TRIGONOMETRIC EQUATIONS

1.

Equation	Interval in which principal solution lies	General solution
$\sin\theta = k$ $(-1 \le k \le 1)$	$[-(\pi/2), \pi/2]$	$\theta = n\pi + (-1)^n\alpha$ $n \in z$
$\cos\theta = k$ $(-1 \le k \le 1)$	$[0, r]$	$\theta = 2n\pi \pm \alpha$ $n \in z$
$\tan\theta = k$ $(k \in R)$	$[-(\pi/2), \pi/2]$	$\theta = n\pi + \alpha;$ $n \in z$

2. The solution of $\sin\theta = k$ $(|k| \le 1)$ lying between $-\frac{\pi}{2}$ and $\frac{\pi}{2}$ is called the principle solution of the equation.

3. The solution of $\cos\theta = k$ $(|k| \le 1)$ lying between 0 and π is called the principal solution of the equation.

4. That solution of $\tan\theta = k$, lying between $-\frac{\pi}{2}$ and $\frac{\pi}{2}$ is called the principal solution of the equation.

5. The general value of θ satisfying $\cos\theta = k$ $(|k| \le 1)$ is given by $\theta = 2n\pi \pm \alpha$ where $n \in Z$.

6. The general value of θ satisfying $\sin\theta = k$ $(|k| \le 1)$ is given by $\theta = n\pi + (-1)^n \alpha$ where $n \in Z$.

7. The general value of θ satisfying $\tan\theta = k$ is given by $\theta = n\pi + \alpha$ where $n \in Z$. (in each of the above cases, α is the principal solution).

8. If $\sin\theta = k$, $\tan\theta = k$ are given equations, then the general value of θ is given by $\theta = 2n\pi + \alpha$ where α is that solution lying between 0 and 2π.

9. The equation $a\cos\theta + b\sin\theta = c$ will have no solution or will be inconsistent if $|c| > \sqrt{a^2 + b^2}$

10. If $\sin A = \sin B$ and $\cos A = \cos B$, then $\sin\frac{A-B}{2} = 0$ and $A = 2n\pi + B$.

11. $\cos n\pi = (-1)^n$, $\sin n\pi = 0$.

12. If $\sin^2\theta = \sin^2\alpha$ or $\cos^2\theta = \cos^2\alpha$ or $\tan^2\theta = \tan^2\alpha$, then $\theta = n\pi \pm \alpha$; $n \in Z$.