Trigonometric Identities for Competitive Exams

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

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

$$cosec\,A = \frac{1}{\sin\ A}$$

$$\cot\ A = \frac{\cos\ A}{\sin\ A} = \frac{1}{\tan\ A}$$

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

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

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

$$\sin\ (A \pm B) = sinAcosB \pm CosAsinB$$

$$cos\,(A \pm B) = cosAcosB \pm sinAsinB$$

$$tan\,(A \pm B) = \frac{tanA \pm tanB}{1 \mp tanAtanB}$$

$$sin2A = 2sinAcosA$$

$$cos2A = \cos^2 A - \sin^2 A$$

$$cos2A = 2\cos^2 A - 1$$

$$cos2A = 1 - 2\sin^2 A$$

$$tan2A = \frac{2tanA}{1 - \tan^2 A}$$

$$sin3A = 3sinA - 4\sin^3 A$$

$$cos3A = 4\cos^3 A - 3cosA$$

$$\tan\ 3A = \frac{3tanA - \tan^3 A}{1 - 3\tan^2 A}$$

$$sinA + sinB = 2\sin\frac{A+B}{2}\cos\frac{A-B}{2}$$

$$sinA - sinB = 2\cos\frac{A+B}{2}\sin\frac{A-B}{2}$$

$$cosA + cosB = 2\cos\frac{A+B}{2}\cos\frac{A-B}{2}$$

$$cosA - cosB = -2\sin\frac{A+B}{2}\sin\frac{A-B}{2}$$

$$2\sin\ A cos\ B = \sin\ (A+B) + \sin(A-B)$$

$$2\cos\ A sin\ B = \sin\ (A+B) - \sin(A-B)$$

$$2\cos\ A cos\ B = \cos\ (A+B) + \cos(A-B)$$

$$-2\sin\ A sin\ B = \cos\ (A+B) - cos\,(A-B)$$

$$a\sin\ x + b\cos\ x = R\sin\ (x+\Phi),\ where\ R = \sqrt{a^2+b^2}\ and\ cos\Phi = \frac{\mathrm{a}}{\mathrm{R}}, sin\Phi = \frac{\mathrm{b}}{\mathrm{R}}.$$

$$If\ t = \tan\frac{1}{2}x\ than\ sinx = \frac{2t}{1+t^2},\ cosx = \frac{1-t^2}{1+t^2}.$$

$$\cos\ x = \frac{1}{2}\left(e^{ix}+e^{-ix}\right);$$

$$\sin\ x = \frac{1}{2i}\left(e^{ix}-e^{-ix}\right)$$

$$e^{ix} = cosx + i\,sinx;$$

$$e^{-ix} = cosx - i\,sinx$$

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