Mathematics revision sheet for class 11 and class 12 physics

April 9, 2012

Trigonometry Properties of trigonometric functions

1. Pythagorean identity

$sin^2A + cos^2A = 1$

$1 + tan^A = sec^2A$

$1 + cot^2A = cosec^2A$

2. Periodic function

$sin(A + 2\pi) = sinA$

$cos(A + 2\pi) = cosA$

3.Even-Odd Identities

$cos(-A) = cos(A)$

$sin(-A) = -sin(A)$

$tan(-A) = -tan(A)$

$cosec(-A) = -cosec(A)$

$sec(-A) = sec(A)$

$cot(-A) = -cot(A)$

4. Quotient identities $tan(A) = \frac{sinA}{cosA}$

$cot(A) = \frac{cosA}{sinA}$

5. Co-function identities

$sin\left(\frac{\pi}{2} - A\right) = cos(A)$

$cos\left(\frac{\pi}{2} - A\right) = sin(A)$

$tan\left(\frac{\pi}{2} - A\right) = cot(A)$

$cosec\left(\frac{\pi}{2} - A\right) = sec(A)$

$sec\left(\frac{\pi}{2} - A\right) = cosec(A)$

$cot\left(\frac{\pi}{2} - A\right) = tan(A)$

6. Sum difference formulas

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

$cos(A \pm B) = cos(A)cos(B) \mp sin(A)sin(B)$

$tan(A \pm B) = \frac{tan(A) \pm tan(B)}{1 \mp tan(A)tan(B)}$

7. Double angle formulas

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

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

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

8. Product to sum formulas

$sin(A)cos(B) = \frac{1}{2}[cos(A - B) - cos[A + B]$

$cos(A)cos(B) = \frac{1}{2}[cos(A - B) + cos[A + B]$

$sin(A)cos(B) = \frac{1}{2}[sin(A + B) + sin[A - B]$

$cos(A)sin(B) = \frac{1}{2}[sin(A + B) - sin[A - B]$

9. Power reducing formulas

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

$cos^2 A = \frac{1+cos(2A)}{2}$

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

10. reciprocal identities

$Sin(A) = \frac{1}{cosec(A)}$

$cos(A) = \frac{1}{sec(A)}$

$tan(A) = \frac{1}{cot(A)}$

$cosec(A) = \frac{1}{sin(A)}$

$Sec(A) = \frac{1}{cos(A)}$

$cot(A) = \frac{1}{tan(A)}$

Binomial Theorem

$(a + b)^n = C_0^n a^n + C_1^n a^{n-1} b + C_2^n a^{n-2} b^2 + ... + C_n^n b^n$ From the binomial formula, if we let a = 1 and b = x, we can also obtain the binomial series which is valid for any real number n if —x— ¡ 1.

(1+x)$^n = 1 + nx + \frac{n(n-1)}{2!} x^2 + \frac{n(n-1)(n-2)}{3!} x^3 + ...$

Geometric Series

$a, aq, aq^2, aq^3, aq^4 ....aq^{n-1}$ where q is not equal to 0, q is the common ratio and a is a scale factor.Formula for the sum of the first n numbers of geometric progression $S_n = \frac{a(1-q^n)}{(1-q)}$

Infinite geometric series where $|q| < 1$ If $|q| < 1$ then $a_n \to 0$, when n goes to infinity So the sum S of such a infinite geometric progression is:

$S = \frac{1}{(1-x)}$ which is valid only for $|x|$

Arithmetic Progression $a, a+d, a+2d, a+3d..........a+(n-1)d$ The sum S of the first n values of a finite sequence is given by the formula:

$S = \frac{n}{2}[(2a + d(n-1)]$

Quadratic Formula $ax^2 + bx + c = 0$ then $x = -\frac{b \pm (b2-4ac)}{2a}$

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