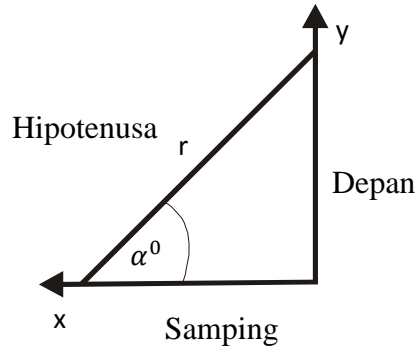


Materi : Perbandingan Trigonometri, Koordinat Kutub

1. Perbandingan Trigonometri



$$\cos^2 \alpha + \sin^2 \alpha = 1$$

$$\cos^2 \alpha = 1 - \sin^2 \alpha$$

$$\sin^2 \alpha = 1 - \cos^2 \alpha$$

$$\text{Tg } \alpha = \frac{\sin \alpha}{\cos \alpha}$$

$$\text{Cot } \alpha = \frac{\cos \alpha}{\sin \alpha}$$

$$\text{Sec}^2 \alpha = 1 + \text{tag}^2 \alpha$$

$$\text{Cosec}^2 \alpha = 1 + \text{Cotg}^2 \alpha$$

$$\text{Cosec } \alpha = \frac{1}{\sin \alpha}$$

$$\text{CoSec } \alpha = \frac{1}{\cos \alpha}$$

$$\text{Cot } \alpha = \frac{1}{\text{tg} \alpha}$$

$$\sin \alpha = \frac{y}{r}$$

$$\cos \alpha = \frac{x}{r}$$

$$\text{Tg } \alpha = \frac{y}{x}$$

$$\text{Sec } \alpha = \frac{r}{x}$$

$$\text{Cosec } \alpha = \frac{r}{y}$$

$$\text{Cotg } \alpha = \frac{x}{y}$$

2. Koordinat Kutub dan Cartesius

Cartesius → Kutub $P(x,y) \rightarrow P(r,\alpha^0)$	Kutub → Cartesius $P(r,\alpha^0) \rightarrow P(x,y)$
$r = \sqrt{x^2 + y^2}$ $\text{tg } \alpha^0 = \frac{x}{y}$	$x = r \cdot \cos \alpha^0$ $y = r \cdot \sin \alpha^0$

3. Rumus-rumus segitiga dalam trigonometri

a). Aturan Sinus

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} = 2R$$

b). Aturan Cosinus

$$a^2 = b^2 + c^2 - 2bc \cdot \cos A$$

$$b^2 = a^2 + c^2 - 2ac \cdot \cos B$$

$$c^2 = a^2 + b^2 - 2ab \cdot \cos C$$

$$\cos A = \frac{a^2 + c^2 - b^2}{2bc}$$

$$\cos C = \frac{a^2 + b^2 - c^2}{2ab}$$

$$\cos B = \frac{a^2 + c^2 - b^2}{2ac}$$

c). Luas Segitiga

$$1). L\Delta ABC = \frac{1}{2} a \times t$$

$$L\Delta ABC = 2r^2 \cdot \sin A \cdot \sin B \cdot \sin C$$

R = jari-jari lingkaran luar

$$2). L\Delta ABC = \frac{1}{2} b \cdot c \cdot \sin A$$

$$\frac{1}{2} a \cdot b \cdot \sin C$$

$$\frac{1}{2} a \cdot c \cdot \sin B$$

$$L\Delta ABC = \frac{a^2 \cdot \sin B \cdot \sin C}{2 \cdot \sin A}$$

$$\frac{b^2 \cdot \sin A \cdot \sin C}{2 \cdot \sin B}$$

$$3). L\Delta ABC = \frac{a^2 \cdot \sin B \cdot \sin C}{2 \cdot \sin(B+C)}$$

$$\frac{c^2 \cdot \sin A \cdot \sin C}{2 \cdot \sin C}$$

$$\frac{b^2 \cdot \sin A \cdot \sin C}{2 \cdot \sin(A+C)}$$

$$\frac{c^2 \cdot \sin A \cdot \sin B}{2 \cdot \sin(A+B)}$$

$$4). S = \frac{1}{2}(a + b + c)$$

$$L\Delta ABC = \sqrt{s(s-a)(s-b)(s-c)}$$

4. Nilai Periodik ($\alpha^0 > 360^0$)

$$\sin \alpha = \sin (\alpha + k \cdot 360^0)$$

$$\cos \alpha = \cos (\alpha + k \cdot 360^0)$$

$$\text{Tag } \alpha = \text{tag } (\alpha + k \cdot 180^0) \quad k = \text{bilangan bulat}$$

Menentukan nilai sudut ke kuadran I

Contoh

$$\begin{aligned} \sin 400^0 &= \sin (40^0 + 1 \times 360^0) \\ &= \sin 40^0 \end{aligned}$$

$$\begin{aligned} \cos 780^0 &= \cos (60^0 + 2 \times 360^0) \quad \text{praktis } \gg 780 \quad (7+8)+0 = 150 = (1+5)+0 = \mathbf{60 \text{ (kuadran I)}} \\ &= \cos 600 \end{aligned}$$

$$\begin{aligned} \text{Tag } 480^0 &= \text{tag } (120^0 + 2 \times 180^0) \quad \text{praktis } \gg 480 \quad (4+8)+0 = 120 = (1+2)+0 = \mathbf{30 \text{ (kuadran I)}} \\ &= \text{tag } 30^0 \end{aligned}$$

Sudut-Sudut Istimewa

α^0	0^0	30^0	45^0	60^0	90^0
Sinus	0	$\frac{1}{2}$	$\frac{1}{2}\sqrt{2}$	$\frac{1}{2}\sqrt{3}$	1
Cosinus	1	$\frac{1}{2}\sqrt{3}$	$\frac{1}{2}\sqrt{2}$	$\frac{1}{2}$	0
Tangen	0	$\frac{1}{3}\sqrt{3}$	1	$\sqrt{3}$	~
Cotangen	~	$\sqrt{3}$	1	$\frac{1}{3}\sqrt{3}$	0

Keterangan

$$\frac{1}{2} = 0,5$$

$$\frac{1}{3}\sqrt{3} = 0,577$$

$$\frac{1}{2}\sqrt{2} = 0,707$$

$$\sqrt{3} = 1,732$$

$$\frac{1}{2}\sqrt{3} = 0,866$$

5. Perbandingan Trigonometri Sudut Berelasi

1. α^0 dengan $(180 - \alpha)^0$

$$\cos(180 - \alpha)^0 = -\cos \alpha$$

$$\sin(180 - \alpha)^0 = \sin \alpha$$

$$\operatorname{tg}(180 - \alpha)^0 = -\operatorname{tg} \alpha$$

2. α^0 dengan $(360 - \alpha)^0$

$$\cos(360 - \alpha)^0 = \cos \alpha$$

$$\sin(360 - \alpha)^0 = -\sin \alpha$$

$$\operatorname{tg}(360 - \alpha)^0 = -\operatorname{tg} \alpha$$

3. α^0 dengan $(180 + \alpha)^0$

$$\cos(180 + \alpha)^0 = -\cos \alpha$$

$$\sin(180 + \alpha)^0 = -\sin \alpha$$

$$\operatorname{tg}(180 + \alpha)^0 = \operatorname{tg} \alpha$$

4. α^0 dengan $(90 - \alpha)^0$

$$\cos(90 - \alpha)^0 = \sin \alpha$$

$$\sin(90 - \alpha)^0 = \cos \alpha$$

$$\operatorname{tg}(90 - \alpha)^0 = \operatorname{cotg} \alpha$$