Maths Formula Sheet

Chapter by chapter, topic by topic. Written by the PadhoNa team for quick revision.

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CHAPTER 10

Trigonometric Equations

General solutions

$$\sin\theta = 0 \Rightarrow \theta = n\pi; \qquad \cos\theta = 0 \Rightarrow \theta = (2n+1)\frac{\pi}{2}; \qquad \tan\theta = 0 \Rightarrow \theta = n\pi$$

$$\sin\theta = \sin\alpha \Rightarrow \theta = n\pi + (-1)^n\alpha$$

$$\cos\theta = \cos\alpha \Rightarrow \theta = 2n\pi \pm \alpha; \qquad \tan\theta = \tan\alpha \Rightarrow \theta = n\pi + \alpha$$

$$\sin^2\theta = \sin^2\alpha,\ \cos^2\theta = \cos^2\alpha,\ \tan^2\theta = \tan^2\alpha \Rightarrow \theta = n\pi \pm \alpha$$

In all of these, $n \in \mathbb{Z}$.

a cos θ + b sin θ = c

$$\text{divide by } \sqrt{a^2+b^2}:\ \cos(\theta - \phi) = \frac{c}{\sqrt{a^2+b^2}}, \qquad \tan\phi = \frac{b}{a}$$

Solvable only when $|c| \le \sqrt{a^2+b^2}$.

Principal values and inequalities

PRINCIPAL SOLUTION

$$\text{solutions in } [0, 2\pi)$$

INEQUALITIES

$$\text{solve on one period using the graph, then add the period}$$

Example: $\sin x > \frac{1}{2} \Rightarrow x \in \left(2n\pi + \frac{\pi}{6},\ 2n\pi + \frac{5\pi}{6}\right)$.

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