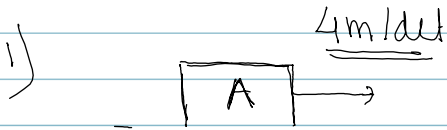


## Gerak Relatif



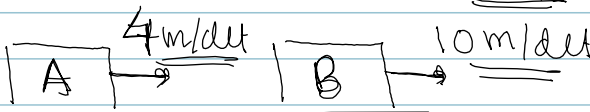
A bergerak tiap detik 4 m

B bergerak tiap detik 1 m

Menurut B, si A itu meninggalkan dia  
tiap detiknya 3 m

Kec A menurut B  $\rightarrow V_{A/B} = \underline{\underline{3m/det}}$

2)



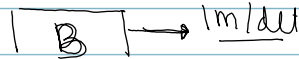
A bergerak tiap detik 4 m

B bergerak tiap detik 10 m

$V_{B/A} = 6m/det$

Kec B relatif thd A = 6 m/det

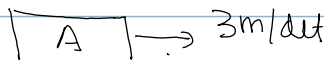
## Agar lebih mudah



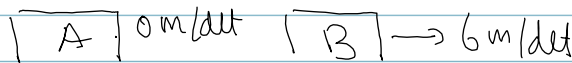
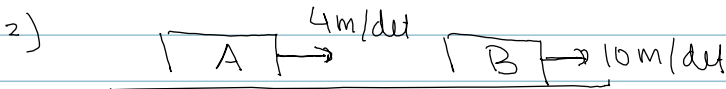
menghitung  $V_{A/B}$

Anggap ada angin badai yang bertiup ke arah A dan B. Angin ini ingin menghentikan B.

Kec angin harus 1 m/det ke kiri



$$V_{A/B} = \underline{3 \text{ m/det}}$$



angin ke kiri 4 m/det menghentikan A

$$V_{B/A} = \underline{6 \text{ m/det}}$$

1)

(A) → 25 m/det

(B) → 10 m/det

$V_{A/B} = ?$  15 m/det

(A) → 15 m/det

(B) 0 m/det

2)

(A) → 3 m/det

(B) → 2 m/det

$V_{A/B} = ?$

$V_{B/A} = ?$

$V_{A/B} = 1 \text{ m/det}$  (kekanan)

(A) → 1 m/det

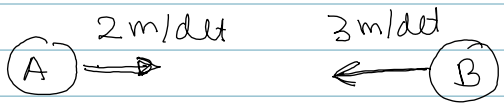
(B) 0 m/det

$V_{B/A} = 1 \text{ m/det}$  (kiri)

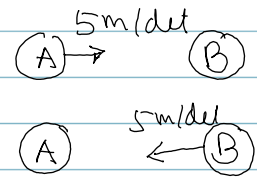
(A) 0 m/det

← (B)  
1 m/det

3



$$V_{A/B} = 5 \text{ m/det} \quad (\text{kanan})$$
$$V_{B/A} = 5 \text{ m/det} \quad (\text{kiri})$$



### Latihan

1)  $\text{A} \rightarrow 10 \text{ m/det}$   
 $\text{B} \rightarrow 5 \text{ m/det}$

$$V_{A/B} = ?$$
$$V_{B/A} = ?$$

2)  $\text{A} \rightarrow 8 \text{ m/det}$   
 $\text{B} \rightarrow 10 \text{ m/det}$

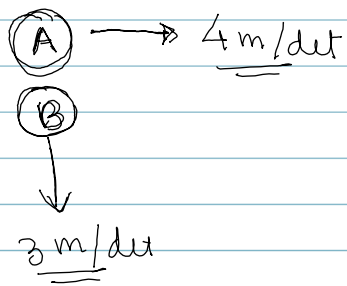
$$V_{A/B} = ?$$
$$V_{B/A} = ?$$

3)  $\text{A} \rightarrow 5 \text{ m/det}$      $\text{B} \leftarrow 1 \text{ m/det}$

$$V_{A/B} = ?$$
$$V_{B/A} = ?$$

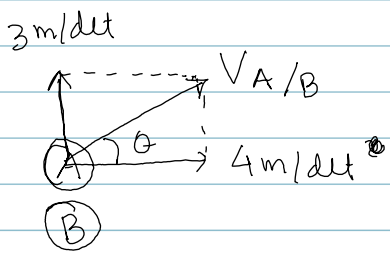
4)  $\text{A} \rightarrow 10 \text{ m/det}$      $\text{B} \leftarrow 5 \text{ m/det}$

$$V_{A/B} = ?$$
$$V_{B/A} = ?$$



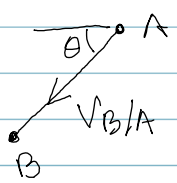
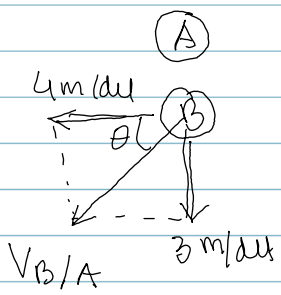
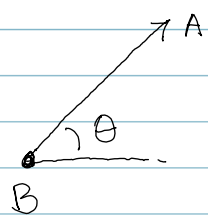
$$V_{A/B} = ?$$

$$V_{B/A} = ?$$



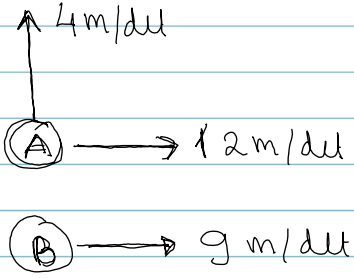
$$V_{A/B} = \sqrt{3^2 + 4^2}$$
$$= 5 \text{ m/det}$$

$$\tan \theta = \frac{3}{4}$$



$$V_{B/A} = \sqrt{4^2 + 3^2}$$
$$= 5 \text{ m/det}$$

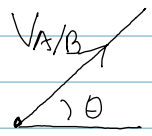
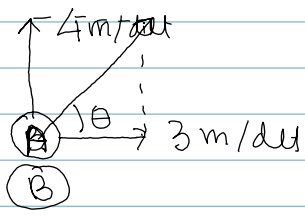
$$\tan \theta = \frac{3}{4}$$



$$V_{A/B} = ?$$

$$V_{B/A} = ?$$

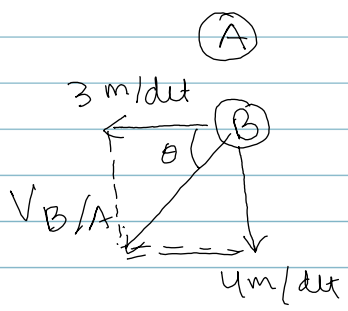
$V_{A/B}$



$$V_{A/B} = \sqrt{4^2 + 3^2} = 5 \text{ m/det}$$

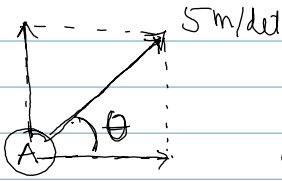
$$\tan \theta = \frac{4}{3}$$

$V_{B/A}$



$$V_{B/A} = \sqrt{3^2 + 4^2} = 5 \text{ m/det}$$

$$\tan \theta = \frac{4}{3}$$



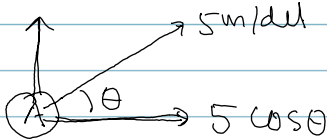
$$\tan \theta = \frac{4}{3}$$

$$V_{A/B} = ?$$



$$V_{B/A} = ?$$

$$5 \sin \theta = 4 \text{ m/det}$$

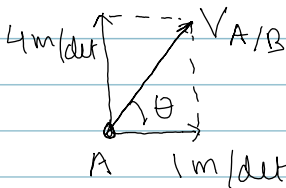
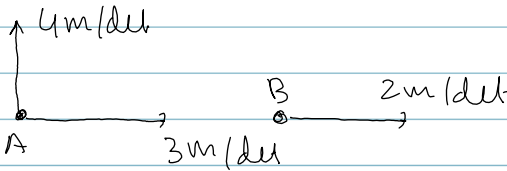
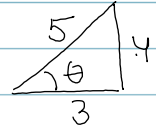


$$5 \cdot \frac{3}{5} = 3 \text{ m/det}$$

$$\tan \theta = \frac{4}{3}$$

$$\sin \theta = \frac{4}{5}$$

$$\cos \theta = \frac{3}{5}$$

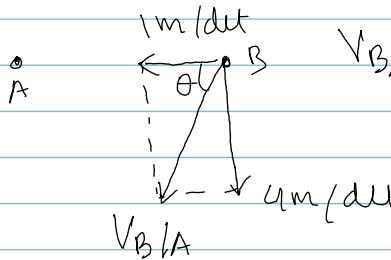


$$V_{A/B} = \sqrt{4^2 + 1^2} = \sqrt{17} \text{ m/det}$$

$$\bullet 0 \text{ m/det}$$

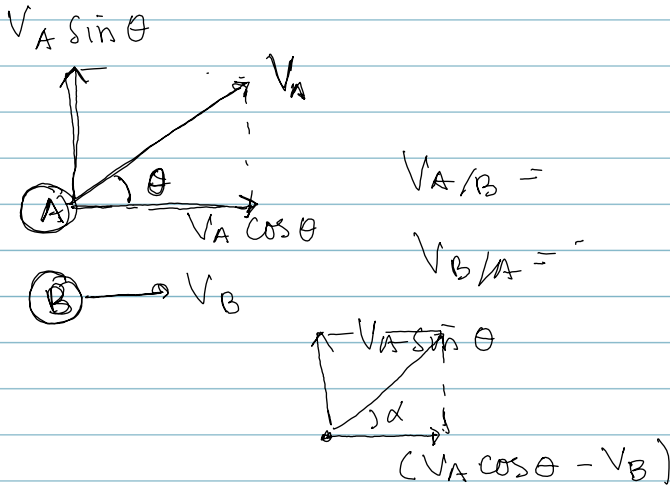
$$\tan \theta = \frac{4}{1}$$

$$V_{B/A}$$



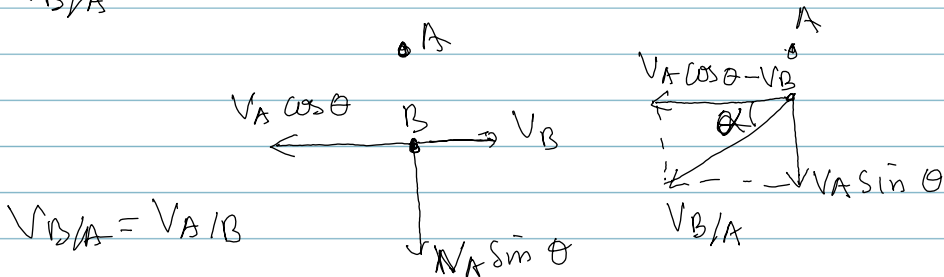
$$V_{B/A} = \sqrt{4^2 + 1^2} = \sqrt{17} \text{ m/det}$$

$$\tan \theta = \frac{4}{1} = 4$$



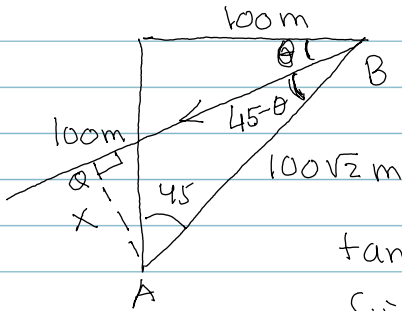
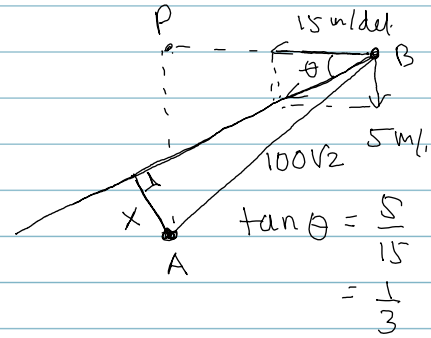
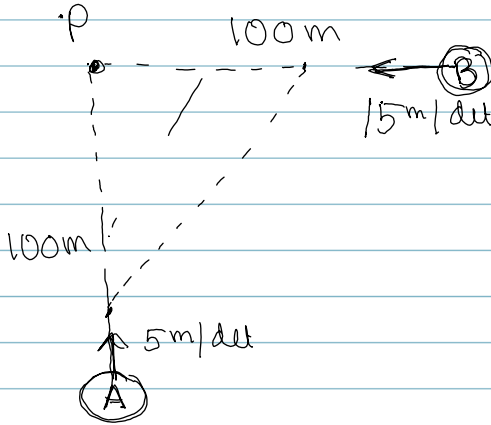
$$\begin{aligned}
 V_{A/B} &= \sqrt{(V_A \sin \theta)^2 + (V_A \cos \theta - V_B)^2} \\
 &= \sqrt{V_A^2 \sin^2 \theta + V_A^2 \cos^2 \theta + V_B^2 - 2 V_A V_B \cos \theta} \\
 &= \sqrt{V_A^2 + V_B^2 - 2 V_A V_B \cos \theta} \\
 \tan \alpha &= \frac{V_A \sin \theta}{V_A \cos \theta - V_B}
 \end{aligned}$$

$V_{B/A}$

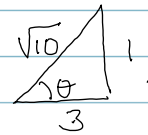


$V_{B/A} = V_{A/B}$





$$X = AB \sin(45 - \theta)$$



$$\tan \theta = \frac{1}{3}$$

$$\sin \theta = \frac{1}{\sqrt{10}}$$

$$\cos \theta = \frac{3}{\sqrt{10}}$$

$$X = 100\sqrt{2} \sin(45 - \theta)$$

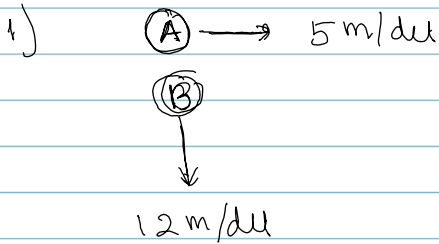
$$= 100\sqrt{2} (\sin 45 \cos \theta - \cos 45 \sin \theta)$$

$$= 100\sqrt{2} \left( \frac{1}{2} \cdot \sqrt{2} \cdot \frac{3}{\sqrt{10}} - \frac{1}{2} \cdot \sqrt{2} \cdot \frac{1}{\sqrt{10}} \right)$$

$$= 100 \sqrt{2} \left( \frac{1}{2} \sqrt{2} \right) \left( \frac{2}{\sqrt{10}} \right)$$

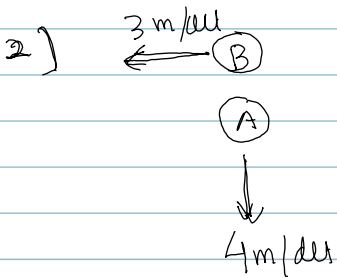
$$= \frac{100}{\sqrt{10}} \cdot 2 = \frac{200}{10} \sqrt{10} = \underline{\underline{20\sqrt{10} \text{ m}}}$$

# Latihan



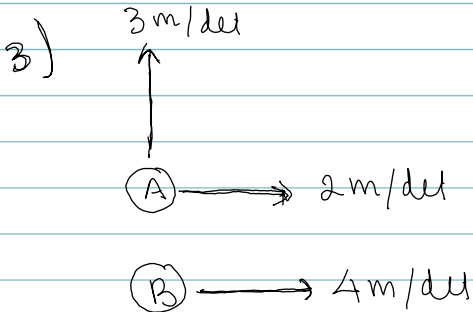
$V_{A/B} = ?$

$V_{B/A} = ?$



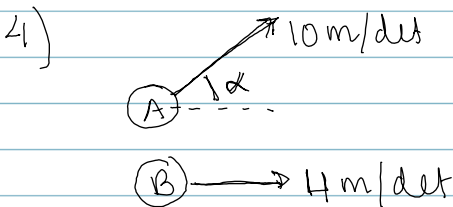
$V_{A/B} =$

$V_{B/A} =$



$V_{A/B} = ?$

$V_{B/A} = ?$



$\tan \alpha = \frac{3}{4}$

$V_{A/B} = ?$

$V_{B/A} = ?$