

①  
 $a = (2, 1, 5)$   
 $b = (2, -3, 8)$



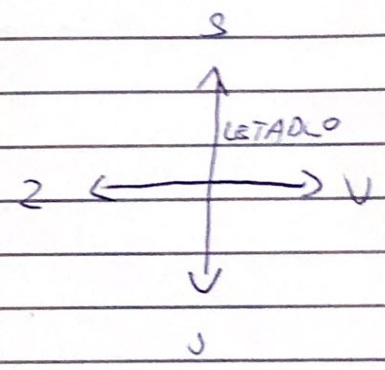
$$a_n = \frac{(-2, 1, 5)}{\sqrt{4+1+25}} = \frac{-2}{\sqrt{30}}i + \frac{1}{\sqrt{30}}j + \frac{5}{\sqrt{30}}k$$

$$b_n = \frac{-2}{\sqrt{30}} \cdot 2 + \frac{1}{\sqrt{30}} \cdot (-3) + \frac{5}{\sqrt{30}} \cdot 8 =$$

$$n = \frac{2}{\sqrt{30}}i + \frac{1}{\sqrt{30}}j + \frac{5}{\sqrt{30}}k$$

$$= \frac{-4}{\sqrt{30}} + \frac{-3}{\sqrt{30}} + \frac{40}{\sqrt{30}} = \frac{33}{\sqrt{30}}$$

②



③

$$v = 50 \text{ km/h}$$

$$t = 1,2$$

$$A_1 = 1,2 \cdot 13,89 \quad v = 13,89$$

$$a = \frac{\Delta v}{\Delta t}$$

$$A_1 = 16,67 \text{ m}$$

$$\Delta t = \frac{\Delta v}{a}$$

$$A_2 = \frac{1}{2} \cdot a t^2$$

$$t = \frac{13,89}{3}$$

$$A_2 = \frac{1}{2} \cdot 3 \cdot 4,63^2$$

$$a = 4,63$$

$$A_2 = 32,16 \text{ m}$$

$$32,16 < 33,33$$

$$A = A_1 + A_2$$

$$A = 16,67 + 32,16$$

ANO, STIHNE!

$$A = 48,83 \text{ m}$$

## GRAVIT



⑤  $m_0 = 20 \text{ kg}$

$v_0 = 100 \text{ m/s}$

$m_1 = 12 \text{ kg}$

$v_1 = 200 \text{ m/s}$

$\bar{m} = m_1 + m_2$

~~12 + m\_2 = 20~~  
 $v_2 = ?$

~~12 + m\_2 = 20~~

$m_2 = 8$

$m_0 \cdot v_0 = -m_1 v_1 + m_2 v_2$

$m_0 v_0 + m_1 v_1 = m_2 v_2$

$v_2 = \frac{m_0 v_0 + m_1 v_1}{m_2} = \frac{20 \cdot 100 + 12 \cdot 200}{8} = \frac{2000 + 2400}{8} = \frac{4400}{8} = 550$

$v_2 = 550 \text{ m} \cdot \text{s}^{-1}$

④

$d = 80$

$r = 40 \text{ m}$

$v = 72 \text{ km/h}$

$r = 0,4 \text{ m}$

$= 20 \text{ m} \cdot \text{s}^{-1}$



$\omega = \frac{v}{r}$

$\omega = \frac{20}{0,4}$

$a_d = v^2 \cdot r$

$= 20^2 \cdot 0,4$

$= 1600 \text{ m} \cdot \text{s}^{-2}$

$\omega = 50 \text{ RAD} \cdot \text{s}^{-1}$

$\omega = 2\pi f$

$f = \frac{\omega}{2\pi} \Rightarrow f = \frac{50}{2\pi}$

$= 7,958 \text{ Hz}$