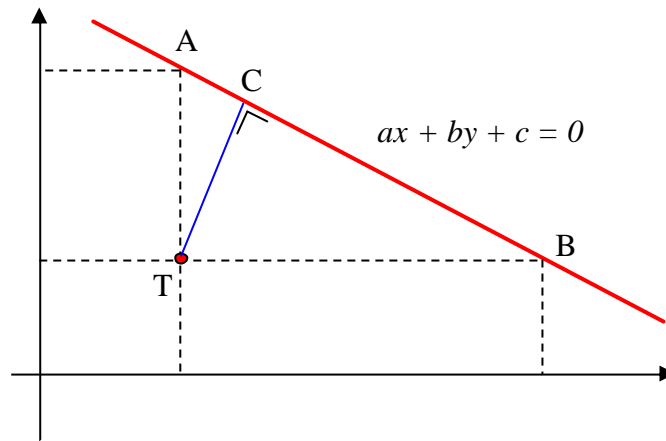


## Rumus Jarak Titik dan Garis



Misalkan titik  $T(x_1, y_1)$  dan  $A(x_A, y_A)$

(1).  $x_A = x_1$

(2).  $A$  pada garis  $ax + by + c = 0$ , maka :

$$\Rightarrow ax_1 + by_A + c = 0$$

$$\Rightarrow by_A = -ax_1 - c$$

$$\Rightarrow y_A = \frac{-ax_1 - c}{b}$$

sehingga  $A\left(x_1, \frac{-ax_1 - c}{b}\right)$

Misalkan titik  $B(x_B, y_B)$

(1).  $y_B = y_1$

(2).  $B$  pada garis  $ax + by + c = 0$ , maka :

$$\Rightarrow ax_A + by_1 + c = 0$$

$$\Rightarrow ax_A = -by_1 - c$$

$$\Rightarrow x_A = \frac{-by_1 - c}{a}$$

sehingga  $B\left(\frac{-by_1 - c}{a}, y_1\right)$

www.matikzone.com

807072

Panjang AT, BT, dan AB adalah:

$$\bullet AT = y_A - y_1 = \frac{-ax_1 - c}{b} - y_1 = \frac{-ax_1 - by_1 - c}{b}$$

$$\bullet BT = x_B - x_1 = \frac{-by_1 - c}{a} - x_1 = \frac{-ax_1 - by_1 - c}{a}$$

$$\begin{aligned}\bullet AB &= \sqrt{(x_A - x_B)^2 + (y_A - y_B)^2} \\ &= \sqrt{\left(x_1 - \left(\frac{-by_1 - c}{a}\right)\right)^2 + \left(\left(\frac{-ax_1 - c}{b}\right) - y_1\right)^2} \\ &= \sqrt{\left(\frac{ax_1 + by_1 + c}{a}\right)^2 + \left(\frac{-ax_1 - by_1 - c}{b}\right)^2} \\ &= \sqrt{\frac{(ax_1 + by_1 + c)^2}{a^2} + \frac{(ax_1 + by_1 + c)^2}{b^2}} \\ &= (ax_1 + by_1 + c) \sqrt{\frac{1}{a^2} + \frac{1}{b^2}} \\ &= (ax_1 + by_1 + c) \sqrt{\frac{a^2 + b^2}{a^2 b^2}} \\ &= \frac{1}{ab} (ax_1 + by_1 + c) \sqrt{a^2 + b^2}\end{aligned}$$

www.matikzone.com  
28 Mei 2013

Perhatikan segitiga ABC

$$\sin B = \frac{CT}{BT} = \frac{AT}{AB}$$

$$\Rightarrow CT = \frac{AT \cdot BT}{AB}$$

$$\Rightarrow CT = \frac{\left( \frac{-ax_1 - by_1 - c}{b} \right) \left( \frac{-ax_1 - by_1 - c}{a} \right)}{(ax_1 + by_1 + c) \sqrt{a^2 + b^2}}$$

$$\Rightarrow CT = \frac{\frac{(ax_1 + by_1 + c)^2}{ab}}{(ax_1 + by_1 + c) \sqrt{a^2 + b^2}}$$

$$\Rightarrow CT = \frac{(ax_1 + by_1 + c)^2}{(ax_1 + by_1 + c) \sqrt{a^2 + b^2}}$$

$$\Rightarrow CT = \frac{ax_1 + by_1 + c}{\sqrt{a^2 + b^2}}$$

*www.matikzone.com*  
*Et Utg2*

CT adalah jarak titik T dengan garis  $ax + by + c = 0$ . Karena jarak tidak pernah bernilai negatif, maka dapat disimpulkan bahwa:

Jarak titik  $T(x_1, y_1)$  dengan garis  $ax + by + c = 0$  adalah:

$$d = \left| \frac{(ax_1 + by_1 + c)}{\sqrt{a^2 + b^2}} \right|$$