpha \cos \beta + \cos \alpha \sin \beta$ $\sin(\alpha - \beta) = \sin \alpha \cos \beta - \cos \alpha \sin \beta$ $\cos(\alpha + \beta) = \cos \alpha \cos \beta - \sin \alpha \sin \beta$ $\cos(\alpha - \beta) = \cos \alpha \cos \beta + \sin \alpha \sin \beta$ $\tan(\alpha + \beta) = \frac{\tan \alpha + \tan \beta}{1 - \tan \alpha \tan \beta}$ $\tan(\alpha - \beta) = \frac{\tan \alpha - \tan \beta}{1 + \tan \alpha \tan \beta}$ $\sin 2\theta = 2 \sin \theta \cos \theta$ $\cos 2\theta = \cos^2 \theta - \sin^2 \theta$ $\qquad = 2 \cos^2 \theta - 1$ $\qquad = 1 - 2 \sin^2 \theta$ $\tan 2\theta = \frac{2 \tan \theta}{1 - \tan^2 \theta}$	$\text{For } ax^2 + bx + c = 0, x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
	Logarithms
	<p>In chemistry, the pH scale measures the acidity ($0 < 7$), alkalinity ($7 > 14$), and neutrality (7) of a solution. It is a logarithmic scale in base 10. Thus, a solution of pH of 9 is 10 times more alkaline than a solution of pH of 8.</p> <div style="text-align: center;"> </div>
	Permutations and Combinations
	${}_n P_r = \frac{n!}{(n-r)!}$ ${}_n C_r = \binom{n}{r} = \frac{n!}{r!(n-r)!}$ <p>In the expansion of $(a + b)^n$, the general term is</p> $t_{k+1} = {}_n C_k a^{n-k} b^k$