

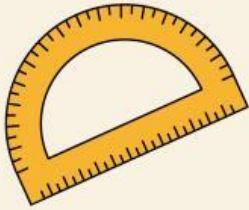
The background is a light beige color. It is decorated with various geometric shapes and tools in blue and orange. At the top, there are faint outlines of a ruler, a protractor, a compass, and a set square. In the center, there is a blue rounded rectangle containing the text 'LKPD' and 'Lembar kerja peserta didik'. Below this, the word 'TRIGONOMETRI' is written in large, bold, orange letters with a black outline. Underneath that, 'BY : OLIVEA MECCA' is written in smaller, black, sans-serif capital letters. At the bottom, there are more geometric shapes: a blue set square, an orange ruler, a blue rectangle, two blue circles, and an orange protractor. The bottom right corner features the 'LIVEWORKSHEETS' logo, which consists of a small colorful icon followed by the text 'LIVEWORKSHEETS' in blue capital letters.

LKPD

Lembar kerja peserta didik

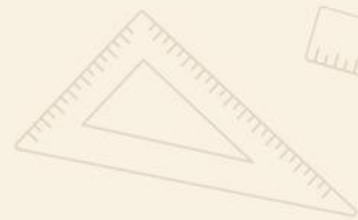
TRIGONOMETRI

BY : OLIVEA MECCA



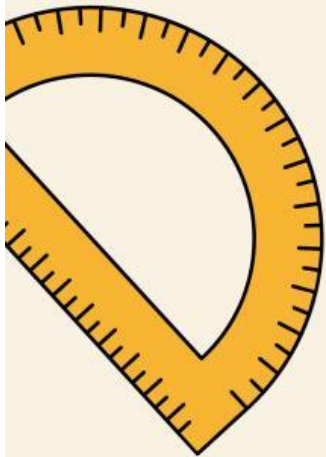
Hari ini kita akan mempelajari :

- 1) Definisi rasio atau perbandingan trigonometri
- 2) Identitas trigonometri
- 3) Nilai-nilai rasio trigonometri pada sudut istimewa
- 4) Sudut-sudut berelasi

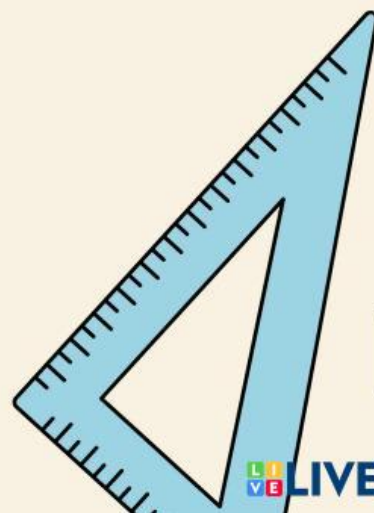


Trigonometri membuka jendela baru dunia!

AYO KITA MULAI!



A yellow sticky note with a folded bottom-right corner, containing three lines of math equations.
$$\frac{x}{3} - 8 = 6$$
$$\frac{x}{3} - 8 + 8 = 6 +$$
$$\frac{x}{3} = 14$$



RASIO TRIGONOMETRI

Selanjutnya rasio-rasio tersebut diberi nama yaitu:

Sinus (Sin)

$$\frac{\text{Depan}}{\text{Miring}}$$

Cosinus (Cos)

$$\frac{\text{Samping}}{\text{Miring}}$$

Tangen (Tan)

$$\frac{\text{Depan}}{\text{Samping}}$$

Kebalikan dari rasio-rasio trigonometri adalah sebagai berikut

Cosecan (Csc)

$$\frac{\text{Miring}}{\text{Depan}}$$

Secan (Sec)

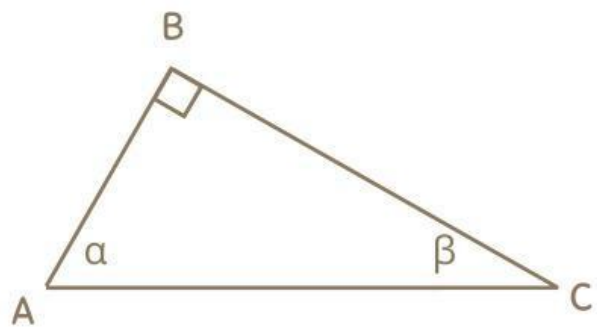
$$\frac{\text{Miring}}{\text{Samping}}$$

Cotangen (Cot)

$$\frac{\text{Samping}}{\text{Depan}}$$

Contoh

Tentukan keenam rasio trigonometri untuk sudut β , jika diketahui panjang $AB = 5\text{cm}$, dan panjang $BC = 12\text{cm}$

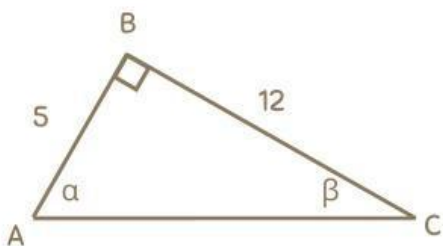


Jawab

Menggunakan teorema Pythagoras:

$$\begin{aligned}AC^2 &= 5^2 + 12^2 \\&= 25 + 144 \\&= 169\end{aligned}$$

$$AC = \sqrt{169} = 13$$



Rasio trigonometri untuk $\angle \beta$

$$\sin \beta = \frac{5}{13} \qquad \csc \beta = \frac{13}{5}$$

$$\cos \beta = \frac{12}{13} \qquad \sec \beta = \frac{13}{12}$$

$$\tan \beta = \frac{5}{12} \qquad \cot \beta = \frac{12}{5}$$



IDENTITAS TRIGONOMETRI

Sifat kebalikan rasio trigonometri dapat dituliskan sebagai persamaan-persamaan berikut

Identitas Kebalikan

1.

$$\csc \alpha = \frac{1}{\sin \alpha}$$

2.

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

3.

$$\cot \alpha = \frac{1}{\tan \alpha}$$



Beberapa identitas lain yang sering digunakan diantaranya:

Identitas Tangen dan cotangen

1. $\tan \alpha = \frac{\sin \alpha}{\cos \alpha}$
2. $\cot \alpha = \frac{\cos \alpha}{\sin \alpha}$

Identitas Pythagoras

1. $\sin^2 \alpha + \cos^2 \alpha = 1$
2. $1 + \cot^2 \alpha = \csc^2 \alpha$
3. $\tan^2 \alpha + 1 = \sec^2 \alpha$

Contoh

Buktikan bahwa persamaan di bawah ini benar!

$$\frac{2 - \sec^2 \theta}{\sec^2 \theta} = \cos^2 \theta - \sin^2 \theta$$

Jawab

Bukti:

$$\frac{2 - \sec^2 \theta}{\sec^2 \theta} = \frac{2}{\sec^2 \theta} - \frac{\sec^2 \theta}{\sec^2 \theta}$$

$$= \frac{2}{\sec^2 \theta} - 1$$

$$= 2\left(\frac{1}{\sec \theta}\right)^2 - 1$$

$$= 2(\cos \theta)^2 - 1$$

$$= 2\cos^2 \theta - (\sin^2 \theta + \cos^2 \theta)$$

$$= 2\cos^2 \theta - \sin^2 \theta - \cos^2 \theta$$

$$= \cos^2 \theta - \sin^2 \theta$$



SUDUT-SUDUT ISTIMEWA

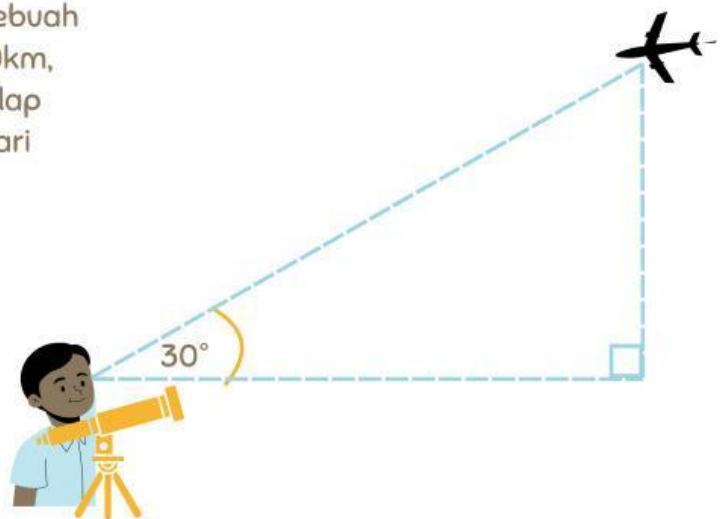
Sudut-sudut istimewa diantaranya adalah: 0° , 30° , 45° , 60° , dan 90° .
Nilai-nilai rasio trigonometri untuk sudut istimewa:



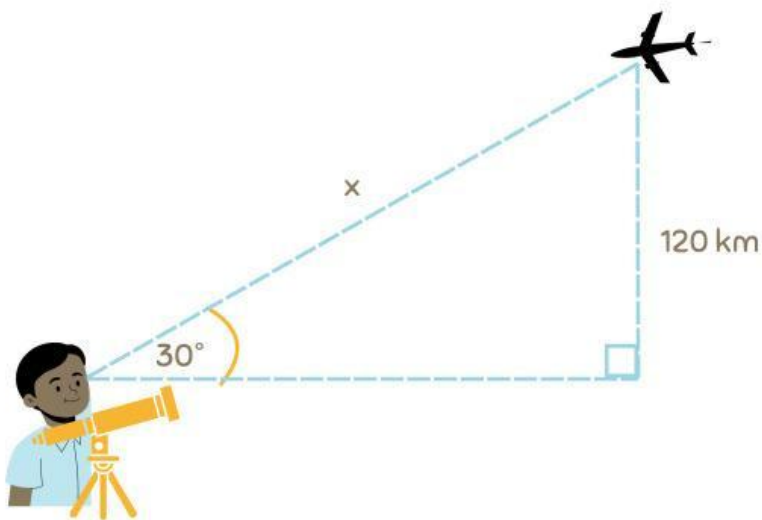
	0°	30°	45°	60°	90°
Sin	0	$\frac{1}{2}$	$\frac{1}{2}\sqrt{2}$	$\frac{1}{2}\sqrt{3}$	1
Cos	1	$\frac{1}{2}\sqrt{3}$	$\frac{1}{2}\sqrt{2}$	$\frac{1}{2}$	0
Tan	0	$\frac{1}{3}\sqrt{3}$	1	$\sqrt{3}$	tidak terdefinisi

Contoh

Seorang pengamat sedang mengamati sebuah pesawat yang terbang di ketinggian 120km, dengan sudut elevasi pengamat terhadap pesawat adalah 30° . Tentukan jarak dari pengamat ke pesawat!



Jawab



$$\sin 30^\circ = \frac{120}{x}$$

$$\frac{1}{2} = \frac{120}{x}$$

$$x = 240$$

Jadi, jarak dari pengamat ke pesawat adalah 240km.

SUDUT-SUDUT BERELASI

Sudut-sudut berelasi merupakan sudut di kuadran II, III, dan IV, yang nilai rasio trigonometri-nya bersesuaian dengan sudut-sudut pada kuadran I.

