

Тело брошено под углом к горизонту.

КОД: _____

N 131

$$\alpha = 30^\circ$$

$$v_0 = 20 \frac{\text{м}}{\text{с}}$$

$$g = 10 \frac{\text{м}}{\text{с}^2}$$

$$t = ?$$

$$v_y = v_{0y} + g_y t$$

на макс H $v_y = 0$.

$$0 = v_0 \sin \alpha - g t$$

$$t = \frac{v_0 \sin \alpha}{g} = \frac{20 \frac{\text{м}}{\text{с}} \cdot \sin 30^\circ}{10 \frac{\text{м}}{\text{с}^2}} = 1 \text{ с} - \text{подъем}$$

t спуск = 1 с

N 132

$$v_0 = 40 \frac{\text{м}}{\text{с}}$$

$$\alpha = 60^\circ$$

$$g = 10 \frac{\text{м}}{\text{с}^2}$$

$$H_{\text{max}} = S_y = \frac{v_y^2 - v_{0y}^2}{2g_y}$$

$$H_{\text{max}} = \frac{0 - (v_0 \sin \alpha)^2}{-2g} = \frac{40^2 \frac{\text{м}^2}{\text{с}^2} (\sin 60^\circ)^2}{2 \cdot 10 \frac{\text{м}}{\text{с}^2}} = \frac{40 \cdot \sqrt{3} \cdot \sqrt{3} \cdot 40}{20} \text{ м}$$

= 120 м.

N 133

$$t = 20 \text{ с}$$

$$g = 10 \frac{\text{м}}{\text{с}^2}$$

$$v_y = v_{0y} + g_y t' \quad \text{на макс. высоте}$$

$$t' = \frac{t}{2}$$

$$v_{0y} = v_y - g_y \frac{t}{2}$$

$$v_{0y} = 0 + g \frac{t}{2} = 10 \frac{\text{м}}{\text{с}^2} \cdot \frac{20 \text{ с}}{2} = 100 \frac{\text{м}}{\text{с}}$$

$$H_{\text{max}} = \frac{v_y^2 - v_{0y}^2}{2g_y} = \frac{0 - (v_{0y})^2}{-2g} = \frac{(100 \frac{\text{м}}{\text{с}})^2}{2 \cdot 10} = \frac{10^4}{2 \cdot 10} = 500 \text{ м}$$

N134.

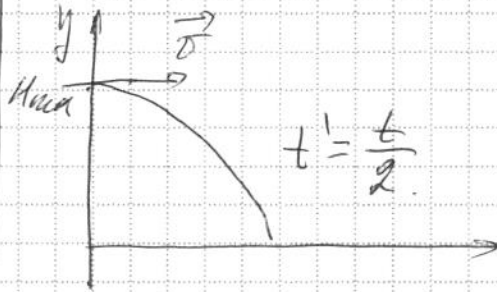
КОД:

$H_{max} = 20 \text{ м}$

$g = 10 \frac{\text{м}}{\text{с}^2}$

$t = ?$

Рассмотрим вторую половину полета камня.



$v_x = v_{0x}$

$v_{0y} = 0$

$H_{max} = v_y t + \frac{g t^2}{2}$

$H_{max} = 0 - \frac{g t^2}{2}$

$t' = \sqrt{\frac{2 H_{max}}{g}} = \sqrt{\frac{2 \cdot 20 \text{ м}}{10 \frac{\text{м}}{\text{с}^2}}}$

$= 2 \text{ с.} \quad \underline{\underline{t = 4 \text{ с.}}}$

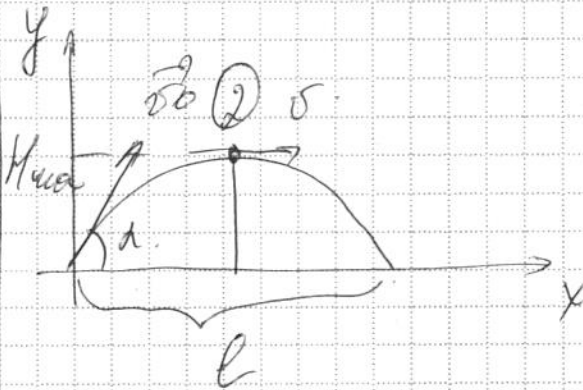
N135

$v_0 = 40 \frac{\text{м}}{\text{с}}$

$\alpha = 15^\circ$

$g = 10 \frac{\text{м}}{\text{с}^2}$

$l = ?$



$l = v_{0x} \cdot t = v_0 \cdot \cos \alpha \cdot t$

g acts only today

$v_y = v_{0y} + g_y t'$

$0 = v_0 \cdot \sin \alpha - g t'$

$t' = \frac{v_0 \sin \alpha}{g} \quad t = 2 t'$

$l = 2 v_0 \cos \alpha \cdot \frac{v_0 \sin \alpha}{g} = \frac{2 v_0^2 \sin \alpha \cos \alpha}{g}$

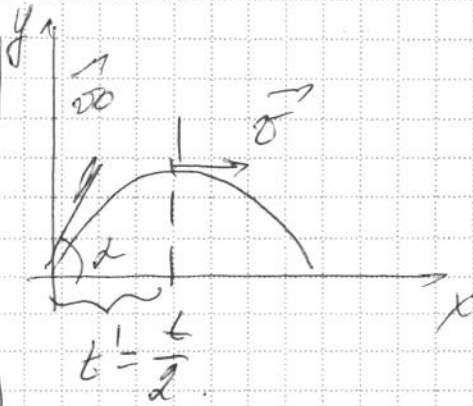
$= \frac{2 \cdot 1600 \frac{\text{м}^2}{\text{с}^2} \cdot \sin 30^\circ}{2 \cdot 10 \frac{\text{м}}{\text{с}^2}} = 80 \text{ (м)}$

N136.

$\alpha = 30^\circ$

$t = 2c$

$g = 10 \frac{m}{c^2}$

 $v_0 = ?$ 

$$v_y = v_{0y} + g_y t'$$

$$0 = v_0 \cdot \sin \alpha - g t'$$

$$v_0 = \frac{g t'}{\sin \alpha} = \frac{10 \frac{m}{c^2} \cdot 1c}{\sin 30^\circ} =$$

$$= 20 \frac{m}{c}$$

N137.

$v = v_{max}$

$v = v_{max}$

$v = v_{0x}$

$v = \frac{v_0}{2}$

$v_{0x} = v_0 \cdot \cos \alpha$

 $\alpha = ?$

$$\frac{v_0}{2} = v_0 \cdot \cos \alpha$$

$$\cos \alpha = \frac{1}{2} \quad \alpha = 60^\circ$$

N138

Дано:

$v = 15 \frac{m}{c}$

$v_{max} = 3v_{min}$

$g = 10 \frac{m}{c^2}$

 $v_{max} = ?$

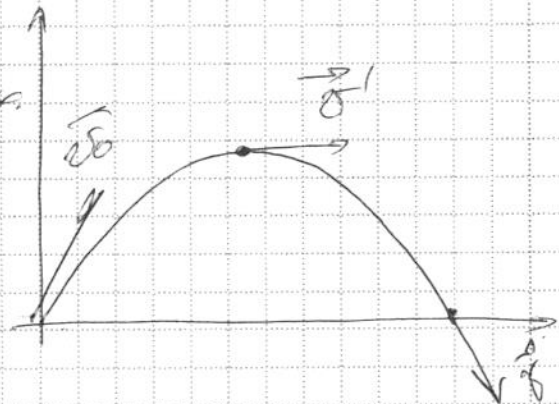
$v_0 = v = v_{max}$

$v' = v_{min} = v_{0x}$

$v = 3v_{0x}$

$v_{0x} = \frac{v}{3} = 5 \frac{m}{c}$

$$v_{0y} = \sqrt{v_0^2 - v_{0x}^2} = \sqrt{15^2 - 5^2} = 10\sqrt{2}$$



$$H_{\max} = \frac{v_y^2 - v_{0y}^2}{2g}$$

$$H_{\max} = \frac{v_{0y}^2}{2g} = \frac{(10\sqrt{2})^2}{2 \cdot 10} = \frac{200}{20} = 10 \text{ (м)}$$

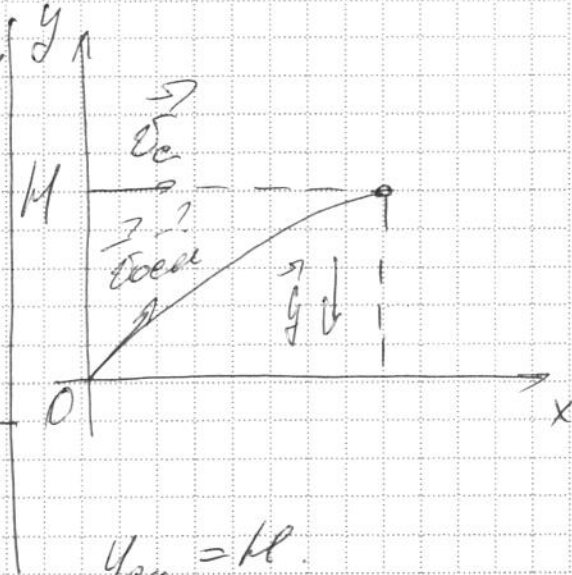
N139

$$v_c = 540 \frac{\text{км/ч}}{2} = 150 \frac{\text{м/с}}$$

$$H = 2 \text{ км} = 2 \cdot 10^3 \text{ м}$$

$$g = 10 \frac{\text{м}}{\text{с}^2}$$

$$x_{oc} = x_{osc}$$



Век или -?

$$y_{osc} = H$$

$$H = v_{0y} t - \frac{gt^2}{2} = \frac{v_y^2 - v_{0y}^2}{2g}$$

$$x_c = v_{0x} \cdot t$$

$$x_{osc} = v_{0x} t$$

$$v_c \cdot x = v_{0x} x_c$$

$$v_{0x} = v_c = 150 \frac{\text{м/с}}$$

В или \Rightarrow H_{\max}

$$H = \frac{v_{0y}^2}{2g}$$

$$v_{0y}^2 = 2gH$$

$$v_{0y}^2 = 2 \cdot 10 \cdot 2 \cdot 10^3 = 4 \cdot 10^4 \left(\frac{\text{м}^2}{\text{с}^2} \right)$$

$$v_0 = \sqrt{v_{0y}^2 + v_{0x}^2} = \sqrt{400 \cdot 10^2 + 225 \cdot 10^2} = 25 \cdot 10 = 250 \left(\frac{\text{м}}{\text{с}} \right)$$