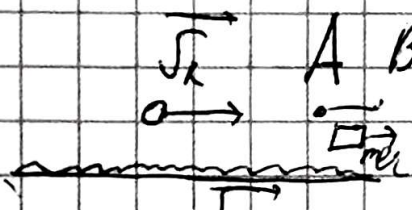
9,2,24

Юрий Андреевич Гагарин

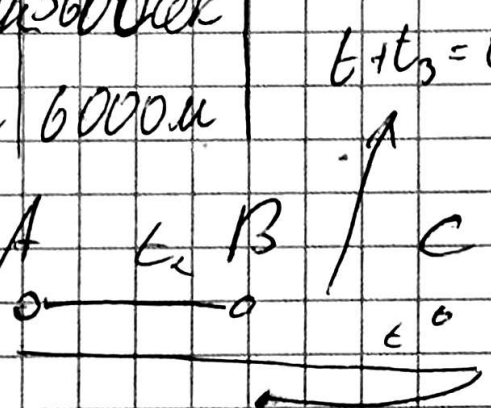


Дано: | СИ:

$\vec{v}_{ma} = ?$

$t = 60$ мин | 3600 сек

$AB = 6$ км | 6000 м



Решение:

$AC = (v_k + v_m)t$

$AB = AC - BC = v_m \cdot t_2$

$AC + BC = (v_k + v_m)\cdot t + (v_k - v_m)(t_2 - t) =$

$BC = (v_k - v_m)\cdot t_3$

$= v_k t - v_m t + v_k t_2 - v_k t - v_m t_2 + v_m t$

$= 2v_k t - v_k t - v_m t_2 = AB$

$BC = AC - AB$

$BC = (v_k + v_m)t - AB$

$(t_2 - t)(v_k - v_m) = (v_k + v_m)t + AB$

$$\begin{cases} v_k t_2 - v_m t_2 = v_k t - AB \\ t_2 v_m = AB \end{cases}$$

$t^2 = \frac{AB}{v_k}$

$$\frac{AB}{v_T} \cdot v_k - v_T \frac{AB}{v_T} = C$$

$$\frac{v_k}{v_t} \cdot AB - AB = v_k \cdot t - AB$$

$$v_T = \frac{AB}{t} = \frac{6000\,t}{3600} =$$

New Solution

$$BC = (v_k + v_T)t - AB$$

$$(v_k - v_T)t_3 = v_k t - v_t t - v_T (t + t_3)$$

$$v_k t_3 = v_k t \quad | \quad v_k t_3 - v_t t_3$$

$$t_2^2 = 2t$$

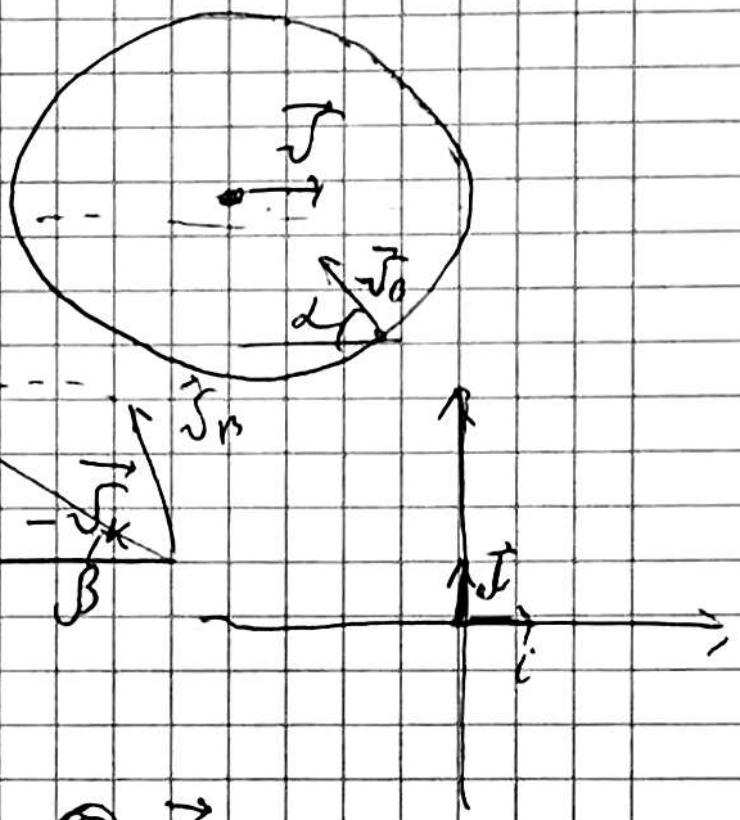
$$v_T = \frac{AB}{2t}$$

Дано:

$v_к = 30$ км/ч

$v_в = 15$ км/ч

$\angle \alpha = 60°$



$v_{вк}$

$\beta_{отн\,к}$

$$\vec{v}_{отн} = \vec{v}_в - \vec{v}_к$$

$$\vec{v}_к = v_к \vec{i} + 0 \vec{i}$$

$$\vec{v}_в = v_{в_x} \vec{i} + v_{в_y} \vec{j}$$

$$v_{отн_x} = -v_к + v_{в_x} = -30 + 4{,}5 = -25{,}5$$

$$v_{отн_y} = -v_{в_y}$$

$$\begin{cases} v_{в_x} = \frac{15}{2} = 4{,}5 \\ v_{в_y} = 4{,}5\sqrt{3} \end{cases}$$

$$v_{отн\,к} = \frac{(-54{,}5)(4{,}5\sqrt{3})\cos\alpha}{\sqrt{(-54{,}5)^2 + (4{,}5\sqrt{3})^2}} =$$

$$\beta = \arccos \frac{-54{,}5}{40}$$