

# Часть 1

Олимпиада: **Физика, 10 класс (1 часть)**

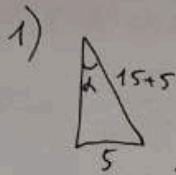
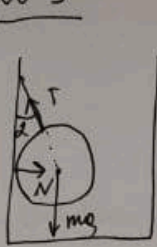
Шифр: **21204034**

ID профиля: **178002**

Вариант 3

Умовову емп 1

W3

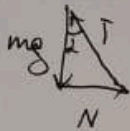


$$20 \cdot \sin d = 5$$

$$\sin d = \frac{1}{4} \Rightarrow \cos d = \sqrt{1 - \frac{1}{16}} = \sqrt{\frac{15}{16}} = \frac{\sqrt{15}}{4}$$

$$\text{II } 3H: \vec{mg} + \vec{N} + \vec{T} = 0$$

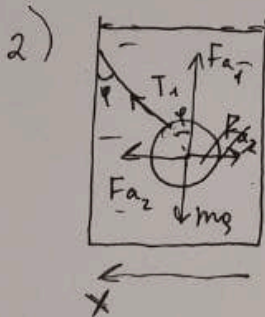
$$\tan d = \frac{\frac{1}{4}}{\frac{\sqrt{15}}{4}} = \frac{1}{\sqrt{15}}$$



$$\cos d \frac{N}{mg} = \tan d$$

$$N = mg \cdot \frac{1}{\sqrt{15}}$$

$$N = \frac{8}{\sqrt{15}} \text{ (H)} = \frac{8\sqrt{15}}{15} \text{ (H)}$$



II 3H:

$$O_y: F_{a1} + T_1 \cos \varphi = mg$$

$$O_x: T_1 \sin \varphi + F_{a2} = m \cdot a$$

$$a = \omega^2 \cdot (l+R) \sin \varphi$$

$$F_{a1} = P_b \cdot g \cdot V_m$$

$$F_{a2} = P_b \cdot V_m \cdot \omega^2 \cdot (l+R) \sin \varphi$$

$$P_b g V_m + T_1 \cos \varphi = mg$$

$$T_1 \sin \varphi + P_b V_m \cdot \omega^2 (l+R) \sin \varphi = m \omega^2 (l+R) \sin \varphi$$

$$T_1 = \frac{mg - P_b g V_m}{\cos \varphi}$$

$$\frac{mg - P_b \cdot g \cdot V_m}{\cos \varphi} \cdot \sin \varphi + P_b \cdot V_m \cdot \omega^2 (l+R) \sin \varphi = m \omega^2 (l+R) \sin \varphi$$

$$(P_m \cdot V_m \cdot g - P_b \cdot V_m \cdot g) \cdot \tan \varphi + P_b \cdot V_m \cdot \omega^2 (l+R) \sin \varphi = P_m \cdot V_m \cdot \omega^2 (l+R) \sin \varphi$$

$$P_m = \frac{m}{\frac{4}{3} \pi R^3} = \frac{0,8 \text{ m}}{\frac{4}{3} \pi \cdot 0,05^3}$$

$$(P_m - P_b) g \cdot \frac{\sin \varphi}{\cos \varphi} + P_b \cdot \omega^2 (l+R) \sin \varphi = P_m \cdot \omega^2 (l+R) \sin \varphi$$

$$(P_m - P_b) g + P_b \omega^2 (l+R) \cos \varphi - P_m \omega^2 (l+R) \cos \varphi = 0$$

4. Автомобиль стр 2

$$(\rho_m - \rho_b) \omega^2 (l+R) \cos \alpha = (\rho_m - \rho_b) g$$

$$\omega^2 (l+R) \cos \alpha = g$$

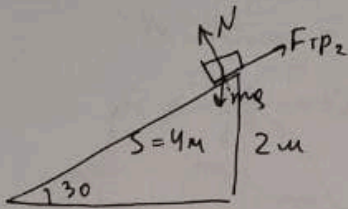
$$\cos \alpha = \frac{g}{\omega^2 (l+R)} = \frac{10 \frac{\text{м}}{\text{с}^2}}{10^2 (0,2 \text{ м})} = \frac{10}{10 \cdot 2} = \frac{1}{2} \Rightarrow \alpha = 60^\circ$$

Ответ:  $N = \frac{8}{\sqrt{15}} \text{ (кН)}$ ;  $\alpha = 60^\circ$

Числовые стр 3.

W 2.

1. Имеет 2х мостов-грамоток тормозные. выше-разгона  
 ⇒ на грамоток имеет спусок выигрывает с меньшей скоростью V.



$$S = \frac{2}{\sin 30} = 4 \text{ (м)}$$

$$F_{тр2} - mg \sin \alpha = ma_2$$

$$F_{тр2} = \mu_2 \cdot N = \mu_2 \cdot mg \cos \alpha$$

$$\mu_2 mg \cos \alpha - mg \sin \alpha = ma_2$$

$$g(\mu_2 \cos \alpha - \sin \alpha) = a_2$$

$$\text{В конце } V_{кон} = 0 \Rightarrow V - a_2 T = 0$$

$$V = a_2 T$$

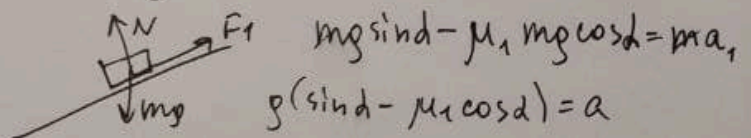
$$V \cdot T - \frac{a_2 T^2}{2} = S \Rightarrow \frac{a_2 T^2}{2} = S$$

$$T = \sqrt{\frac{2S}{g(\mu_2 \cos \alpha - \sin \alpha)}} = \sqrt{\frac{2 \cdot 4}{10 \cdot (0,81 \cdot \frac{\sqrt{3}}{2} - \frac{1}{2})}}$$

$$= 0,94 \text{ c } \approx 1,99 \approx 2 \text{ c}$$

$$V = g(\mu_2 \cos \alpha - \sin \alpha) \cdot T \Rightarrow V = 0,988 \frac{\text{м}}{\text{с}} \quad V = 4 \frac{\text{м}}{\text{с}}$$

грамоток выше 2х мостов:



$$V = a \cdot t_1 \Rightarrow t_1 = \frac{V}{a} = \frac{4 \frac{\text{м}}{\text{с}}}{10(0,5 - 0,11 \cdot \frac{\sqrt{3}}{2})} \approx 0,988 \text{ c}$$

$$S = V_0 t_1 + \frac{a t_1^2}{2} = \frac{a \cdot V^2}{2a} = \frac{V^2}{2a} = \frac{4^2}{2 \cdot 10(0,5 - 0,11 \cdot \frac{\sqrt{3}}{2})}$$

$$\approx 1,976 \text{ м} \approx 1,98 \text{ м}$$

$$S \cdot \sin \alpha = H \Rightarrow H = 0,988 \text{ м} - \text{высота беремая}$$

Общая высота  $\approx 3 \text{ м}$

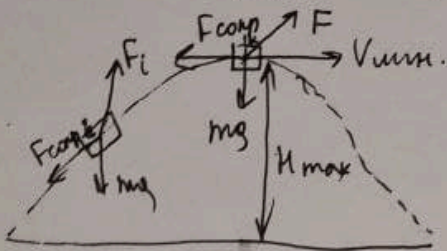
# Умови стріли

w1

$$1) L_{\text{нов}} = \frac{V_0^2 \cdot \sin^2 d}{g} \Rightarrow V_0 = \sqrt{\frac{L \cdot g}{\sin^2 d}} = \frac{\sqrt{Lg}}{\sin d} = \frac{\sqrt{170 \cdot 2}}{\sqrt{3}} \approx 15,06 \frac{\text{м}}{\text{с}}$$

$$\Rightarrow V_0 = \sqrt{\frac{gL}{\sin^2 120}} \approx 14,01 \frac{\text{м}}{\text{с}}$$

2)



$$H_{\text{max}} = \frac{V_0^2 \cdot \sin^2 d}{2g}$$

на верхньому граєнні

$$V = V_0 = \text{const} \Rightarrow \text{нет у.с. у шоренні}$$

$$V^u = 3,5 \frac{\text{м}}{\text{с}}$$

єсть тільки тангенціальне

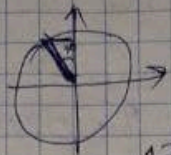
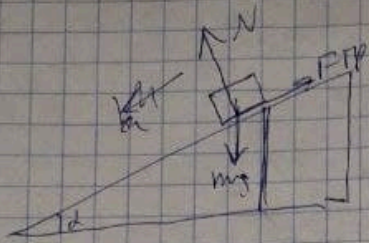
$$\Rightarrow \vec{mg} + \vec{F} + \vec{F}_{\text{comp}} = 0 \quad \text{і к. шорость розоранна}$$

$$\begin{cases} F \cdot \cos d = mg \Rightarrow F_y = mg; & F_{\text{comp}} = K \cdot V \\ F \cdot \sin d = F_{\text{comp}} = m a_{\text{тан.}} \end{cases}$$

F - аэроупр. сила Гілла

$$F_y = 10 \text{ Н}$$

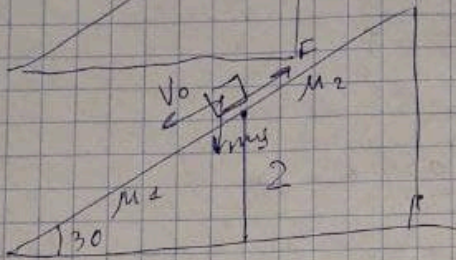
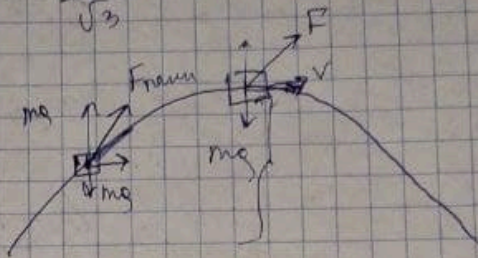
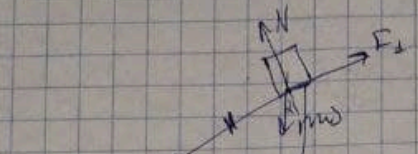
# Упробуи



$$\frac{170}{\sqrt{3}} \sin(90+30) = \sin 90 \cdot \cos 30 + \sin 30 \cdot \cos 90$$

$$\cos 30 = \frac{\sqrt{3}}{2}$$

$$\frac{170 \cdot 2}{\sqrt{3}}$$



$$mg \sin \alpha - \mu mg \cos \alpha = ma$$

$$g \sin \alpha - \mu g \cos \alpha = a$$

$$a = g(\sin \alpha - \mu \cos \alpha)$$

$$S = \frac{v_0^2}{2a}$$

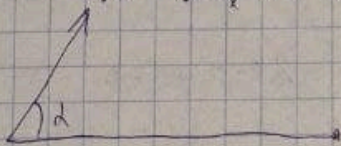
$$\frac{\sqrt{3}}{2}$$

$$v_0 = at$$

$$ma = \mu_2 mg \cos \alpha - mg \sin \alpha_{max} = \frac{v_0^2 \cdot \sin^2 \alpha}{2S}$$

$$v_0 a = \mu_2 \cos \alpha - \sin \alpha \cdot g$$

$$\mu_{max} = \frac{v_0^2 \cdot \sin^2 \alpha}{2g}$$



$$v_0 t - \frac{at^2}{2} = 4$$

$$v_0 \cos \alpha \cdot t = 17$$

$$v_0 \sin \alpha \cdot t = \frac{gt^2}{2}$$

$$2v_0 \sin \alpha = t$$

$$S \cdot \sin 30 = 2 \quad v_0$$

$$S \cdot \frac{1}{2} = 2$$

$$\frac{v_0 \cos \alpha \cdot 2v_0 \sin \alpha}{g} = 17$$

$$S = 4$$

$$\frac{2v_0^2 \cdot \sin^2 \alpha}{g} = 17$$

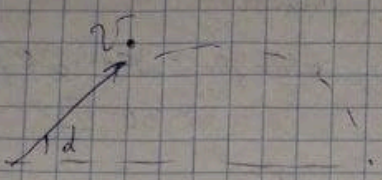
$$17g$$

$$\frac{at^2}{2} - v_0 t + 4 = 0 \quad v_0 = \frac{17 \cdot g}{\sqrt{\sin 2\alpha}}$$

$$0.58$$

$$\frac{v_0 \pm \sqrt{v_0^2 - 4 \cdot 4 \cdot \frac{a}{2}}}{a}$$

# Чепурбун



$$v_0 t \cos \alpha = 17$$

$$v_0 t \sin \alpha = \frac{g t^2}{2}$$

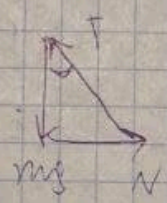
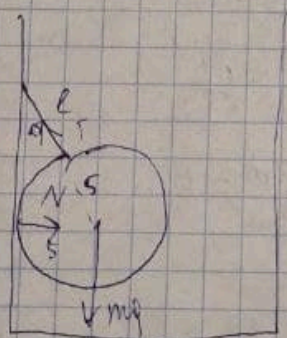
$$v_0 \sin \alpha = \frac{g t}{2}$$

$$t = \frac{2 v_0 \sin \alpha}{g}$$

$$\frac{v_0 \cos \alpha \cdot 2 v_0 \sin \alpha}{g} = 17$$

$$\frac{2 v_0^2 \cdot \sin \alpha \cdot \cos \alpha}{g} = 17$$

$$T_1 \cos \varphi + P_{\text{mg}} V = P_{\text{mg}} V$$



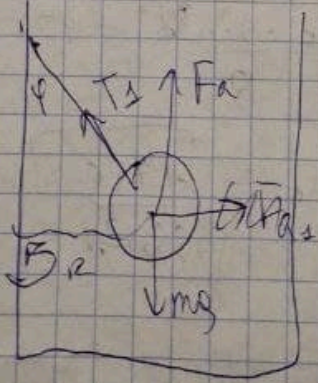
$$20 \cdot \sin \alpha = 8$$

$$\sin \alpha = \frac{1}{4}$$

$$\frac{N}{mg} = \tan \alpha$$

$$N = mg \tan \alpha$$

$$\mu = \frac{\omega}{c} \cdot k$$



$$T_1 \cos \varphi + P_{\text{g}} V = mg$$

$$T_1 \sin \varphi = \rho \cdot \frac{4}{3} \pi R^3 \omega^2 R \cdot V$$

$$\frac{\omega}{c} = \frac{\omega^2}{c^2} \cdot \frac{1}{\omega}$$

reproducible

$$20^2 - 5^2 =$$

$$400 - 25 = 375$$

$$20^2 - 5^2 =$$

$$\sqrt{375}$$

$$\sqrt{(15)(25)} =$$

$$5\sqrt{15}$$

$$5\sqrt{15} \quad T \cdot \cos d = mg$$

$$T \sin d = N$$

∴

$$\tan d = \frac{N}{mg}$$

$$\frac{5}{5\sqrt{15}} = \frac{1}{\sqrt{15}}$$

$$w \cdot \cos d = 8$$

$$\cos d = \frac{8}{20} \Rightarrow \sin d = \sqrt{1 - \frac{16}{40}} = \sqrt{\frac{24}{40}} = \sqrt{\frac{4 \cdot 6}{4 \cdot 10}} = 2\sqrt{\frac{3}{20}}$$

$$\Rightarrow \tan d = \frac{2\sqrt{\frac{3}{20}}}{\frac{8}{20}}$$



# Часть 2

Олимпиада: **Физика, 10 класс (2 часть)**

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Вариант 3

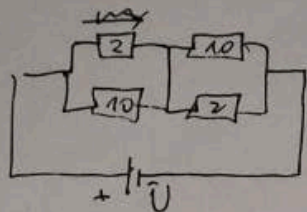
Установив стр. 1

WS



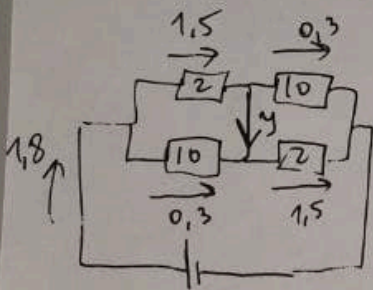
1) вся группа - 24 Ω  
 группа 30° -  $\frac{1}{12}$  всей группы  $\Rightarrow r = 2 \Omega$

↓ получаем цепь



$$R_{\Sigma} = 2 \cdot \left( \frac{1}{10} + \frac{1}{2} \right)^{-1} = 2 \cdot \left( \frac{1}{10} + \frac{5}{10} \right)^{-1} = 2 \cdot \frac{10}{6} = \frac{20}{6} = \frac{10}{3} \Omega$$

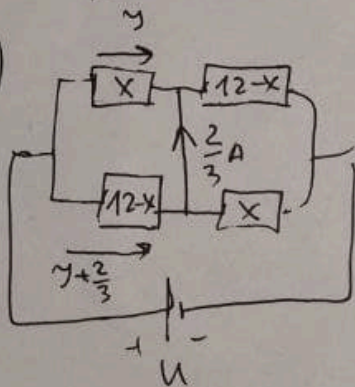
$\Rightarrow I_{\Sigma} = \frac{U}{R_{\Sigma}} = \frac{6 \text{ В} \cdot 3}{10} = 1,8 \text{ А} \Rightarrow$  по резистору  $2 \Omega$  потечет ток  $1,5 \text{ А}$   
 по резистору  $10 \Omega$  - ток  $0,3 \text{ А}$



$\Rightarrow I = 1,5 - 0,3 = 1,2 \text{ А}$

$P = R I^2 = R_{\Sigma} \cdot I_{\Sigma}^2 = \frac{10}{3} \cdot 1,8^2 = 10,8 \text{ Вт}$

2)



$$R_{\Sigma} = \left( \frac{1}{12-X} + \frac{1}{X} \right)^{-1} \cdot 2 = \frac{(X+12-X)^{-1}}{(12-X)X} \cdot 2 = \frac{(12-X)X \cdot 2}{12} = \frac{(12-X)X}{6} = R_{\Sigma}$$

$U = 6 \text{ В} \Rightarrow I_{\Sigma} = \frac{6 \cdot 6}{(12-X)X} = \frac{36}{(12-X)X} = I_{\Sigma}$

$$\begin{cases} I + I + \frac{2}{3} = \frac{36}{(12-X)X} = I = \frac{36}{(12-X)X} - \frac{2}{3} = \frac{18}{(12-X)X} - \frac{1}{3} \\ I \cdot X = \left( I + \frac{2}{3} \right) (12-X) \end{cases}$$

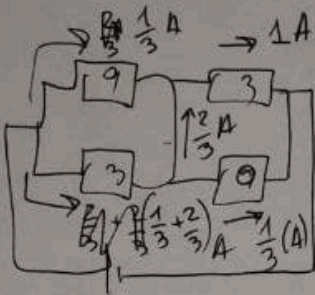
$$\frac{18}{(12-X)X} \cdot X - \frac{1}{3}X = \left( \frac{18}{(12-X)X} + \frac{1}{3} + \frac{2}{3} \right) (12-X)$$

Числовые ср. 2

Заметим, что  $x=9$  корнями

$$\eta_{\xi} = \frac{36}{(12-9)9} = \frac{36}{3 \cdot 9} = \frac{12}{9} = \frac{4}{3}$$

, тогда будет  $\frac{2}{3}$  <sup>гана</sup> когда отношение будет обратным



$$n = 3 > 1$$

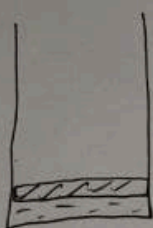
$$3) P_2 = R_{\xi} \cdot \eta_{\xi}^2 = \frac{(12-9)9}{6} \cdot \frac{4^2}{3^2} = \frac{3 \cdot 4 \cdot 4}{6 \cdot 3} = 8 \text{ Вт}$$

Ответ: 1) 10,8 Вт ; 2)  $n=3$  ; 3) 8 Вт

Чистовый стр 3.

W4

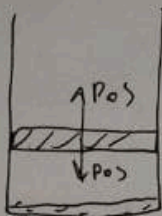
пока что не знаем, есть ли в котле насыщ. пар. <sup>именно</sup>  $\text{H}_2\text{O}, E \Rightarrow$   
~~в сосуде только вода~~ Справивается, сколько погвем и  $\text{H}_2\text{O}, E \Rightarrow$



$$Q_1 = C \cdot m \cdot \Delta t$$

$$Q_1 = 4180 \frac{\text{Дж}}{\text{кг} \cdot \text{К}} \cdot \frac{5,5}{1000} \cdot 100 = 2299 \text{ Дж}$$

$$Q_2 = m \cdot r$$



Поршень сжимает только на расстояние появившегося насыщенного пара ~~минус высота столба воды.~~  
 Сколько образуется пара:  $\frac{Q_2}{r} = \frac{17340 \text{ Дж} \cdot \text{кг}}{2260000 \text{ Дж}} = 0,00767 \text{ кг}$

$$= 7,67 \text{ г} - \text{больше, чем масса воды} \Rightarrow$$

$\Rightarrow$  все вода перейдет в пар, а оставшаяся энергия

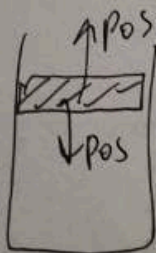
пойдет на нагрев пара  $\Rightarrow$  найдем  $m \cdot r = 12430 \text{ Дж}$  - на парообразование

$$h \cdot \rho = \frac{5,5}{500} = 0,011 \text{ м} - \text{изначальная высота воды} \Rightarrow 5000 \text{ Дж}$$

на пар  $\Rightarrow$  ~~на~~ на расширение

$$C_p \cdot \frac{5,5}{1000} \text{ кг} \cdot \Delta t = 5000 \text{ Дж}$$

$$\Delta t = 413,2 \text{ К}$$



$$p_0 \cdot S \cdot h_1 = \frac{5,5}{1000 \cdot 0,018} \cdot R \cdot (273 + 413,2)$$

$$= 34,847 \text{ м}$$

$$h_1 = \frac{5,5 \cdot R \cdot 686,2}{1000 \cdot 0,018 \cdot \frac{500}{100^2} \cdot 10^5}$$

$$\approx 0,0348 \text{ м} \approx 3,4847 \text{ см} \Rightarrow$$

$$\Rightarrow h = 3,4847 - 0,011 = 3,4737 \text{ см} \quad M = 34,836$$

Черновик

$$\frac{-7}{30}x + \frac{31}{30} = -\frac{20}{30}x + \frac{190}{30}$$

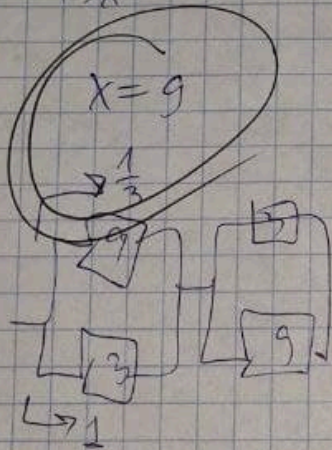
$$\frac{13}{30}x = \frac{159}{30}$$

$$\frac{1}{18}x - \frac{3}{18} = -\frac{12}{18}x + \frac{19.6}{18}$$

$$x - 3 = -12x + 19.6$$

$$13x =$$

36



$$\frac{4}{3}$$

$$\frac{1}{9} + \frac{1}{3}$$

$$2y = \frac{2}{3}$$

$$x = 9$$

$$y = \frac{1}{2} - \frac{1}{6} = \frac{2}{6} = \frac{1}{3}$$

перепробуем

$$2y + \frac{2}{3} = \frac{36}{(12-x)x}$$

$$6y(12-x)x + 2(12-x)x = 36 \cdot 3$$

$$3yx = (3y+2)(12-x)$$

$$(6y+2)(12-x)x = 36 \cdot 3$$

$$(3y+2)(12-x) = 3yx$$

$$\frac{6y+2}{3y+2} \cdot x = \frac{36}{yx} \quad (6y+2)x^2 \cdot y = 36(3y+2)$$

$$(3y+2)(12-x) = 3yx$$

$$yx = 12y - yx + 8 - \frac{2}{3}x$$

$$2yx = 12y - \frac{2}{3}x + 8$$

$$2y + \frac{2}{3} = \frac{36}{(12-x)x}$$

$$12y - 2yx - \frac{2}{3}x + 8 = 0$$

$$y(12-2x) = \frac{2}{3}x - 8$$

$$x \left( 2y - \frac{2}{3} \right) = 12y + 8$$

$$y(12-2x)$$

$$y = \frac{\frac{2}{3}x - 8}{12-2x}$$

$$6y(12-x)x + 2(12-x)x = 36 \cdot 3$$

$$\frac{\frac{2}{3}x - 8}{12-2x} (12-x)x + 2(12-x)x = \frac{36 \cdot 3}{(12-x)x}$$

$$6 \cdot \left( \frac{2}{3}x - 8 \right) (12-x)x + 2(12-x)x(12-2x) = 36 \cdot 3(12-2x)$$

# Черновик

$$1 + 2^3 \cdot 3 + 2^2 \cdot 3^2 + 3^4 \cdot 2$$

$$-1$$

$$-1 - 2^3 \cdot 3 - 2^2 \cdot 3^2 \cdot 3 + 3^4 \cdot 2^2$$

$$-1 - 24 - 108 +$$

$$-2$$

648

$$-8 - 2^3 \cdot 3 \cdot 4 - 2 \cdot 9 \cdot 2 + (3 \cdot 4 \cdot 2^2)$$

$$-27 - 2^3 \cdot 2 \cdot 7 - 2 \cdot 9 \cdot 3 + 648$$

$$7 \quad 5$$

$$\frac{x}{12} = y + \frac{2}{3}$$

$$\frac{12-x}{12} = y + \frac{2}{3}$$

$$\frac{12-x}{12} = \frac{x}{12} + \frac{2}{3}$$

$$\frac{12-x}{12} = \frac{x}{12} + \frac{8}{12}$$

$$12-x = x+8$$

$$4 = 2x$$

$$x = 2$$

$$\left( \frac{1}{x} + \frac{1}{12-x} \right) = \frac{1}{2}$$

$$\frac{1}{2} + \frac{1}{5} = \frac{12}{7}$$

$$\frac{35 \cdot 2 = 35}{12} = \frac{35}{6} \cdot \frac{36}{35} = 7$$

$$\frac{x}{12} = y + \frac{2}{3}$$

$$\frac{12-x}{12} = y$$

$$\frac{x}{12} = \frac{12-x}{12} + \frac{8}{12}$$

$$x = 12 - x + 8$$

$$2x = 20$$

$$x = 5$$

Черновики

$$y = \frac{18}{(12-x)x} - \frac{1}{3}$$

$$\frac{1}{6} = \frac{4}{3} - \frac{1}{6}$$

$$\frac{2}{3} - \frac{1}{3}$$

$$\left(\frac{9}{1/3}\right)$$

$$x=6 \quad x=9$$

$$y=\frac{1}{6} \quad y=\frac{1}{3}$$

$$y = 12y - yx + 8 - \frac{2}{3}x$$

$$\frac{1}{6} = kx + b$$

$$\frac{1}{3} = 9k + b$$

$$\frac{1}{6} - \frac{1}{3} = 9k + b - 6k$$

$$-\frac{1}{6} = 3k + b - 6k$$

$$-\frac{1}{6} = -3k + b$$

$$3k = \frac{1}{6} - b$$

$$k = \frac{1}{18} - \frac{b}{3}$$

$$y = -\frac{2}{3}x + \frac{19}{3}$$

$$2y = 12y + 8 - \frac{2}{3}x$$

$$12y = 1,8 - \frac{2}{3} \quad \frac{1}{6} = 3k$$

$$\frac{1}{2} - \frac{1}{3} = \frac{1}{6} = 3k$$

$$k = \frac{1}{18}$$

$$y = kx + \frac{19}{3}$$

$$y(2x-12) = 8 - \frac{2}{3}x$$

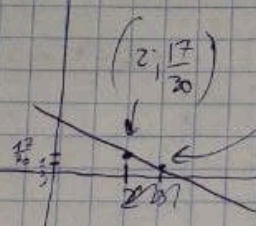
$$\frac{18}{10} - \frac{2}{3} = \frac{54-20}{30} = \frac{34}{30}$$

$$\frac{1}{3} - \frac{1}{6} - \frac{1}{6}$$

$$x=7$$

$$2y=$$

$$y=5$$



$$y = kx + b$$

$$\frac{17}{30} = k \cdot 2 + b$$

$$\frac{1}{3} = 3k + b$$

$$\frac{5}{3} = \frac{14}{3} + \frac{19}{3}$$

$$\frac{5}{3} = \frac{33}{3}$$

$$\frac{5}{3} = 7 \cdot \frac{2}{3} + b$$

$$\frac{1}{3} = 9 \cdot \frac{2}{3} + b$$

$$\frac{1}{3} = 9k + \frac{5}{3} - 7k$$

$$\frac{1}{3} = 2k + \frac{5}{3}$$

$$y = \frac{18}{(12-x)x}$$

$$\frac{24}{3} - \frac{14}{3} = \frac{10}{3} - 2y$$

$$2y + \frac{14}{3} = \frac{24}{(12-x)x} - \frac{2}{3} = \frac{18}{(12-x)x} - \frac{1}{3}$$

$$\frac{5}{3} = 6k + 5$$

$$0 = 6k + 4$$

$$\frac{10}{30} = \frac{-21}{30} + \frac{31}{30}$$

$$x \left( \frac{24}{3} - \frac{14}{3} \right) = 12y + 8$$

$$\frac{1}{3} = 3k + \frac{17}{30} - 2k$$

$$k = -\frac{2}{3}$$

$$\frac{10}{30} = k + \frac{17}{30}$$

$$k = -\frac{7}{30}$$

$$y = \frac{2}{3}x - 8$$

$$12-2x$$

$$\frac{36}{9 \cdot 3} = \frac{61}{3} - \frac{2}{3} = \frac{2}{3}$$

$$\frac{17}{30} = \frac{-14}{30} + \frac{31}{30}$$

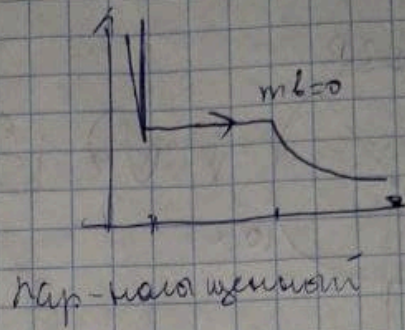
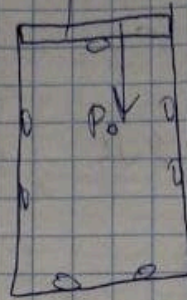
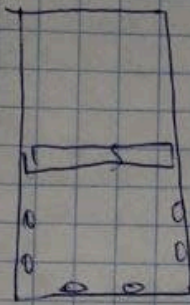
$$y = -\frac{7}{30}x + \frac{31}{30}$$

$$y = \frac{1}{18}x + \frac{1}{6}$$

$$y = -\frac{2}{3}x + \frac{19}{3}$$



Черновик 1 д.



$$P_0 \cdot V = \nu n \cdot R \cdot 273 \text{ K}$$

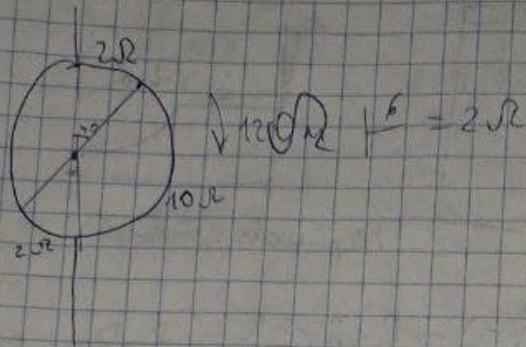
$$C_p \frac{dm}{m \cdot K} \cdot m_n \cdot 100^\circ \text{ C} + C_b \cdot m_b \cdot 100^\circ \text{ C} =$$

$$\frac{1}{2} \nu R.$$

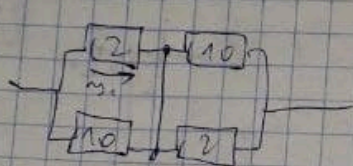
$$P_0 \cdot S \cdot H = \frac{m_n}{M} R T$$

$$P_0 \cdot M = \rho \cdot R T$$

Черновик



$$\frac{1}{10} + \frac{1}{2} = \frac{1+5}{10} = \frac{6}{10} \cdot 2 =$$



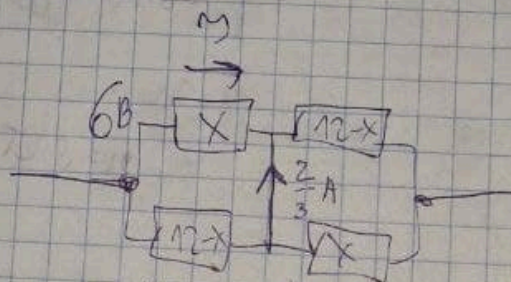
4,2

5A

$$6 \cdot 1,2 = 5A$$

$$\left(2y + \frac{2}{3}\right)(12-x)x = 36$$

$y \cdot x =$



$$y + y + \frac{2}{3}A = \frac{36}{(12-x)x}$$

$$y \cdot x = \left(y + \frac{2}{3}A\right)(12-x)$$

$$R_{\Sigma} = \left(\frac{1}{12-x} + \frac{1}{x}\right)^{-1} \cdot 2$$

~~$$\frac{6V \cdot 6}{(12-x)x} = \frac{36}{(12-x)x} \cdot \left(\frac{x+12-x}{(12-x)x}\right)^{-1} \cdot 2$$~~

$$UI = RI^2$$

$$\frac{(12-x)x}{12} \cdot 2$$

$$R_{\Sigma} = \frac{(12-x)x}{6}$$

$$\frac{10}{3} \cdot \frac{18 \cdot 18}{40 \cdot 10} = \frac{54 \cdot 5}{5 \cdot 10,8} = \frac{54}{10,8}$$