

Trigonometry And Matrices : Introduction to De Moivre's Theorem

Express in $r(\cos\theta + i\sin\theta)$

(i) $1 + i \tan\theta$

(ii) $1 - \cos\theta + i \sin\theta$

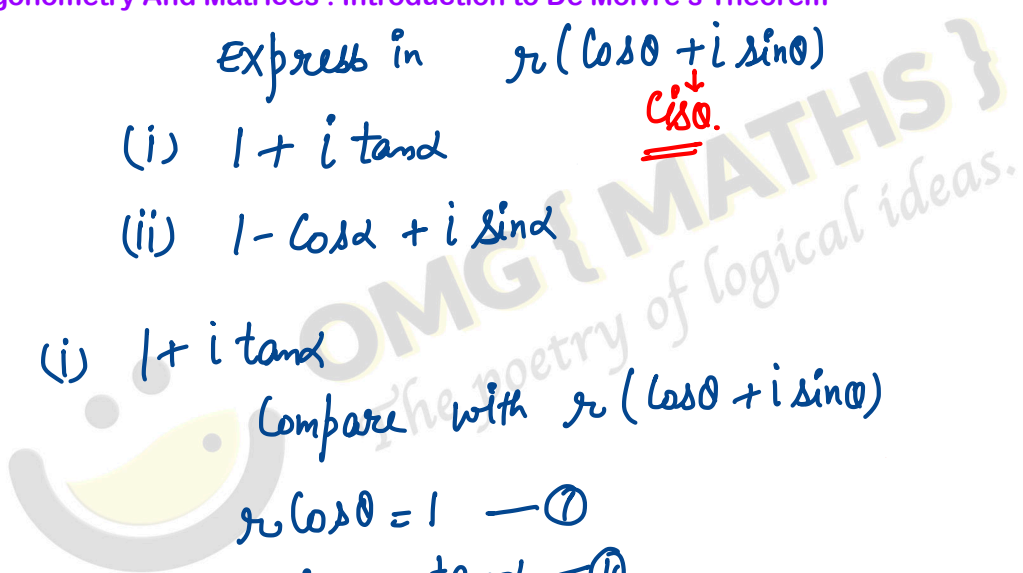
(i) $1 + i \tan\theta$

Compare with $r(\cos\theta + i\sin\theta)$

$$r \cos\theta = 1 \quad \text{--- (i)}$$

$$r \sin\theta = \tan\theta \quad \text{--- (ii)}$$

Cis θ .



Squaring and adding ① + ②

$$r^2 (\cos^2 \theta + \sin^2 \theta) = 1 + \tan^2 \alpha$$

$$r^2 = \sec^2 \alpha$$

$$\underline{\underline{r = \sec \alpha}}$$

$$\cos \theta = \frac{1}{\sec \alpha} = \cos \alpha$$

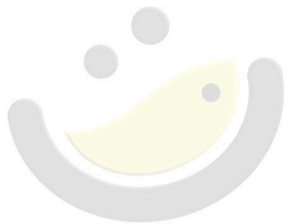
$$\sin \theta = \frac{\tan \alpha}{\sec \alpha} = \frac{\sin \alpha}{\cos \alpha} \cdot \cos \alpha = \sin \alpha$$

$$\sin \theta = \sin \alpha$$

$$\cos \theta = \cos \alpha$$

$$\Rightarrow \theta = \alpha.$$

$$1 + i \tan \alpha = \sec \alpha (\cos \alpha + i \sin \alpha)$$



OMG! MATHS }
The poetry of logical ideas.