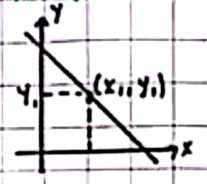
BAB VII Pers. Garis lurus

bentuk umum : $ax + by = c$
atau
$y = mx + c$

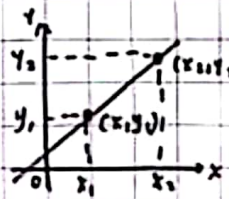
- Menentukan Pers. Garis lurus



1) Jika diket. gradien m dan satu titik (x_1, y_1)

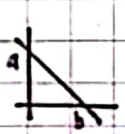
$$y - y_1 = m(x - x_1)$$

2) Jika melalui dua titik



$$\frac{y - y_1}{y_2 - y_1} = \frac{x - x_1}{x_2 - x_1}$$

3) dari grafik yg memotong dua sumbu



$$ax + by = ab$$

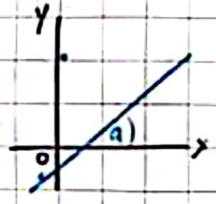
- Gradien (m)

1) $ax + by = c \rightarrow m = -\frac{a}{b}$

2) diket. (x_1, y_1) dan (x_2, y_2)

$$m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$$

3) diket. sudut garis

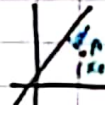


$$m = \tan \alpha$$

4) $m > 0 \rightarrow$ positif $\rightarrow$ naik
$m < 0 \rightarrow$ turun

5) dua garis tegak lurus : $m_1 \cdot m_2 = -1$

6) dua garis sejajar : $m_1 = m_2$

7) 

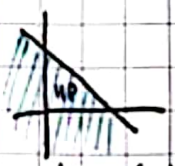
Jarak titik ke garis $\rightarrow d = \left| \frac{ax_0 + by_0 + c}{\sqrt{a^2 + b^2}} \right|$

- Himpunan Penyelesaian dari Pertidaksamaan Linear (daerah HP)

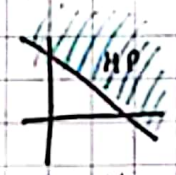
$ax + by \leq ab$

daerah kotor : uji titik, benar
daerah bersih : -"- , salah

- Garis turun (----) → < / >

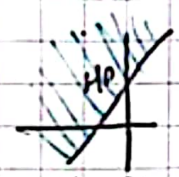


$ax + by \leq ab$



$ax + by \geq ab$

- Garis naik



$ax + by \geq ab$

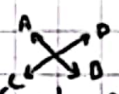
$ax + by \leq ab$

Bab VIII SPL & Kuadrat

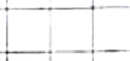
- SPLDV → Sistem Persamaan Linear Dua Variabel
$ax + by = c$
$dx + ey = f$
>> eliminasi & substitusi

- SPLTV → Sistem Pers. linear Tiga Variabel

- Kedudukan Dua Garis

1) Saling berpotongan 

↳ satu penyelesaian (satu nilai x dan y).
syarat : $m_1 \neq m_2$

2) Saling Sejajar 

↳ tidak memiliki penyelesaian.
syarat : $m_1 = m_2$, kedua persamaan tidak saling berkelipatan.

3) Saling berimpit (nempel) 
↳ banyak (lebih dari satu) penyelesaian atau tak hingga.
syarat : $m_1 = m_2$, saling berkelipatan
contoh : $2x + 4y = 10$
$x + 2y = 5$

⇒ SPL (Garis) dan Persamaan Kuadrat (Parabola) (SPLK)

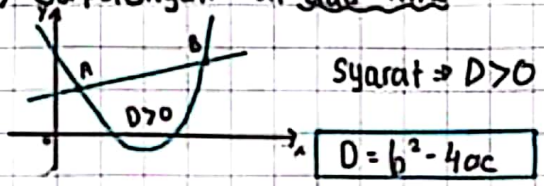
bentuk umum:

$$\begin{cases} y = ax + b \\ y = px^2 + qx + r \end{cases}$$

↳ cara menyelesaikan ⇒ substitusi $y_1 = y_2$, lalu difaktorkan

• Kedudukan Garis dan Parabola

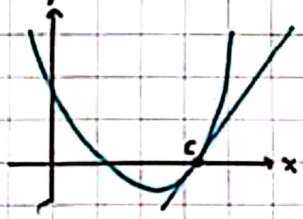
1) Berpotongan di dua titik



Syarat ⇒ $D > 0$

$D = b^2 - 4ac$

2) Bersinggungan



Syarat ⇒ $D = 0$

3) Tidak berpotongan

Syarat → $D < 0$

↳ tidak punya penyelesaian

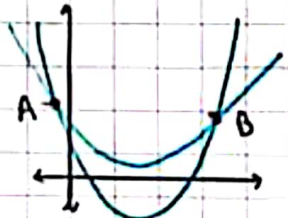
⇒ Sistem Persamaan Kuadrat dengan Kuadrat (SPKK)

bentuk umum:

$$\begin{cases} y = ax^2 + bx + c \\ y = px^2 + qx + r \end{cases}$$

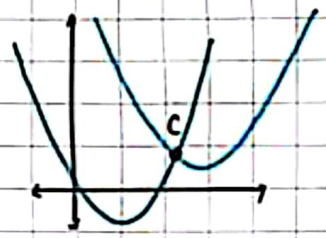
• Kedudukan dua Parabola

1) Berpotongan di dua titik



Syarat ⇒ $D > 0$

2) Berpotongan di satu titik atau berpotongan

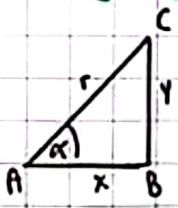


Syarat $D = 0$

3) Tidak berpotongan

Bab IX Trigonometri

⇒ Segitiga siku-siku



Luas = $\frac{\text{alas} \cdot \text{tinggi}}{2}$

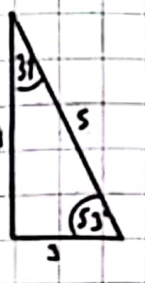
$\sin \alpha = Y/r$
$\cos \alpha = X/r$
$\tan \alpha = Y/X$
$\sec \alpha = r/X$
$\text{cosec}\, \alpha = r/Y$
$\cot \alpha = X/Y$

Identitas Trigonometri

- $\sin \alpha = \frac{1}{\csc \alpha}$
- $\cos \alpha = \frac{1}{\sec \alpha}$
- $\tan \alpha = \frac{\sin \alpha}{\cos \alpha}$
- $\tan \alpha = \frac{1}{\cot \alpha}$
- $\cot \alpha = \frac{\cos \alpha}{\sin \alpha}$
- $\sin^2 \alpha + \cos^2 \alpha = 1$
- $\tan^2 \alpha + 1 = \sec^2 \alpha$
- $\cot^2 \alpha + 1 = \csc^2 \alpha$

⇒ Sudut-sudut Istimewa

	0°	30°	45°	60°	90°	120°
$\sin \alpha$	0	$\frac{1}{2}$	$\frac{1}{2}\sqrt{2}$	$\frac{1}{2}\sqrt{3}$	1	$\frac{1}{2}\sqrt{3}$
$\cos \alpha$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0	$-\frac{1}{2}$
$\tan \alpha$	0	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$	∞	$-\sqrt{3}$
$\csc \alpha$	∞	2	$\sqrt{2}$	$\frac{2}{3}\sqrt{3}$	1	$\frac{2}{3}\sqrt{3}$
$\sec \alpha$	1	$\frac{2}{3}\sqrt{3}$	$\sqrt{2}$	2	∞	-2
$\cot \alpha$	∞	$\sqrt{3}$	1	$\frac{\sqrt{3}}{3}$	0	$-\frac{\sqrt{3}}{3}$

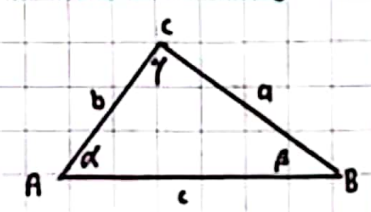


$\sin 37^\circ = 3/5 = 0{,}6$
$\cos 37^\circ = 4/5 = 0{,}8$
$\tan 37^\circ = 3/4 = 0{,}75$

$\sin 53^\circ = 4/5 = 0{,}8$
$\cos 53^\circ = 3/5 = 0{,}6$
$\tan 53^\circ = 4/3 = 1{,}33\ldots$

• Segitiga Sembarang

1) Aturan Sinus



$$\frac{a}{\sin\alpha} = \frac{b}{\sin\beta} = \frac{c}{\sin\gamma} = 2R$$

R = jari-jari lingkaran luar Δ

2) Aturan Kosinus

$\rightarrow a^2 = b^2 + c^2 - 2bc\cos\alpha$
$\rightarrow b^2 = a^2 + c^2 - 2ac\cos\beta$
$\rightarrow c^2 = a^2 + b^2 - 2ab\cos\gamma$

- $\cos A = \dfrac{b^2+c^2-a^2}{2bc}$
- $\cos B = \dfrac{a^2+c^2-b^2}{2ac}$
- $\cos C = \dfrac{a^2+b^2-c^2}{2ab}$

3) Luas Segita Sembarang

a) Diketahui dua rusuk dan satu sudut (RSR)

- $L = \frac{1}{2}ab\sin\gamma$
- $L = \frac{1}{2}bc\sin\alpha$
- $L = \frac{1}{2}ac\sin\beta$

b) Diketahui dua sudut dan satu rusuk (SRS)

- $L\Delta = \dfrac{a^2\sin B\sin C}{2\sin A}$
- $L\Delta = \dfrac{b^2\sin A\sin C}{2\sin B}$
- $L\Delta = \dfrac{c^2\sin A\sin B}{2\sin C}$

c) Diketahui ketiga rusuknya (RRR)

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

dengan $s = \frac{1}{2}$ keliling $= \dfrac{a+b+c}{2}$

d) Diketahui ketiga titik sudutnya
A (x_1, y_1) B (x_2, y_2) C (x_3, y_3)

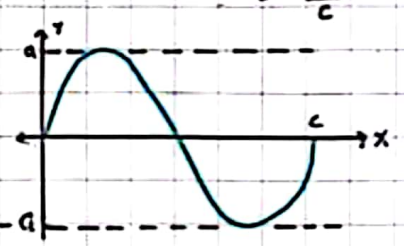
$$L = \pm\frac{1}{2}\begin{vmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{vmatrix}$$

cari determinannya dengan menggunakan sarrus

• Grafik Fungsi Trigonometri

- Grafik $y = a\sin bx$ $\rightarrow b = \frac{2\pi}{c}$

periode $= \frac{2\pi}{b}$



- Grafik $y = a\cos bx$ $\rightarrow b = \frac{2\pi}{c}$