

Trigonometri – Nilai Trigonometri Sudut 15 dan 75

Menentukan nilai trigonometri sudut 15° dan 75° .

Langkah-langkah:

1. Buat segitiga siku-siku ABC, dengan $\angle A = 60^\circ$ dan $\angle B = 30^\circ$.
2. Perpanjang garis CB, shg $AB = BD$. Jadi segitiga ABD samakaki, akibatnya $\angle BAD = \angle BDA = 15^\circ$.
3. Ambil $AC = 1$, maka $AB = BD = 2$, dan $BC = \sqrt{3}$, sehingga $CD = 2 + \sqrt{3}$.

Berdasar Pythagoras,

$$AD = \sqrt{AC^2 + CD^2} = \sqrt{1^2 + (2 + \sqrt{3})^2} = \sqrt{1 + 4 + 3 + 4\sqrt{3}} = \sqrt{8 + 4\sqrt{3}} = \sqrt{6} + \sqrt{2}$$

Perhatikan segitiga ACD yang siku-siku di C, sesuai definisi diperoleh:

$$\sin 15^\circ = \sin D = \frac{AC}{AD} = \frac{1}{\sqrt{6} + \sqrt{2}} = \frac{1}{4}(\sqrt{6} - \sqrt{2})$$

$$\cos 15^\circ = \cos D = \frac{CD}{AD} = \frac{2 + \sqrt{3}}{\sqrt{6} + \sqrt{2}} = \frac{1}{4}(\sqrt{6} + \sqrt{2})$$

$$\tan 15^\circ = \tan D = \frac{AC}{CD} = \frac{1}{2 + \sqrt{3}} = 2 - \sqrt{3}$$

$$\sin 75^\circ = \sin A = \frac{CD}{AD} = \frac{2 + \sqrt{3}}{\sqrt{6} + \sqrt{2}} = \frac{1}{4}(\sqrt{6} + \sqrt{2})$$

$$\cos 75^\circ = \cos A = \frac{AC}{AD} = \frac{1}{\sqrt{6} + \sqrt{2}} = \frac{1}{4}(\sqrt{6} - \sqrt{2})$$

$$\tan 75^\circ = \tan A = \frac{CD}{AC} = \frac{2 + \sqrt{3}}{1} = 2 + \sqrt{3}$$

