

## Trigonometry 1

1. Prove that  $\frac{\sin \theta \tan \theta}{\tan \theta - \sin \theta} = \frac{\tan \theta + \sin \theta}{\sin \theta \tan \theta}$
2. Given :  $-\sqrt{3} \cos 2x + \sin 2x = R \sin (2x + \alpha)$  , find  $R$  and  $\alpha$  in degrees.
3. By completing the square, find the greatest and least values, as  $\theta$  varies, of  $\cos^2 \theta - \cos \theta + 6$ .
4. Solve  $2 \cos(60^\circ + \theta) + 2 \sin(30^\circ + \theta) = \sqrt{3}$  where  $-180^\circ < \theta < 180^\circ$ .
5. Proof:  $\sin(\alpha + \beta) \sin(\alpha - \beta) = \cos^2 \beta - \cos^2 \alpha$ .
6. Solve the equation  $\frac{\sqrt{5}}{2} \sec \theta - \tan \theta = 2$  for  $0^\circ \leq \theta \leq 360^\circ$ .
7. If  $\tan x = 2 \tan y$  , show that  $\tan(x + y) = \frac{3 \sin 2y}{3 \cos 2y - 1}$ .
8. Solve  $-\sqrt{3} \cos 2x + \sin 2x = 1$  for general solution in terms of degrees.
9. Prove  $\frac{1 - \sin \theta}{1 + \sin \theta} \equiv (\sec \theta - \tan \theta)^2$