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МОСКОВСКИЙ ГОСУДАРСТВЕННЫЙ УНИВЕРСИТЕТ
имени М.В.ЛОМОНОСОВА

Вариант 11 класс

Место проведения Москва
город

ПИСЬМЕННАЯ РАБОТА

Олимпиада школьников „Ломоносов“
наименование олимпиады

по „Механика и математическое моделирование“
профиль олимпиады

Егорова Тихона Евгеньевича

фамилия, имя, отчество участника (в родительном падеже)

Дата

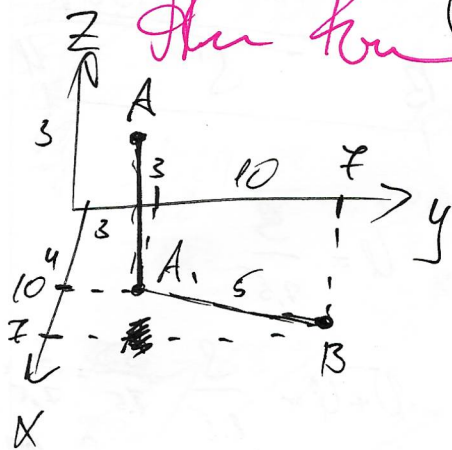
«30» марта 2025 года

Подпись участника

с.с.г.

90 (Декабрь)

Или Ку (N4)

ЧЕРНОВИК

$$A(4; 3; 3)$$

$$A_1(4; 3; 0)$$

$$B(7; 7; 0)$$

$$|A, B| =$$

$$A, B \{3; 4; 0\}$$

$$|A, B| = \sqrt{9+16} = 5 \text{ м.}$$

$$AA_1 = \frac{3}{2} = 1,5 \text{ мм.}$$

$$A_1B = \frac{5}{1} = 5 \text{ мм.} + \underline{\underline{6,5 \text{ мм}}}$$

$$65\% - 35\text{с.} = 22 + 25 = 57$$

$$x\% - 22\text{с.}$$

$$22 - 65 = x \cdot 33$$

$$\frac{22}{33} = \frac{22}{33}$$

$$35\text{с} - 65\%$$

$$13\text{с} - x$$

$$\frac{169}{7} - 22$$

$$\frac{245}{7} - x$$

$$25 - 13 =$$

$$= 22 + 25 = 57$$

$$x\% = \frac{22}{35} = \frac{169}{7} = \frac{169}{7}$$

$$x\% = \frac{22}{35} = \frac{169}{7} = \frac{169}{7}$$

$$35x = 65 \cdot 13$$

$$x = \frac{65 \cdot 13}{7 \cdot 25} = \frac{169}{7} = \frac{169}{7}$$

$$x = 24 \frac{10}{7} \%$$

$$\frac{169}{7} x = \frac{245}{7} \cdot 22 \Rightarrow =$$

$$\frac{22}{35} = \frac{169}{7} = \frac{169}{7}$$

$$35\% - 35\text{с.} \cdot \frac{22}{7}$$

$$x\% - 35\text{с.} \cdot \frac{490}{5390}$$

$$13 \cdot 35 = 35x$$

$$\frac{13 \cdot 35}{35} = x = 13\%$$

$$\frac{169}{7} = \frac{169}{7}$$

$$\frac{169}{7} = \frac{169}{7}$$

$$\frac{169}{7} = \frac{169}{7}$$

Дано:

$$U_k = U_{\text{мотора}}$$

$$U_{\text{логика}}$$

$$p \cdot U \cdot t = S$$

$$(U_{\text{мотор}} + U) \cdot t = S$$

$$(U_{\text{мотор}} - U) \cdot t = S$$

$$p \cdot U + U = \frac{S}{t - 6}$$

$$U_{\text{мотор}} - U = \frac{S}{t - 5}$$

$$b \cdot (U_{\text{мотор}} + U) \cdot S = U_{\text{мотор}} - U$$

$$U_{\text{мотор}} = U_{\text{тр.}}$$

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

$$U_{\text{мотор}} - U = U_{\text{мотор}} + U$$

$$S \cdot U_{\text{мотор}} + S \cdot U - S \cdot U_{\text{мотор}} + S \cdot U = (U_{\text{мотор}} - U)$$

$$(U_{\text{мотор}} - U)$$

Длогш.

Усеч. = $\sigma_{плот}$

$$U \cdot t = S$$

$$(\sigma_u + U)(t - 6) = S$$

$$(\sigma_u - U)(t - 5) = S$$

$$\begin{cases} \sigma_u + U = \frac{S}{t-6} \\ \sigma_u - U = \frac{S}{t-5} \end{cases}$$

$$2U = \frac{S}{t-6} - \frac{S}{t-5}$$

$$2U = \frac{S(t-5) - S(t-6)}{(t-6)(t-5)} = \frac{S(t-5-t+6)}{(t-6)(t-5)}$$

$$2U = \frac{S}{2(t-6)(t-5)}$$

$$\frac{8l}{t} = \frac{8l}{2(t-6)(t-5)}$$

$$\frac{2(t^2 - 6t - 5t + 30) - t}{2t(t^2 - 6t - 5t + 30)} = 0$$

$$2t^2 - 22t + 60 - t = 0$$

$$2t^2 - 23t + 60 = 0$$

$$D = 529 - 480 = 49$$

$$t = \frac{23 \pm 7}{4} = \begin{cases} \frac{30}{4} = 7.5 \text{ м.к.} \\ \frac{16}{4} = 4 \text{ н.к.} \end{cases}$$

ЧЕРНОВИК



$$U = \frac{S}{2.5}$$

$$\sigma_u + U = \frac{S}{1.5} = \frac{55}{1.5} - \frac{S}{2.5}$$

$$\sigma_u = \frac{35}{1.5} + \frac{S}{2.5} = \frac{0.8}{2.5}$$

$$\sigma_u = \frac{S}{1.5} - \frac{S}{2.5}$$

$$\frac{1}{t} - \frac{1}{2(t-6)(t-5)} = 0$$

$$\frac{2(t-6)(t-5) - t}{2t(t-6)(t-5)} = 0$$

$$2(t-6)(t-5) \neq 0$$

$$\begin{cases} t \neq 0 \\ t \neq 6 \\ t \neq 5 \end{cases}$$

$$U \cdot t = S$$

$$\frac{65\%}{35} = \frac{13}{7} \quad 13\% - \text{Fe.}$$

$$x \cdot 7 = 13 \cdot 13$$

$$x = \frac{169}{7} \% - 13\text{c.}$$

$$\frac{760}{7} - \frac{169}{7} = \frac{591}{7} = 84.42857142857143$$

$$\begin{array}{r} 65 \\ \times 7 \\ \hline 455 \end{array}$$

$$\frac{541}{7} = 77 \frac{2}{7} \quad 27 \frac{2}{7} \quad 77 \frac{2}{7} \quad 7 \quad 35 \text{ мб.}$$

ЧЕРНОВИК.

$$\begin{array}{r} 1029 \overline{) 122} \\ \underline{80} \\ 44 \end{array} \quad 100 = x$$

$$\frac{541}{7} = 77 \frac{2}{7} \quad \frac{3500}{7} = 500$$

$$x = \frac{3500}{541}$$

$$\begin{array}{r} 22 \\ \times 13 \\ \hline 66 \\ 22 \\ \hline 286 \end{array}$$

$$\begin{array}{r} 3 \\ \times 55 \\ \hline 295 \\ \times 13 \\ \hline 1121 \\ \hline 465 \\ \hline 169 \\ \hline 624 \end{array}$$

$$35 \text{ е} \rightarrow 65 \text{ е}$$

$$22 \text{ е} \rightarrow x$$

$$x = \frac{169}{7} \text{ е} \Rightarrow 455 + 169 = 624$$

$$25 \text{ е} = \frac{55 \cdot 22}{7} = \frac{286}{7} + \frac{286}{7} = \frac{572}{7}$$

$$\frac{624}{7} = 90 \frac{1}{7} \text{ е}$$

$$\frac{531}{7} = 75 \frac{6}{7}$$

$$1\% = \frac{7}{13} \text{ е.}$$

$$12 \text{ е} = \frac{169}{7} \text{ е}$$

$$\frac{531}{7} = 75 \frac{6}{7}$$

$$100\%$$

$$100\% = \frac{700}{13} \text{ е.}$$

$$x = 35 \text{ е}$$

$$13 \text{ е} = \frac{169}{7} \text{ е}$$

$$\begin{array}{r} 1225 \overline{) 22} \\ \underline{110} \\ 125 \\ \underline{110} \\ 15 \end{array} \text{ мб.}$$

$$13 \cdot 35 = \frac{169 \cdot x}{7}$$

$$91 \cdot 35 = x$$

$$169 \cdot 13$$

$$x = \frac{265}{13} \text{ е.}$$

$$x = \frac{700}{7}$$

$$\frac{169}{7} x = \frac{700 \cdot 13}{7}$$

$$x = \frac{700 \cdot 15}{7} = \frac{7}{169 \cdot 13} = \frac{700}{13} \text{ е.}$$

$$\begin{array}{r} 700 \overline{) 103} \\ \underline{65} \\ 50 \\ \underline{39} \\ 11 \end{array}$$

$$53 \frac{11}{13} \text{ е.}$$

$$40 \frac{11}{13} - 35 \text{ м.}$$

$$\frac{541}{13} - 35 \text{ мб.}$$

$$\frac{440}{13} = 35 \text{ мб.}$$

$$\frac{700}{13} - x$$

$$\frac{440}{13} x = \frac{700 \cdot 35}{13}$$

$$\frac{700}{13} = x \text{ мб.}$$

$$x = \frac{35}{13} \cdot \frac{700 \cdot 35}{13} = \frac{1225}{22}$$

$$= 35 \text{ е} - 65\%$$

$$\frac{0}{\%} = \frac{7}{13} \text{ е.}$$

$$\frac{700}{13} - \frac{22 \cdot 169}{13} = \frac{541}{13}$$

$$x = 100\%$$

$$x = \frac{3500}{65} = \frac{700}{13} \text{ е} = \text{время обз.}$$

ЧЕРНОВИК

$\frac{700}{18} - \frac{169}{13} = x$

$\frac{531}{13} - 35 = y$

$\frac{531}{13} \times \frac{4}{9} = \frac{2124}{9}$

$\frac{10}{10} - \frac{7}{13} = \frac{13}{130}$

$\frac{531}{13} - 35 \times \frac{13}{4} = \frac{531}{13} - \frac{455}{4} = \frac{2044}{52} = \frac{511}{13}$

$\frac{245}{13} = \frac{24500}{1300}$

ЧЕРНОВИК.

$\frac{245}{13} = \frac{7 \cdot 35}{13} \cdot \frac{13}{581} = \frac{245}{581}$

$$\begin{array}{r} 531 \\ \times 6 \\ \hline 3186 \end{array}$$

$$\frac{169}{13} = 13$$

$$12:00:13 \times 169 = 2017$$

$$X = \frac{169 \cdot 35}{1} \cdot \frac{15}{3} = \frac{845 \cdot 5}{515} = 8.2$$

$\frac{100}{13} \checkmark$
 $X = \frac{169 \cdot 35}{13} \cdot \frac{15}{3} = \frac{507}{5315X} \cdot 73$

$\frac{531}{13} - 35 \cdot X$
 $\begin{array}{r} 73 \\ 13 \\ \hline 219 \\ 73 \times 12 \\ \hline 1455 \end{array}$
 $\begin{array}{r} 13 \cdot 35 \\ \times 13 \\ \hline 105 \\ 35 \\ \hline 1455 \end{array}$
 $\begin{array}{r} 531 \times 35 \\ \times 7 \\ \hline 245 \\ 5313 \\ \hline 531 \end{array}$
 $\begin{array}{r} 507 \\ 5315X \\ \hline 73 \\ 13 \\ \hline 219 \\ 73 \\ \hline 1455 \end{array}$

$65\% - 33$

$X - 22\% = 13$
 $X = \frac{22 \cdot 65}{286} = \frac{22}{286} \cdot 13 = 22\% - \frac{286}{455} \cdot \frac{13}{25}$
 $65\% - 35\% = 30\%$
 $35\% - X = 7$
 $1\% = \frac{7}{13} \text{ e.}$

$$x = \frac{35 \cdot 25}{68} = \frac{245}{13} \text{ C.} \times \frac{13}{40} = \frac{231}{13} \text{ C.} = 60 - 55 \frac{11}{13} = 53 \frac{11}{13} \text{ C.}$$

1. 100. $\frac{531}{13} - 35 \text{ Mo. } 13 = 6 \frac{2}{13}$

1:13. 73e. ~~$\frac{859}{13}$~~ $\frac{949}{13}$ e.

$\frac{531}{13 \cdot 35} = \frac{949}{13} - \frac{700}{13} = \frac{249}{13} =$

$\frac{249}{13} = 19 \frac{1}{13}$

$\frac{531}{455} e^{-11.59:19}$

$$\frac{700}{45} \cdot \frac{35}{531} = \frac{24500}{531}$$

$$\begin{array}{r} -24500 \quad | \quad 531 \\ 2124 \quad | \quad 46,130 \\ \hline 3280 \\ 3186 \\ \hline 740 \\ -531 \\ \hline 2090 \\ -1593 \\ \hline 4970 \end{array}$$

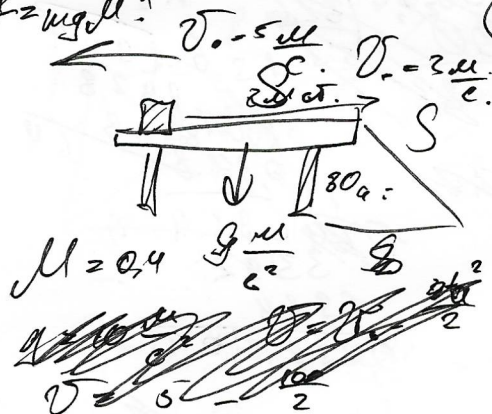
$$\frac{100}{13} = \frac{700}{13} \text{ c.}$$

$$\begin{array}{r} \times 40 \\ 13 \\ \hline 00 \\ 52 \\ \hline 520 \\ 13 \end{array} \text{ c. } -35 \text{ м.}$$

$$\frac{520}{13.35} = 1.115 = \frac{531}{455} \text{ c.}$$

$$\frac{700}{13} \cdot \frac{455}{531} = \frac{24500}{531} \approx 46,13 \text{ м.}$$

$$F = mg \mu$$



$$\mu = 0,4 \quad \frac{g \cdot \mu}{c^2} \quad \frac{g}{c^2}$$

$$5 \cdot 0,4 = 2 \cdot \frac{6}{10} = \frac{3 \text{ м.}}{c}$$

$$z = 24 \text{ м} \quad \gamma = V_0 + \frac{a^2 t}{2}$$

$$V_0 = \frac{a^2 t}{2}$$

$$V = 3 \text{ м.}$$

$$3 + 50$$

$$0,8 \text{ м} = V_0 + \frac{a^2 t}{2}$$

$$0,8 = 50 \text{ м} / 10$$

$$g = 500 \text{ м/с}^2$$

$$3,8 \cdot 0,016 = S$$

$$\begin{array}{r} \times 36 \\ \times 16 \\ \hline 228 \\ 228 \\ \hline 368 \end{array}$$

$$t = \frac{g}{500} = \frac{4}{250} = \frac{2}{125} = \frac{16}{1000} \text{ c.}$$

$$0,016 \text{ c.}$$

ЧЕРНОВИК.

$$53 \frac{11}{13} \text{ c.}$$

$$11:59:19 \text{ c.}$$

$$\begin{array}{r} \times 531 \\ 6 \\ \hline 3186 \end{array}$$

$$\begin{array}{r} \times 531 \\ 3 \\ \hline 1593 \end{array}$$

Дано:

$$V_0 = 5 \text{ м.}$$

$$\mu = 0,4$$

$$S_0 = 2 \text{ м.}$$

$$h = 0,8 \text{ м.}$$

$$S = ? \quad S = (3 + 50 \cdot 0,016) \cdot 0,016$$

$$S = V_0 t$$

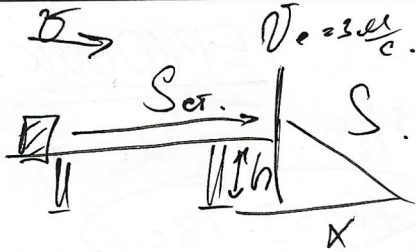
$$S = (V_0 + \frac{a^2 t}{2}) t$$

$$S = (3 + 50 t) t$$

$$S = 3t + 50t^2$$

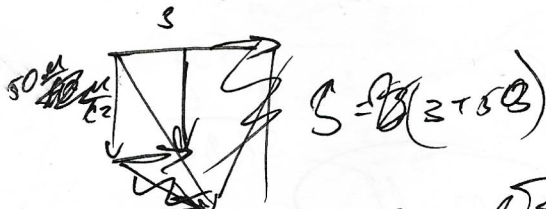
$$\begin{array}{r} \times 160 \\ 800 \\ \hline 0,8 \end{array}$$

$$S = (V_0 + \frac{a^2 t}{2}) t$$



ЧЕРНОВИК.

$$\begin{aligned} V &= 5 \text{ м/с} \\ h &= 0,3 \text{ м.} \\ S_0 &= 3 \text{ м.} \\ Q &= 10 \frac{\text{м}^3}{\text{с}^2} \\ \mu &= 0,4 \end{aligned}$$



$$q = 2000 = 2000 \frac{\text{м}^3}{\text{с}^2}$$

$$V = V_0 + \frac{a^2 b}{2} = 3 + 60 = 53 \frac{\text{м}}{\text{с}^2}$$

$$\begin{array}{r} 13 \\ \times 52,6 \\ \hline 2830 \end{array}$$

0,64

$$\begin{array}{r} 2808,36 \\ - 2600,36 \\ \hline 1488 \end{array}$$

$$\begin{array}{r} 53 \\ \times 53 \\ \hline 159 \\ 265 \\ \hline 2809 \end{array}$$

$$\begin{array}{r} 8992 \\ \times 992 \\ \hline 1984 \\ 8928 \\ 8928 \\ \hline 64 \end{array}$$

$$S = 0,6$$

$$0,6 = 50 \text{ т}$$

$$\frac{8}{500} = 0,016$$

$$f = 0,016$$



$$\begin{array}{r} 1 \\ \times 53 \\ \hline 316 \\ 53 \\ \hline 0,848 \text{ м.} \end{array}$$

$$\begin{array}{r} 6984 \\ \times 3392 \\ \hline 6984 \\ 209568 \\ 209568 \\ \hline 0,739304 \end{array}$$

$$\begin{aligned} c &= 2\sqrt{0,08} \\ c &= 0,8 \\ 10 &= \frac{c}{c^2} \\ \frac{0,8}{10} &= 0,08 \end{aligned}$$

$$\begin{array}{r} 876 \\ \times 98 \\ \hline 764 \\ 882 \\ \hline 9604 \end{array}$$

$$D = \frac{100}{2}$$

$$\begin{array}{r} 0,099304 \\ \times 998 \\ \hline 229984 \\ 9982 \\ 8982 \\ \hline 998004 \end{array}$$

N 5

50 м - 1 с.

0,8 м.

$$\frac{0,8}{50} = 0,016$$

$$\frac{0,16}{100} = 0,0016$$

$$\begin{aligned} V &= 3 \Rightarrow 4 \\ P &= 4 \Rightarrow 3 \\ P &= 3 \Rightarrow 4 \end{aligned}$$

$$\begin{aligned} (1) \quad \frac{P}{P_0} &= \frac{3}{4} \Rightarrow P_0 = 4P \\ (2) \quad \frac{P}{P_0} &= \frac{4}{3} \Rightarrow P_0 = 3P \end{aligned}$$

$$\begin{aligned} 0,16 \text{ м} - 1 \text{ с.} \\ 0,8 \text{ м} - 0,5 \text{ с.} \end{aligned}$$

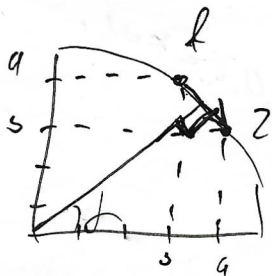
① $\frac{P}{P_0} = \frac{3}{4}$ $P = \frac{3}{4} P_0$ $Q = PU = \frac{3}{4} P_0 \cdot \frac{4}{3} U_0 = P_0 U_0 = Q$ ЦЕРНОВИК.

$\frac{V}{U_0} = \frac{4}{3}$ $V = \frac{4}{3} U_0$

ⓐ Работа A в этом процессе равна нулю, т.к. $\epsilon_{\text{уб}}$

~~$P = \frac{3}{4} P_0$~~
 ~~$U = \frac{4}{3} U_0$~~
 ~~$Q =$~~

А) Работа $A = 0$.



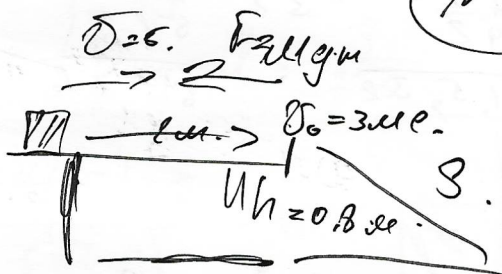
б) $\frac{Q_1}{Q_2} = 1$

$Q_1 = UP$ $\frac{Q_1}{Q_2} = \frac{\frac{3}{4} P_0 \cdot \frac{4}{3} U_0}{P_0 \cdot U_0} = \frac{3}{4} \cdot \frac{4}{3} = 1 = 1$
 $Q_2 = U_0 P_0$

$V = \frac{4}{3} U_0$

$P = \frac{3}{4} P_0$

№2



$\approx 0,64$

54,64

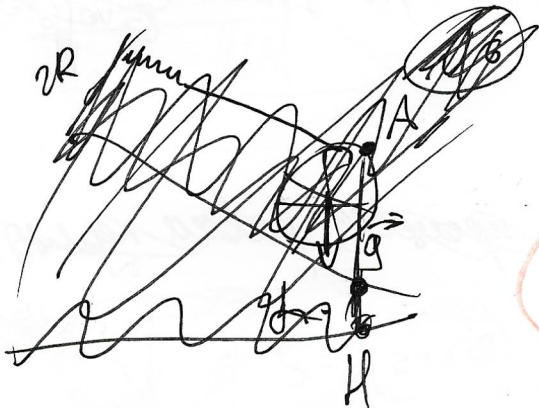
26

25,16

№6

ЧЕРНОВИК.

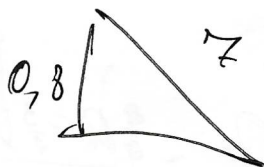
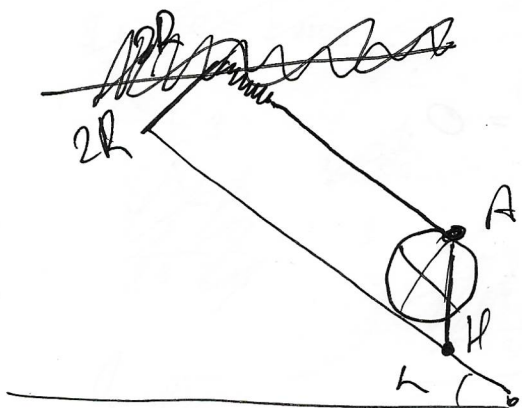
Дано: L ; m ; R ; H .



$$D = \left(3 + \frac{100 \cdot 0.5}{2} \right) 0.5$$

$$D = 28 \cdot 0.5 = 14 \text{ м.}$$

$$S = D \cdot t = 14 \cdot 0.5 = 7 \text{ м.}$$



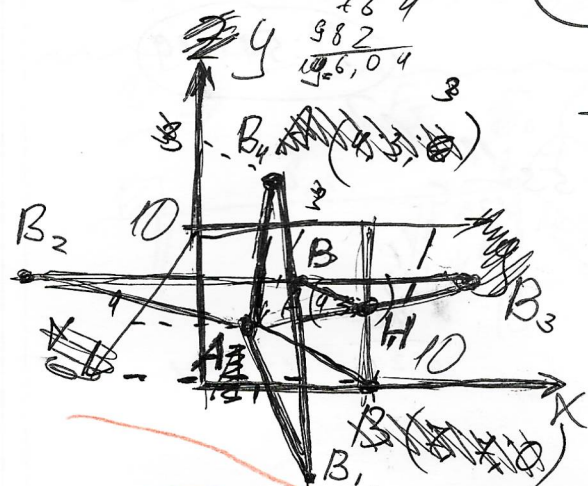
$$\begin{array}{r} 3 \\ \times 66 \\ \hline 396 \\ 396 \\ \hline 896 \end{array}$$

$$\begin{array}{r} 49 - 0.69 = 48.36 \\ 48.36 \\ \times 3 \\ \hline 145.08 \\ 145.08 \\ \hline 429.2 \\ 429.2 \\ \hline 171.532 \end{array}$$

$$\begin{array}{r} 43 \\ \times 76 \\ \hline 274 \\ 274 \\ \hline 296 \\ 296 \\ \hline 518 \\ 518 \\ \hline 59.76 \end{array}$$

$$AB_1^2 = 9 + 100 = 109 \quad \begin{array}{r} 7\ 9\ 8 \\ \times 9\ 8 \\ \hline 6384 \\ 7020 \\ \hline 78182 \end{array}$$

$$AB_2^2 = 121 + 16 = 137$$



МЧ

$$AB_3^2 = 81 + 16 = 97$$

$$AB_4^2 = 9 + 100 = 109$$

ЧИСТОВИК

1) $AA_1 = 3$ метра.

2) $A, B \{3; 4; 0\}$

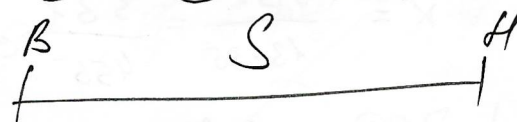
$|A, B| = \sqrt{9 + 16} = 5$ метр.

3) $t_{\text{по стене}} = \frac{3}{2} = 1,5$ мин.

4) $t_{\text{по потол.}} = \frac{\sqrt{97}}{1}$ мин = $\sqrt{97}$

$t_{\text{по стене}} + t_{\text{по потол.}} = 1,5 + \sqrt{97} \approx 11,3$

Н1



$v_{\text{плоск.}} = u_{\text{г.}}$

$u \cdot t = S$

$(v_{\text{плоск.}} + u)(t - 6) = S$

$(v_{\text{плоск.}} - u)(t - 5) = S$

$\begin{cases} v_{\text{плоск.}} + u = \frac{S}{t-6} \\ v_{\text{плоск.}} - u = \frac{S}{t-5} \end{cases} \Rightarrow 2u = \frac{S}{t-6} - \frac{S}{t-5}$

$\frac{2(t-6)(t-5) - t}{2t(t-6)(t-5)} = 0$

$\begin{cases} t \neq 0 \\ t \neq 6 \\ t \neq 5 \end{cases}$

$2(t^2 - 11t + 30) - t = 0$

$2t^2 - 23t + 60 = 0 \Rightarrow$

$u = \frac{S}{2(t-6)(t-5)}$

$\frac{8^2}{t} = \frac{8^2}{2(t-6)(t-5)}$

$\frac{1}{t} - \frac{1}{2(t-6)(t-5)} = 0$

$D = 529 - 480 = 49$
 $t = \frac{23 \pm 7}{4} = \left[\frac{30}{4} = 7,5 \right]$ н.к.

N3

ЧИСТОВИК

1) $65\% - 35\text{с.}$

$100\% - 7\text{хс.}$

$x = \frac{35 \cdot 100}{65 \cdot 12} = \frac{700}{13} \text{с} = 53 \frac{11}{13} \text{с.}$

11:59:19

2) $40 \frac{11}{13} \text{с} - 35 \text{МБ}$
 $x - 1 \text{МБ.}$

$x \cdot 40$
 $520 + 11 = 531$

$\frac{531}{12} \text{с} - 35 \text{МБ.}$

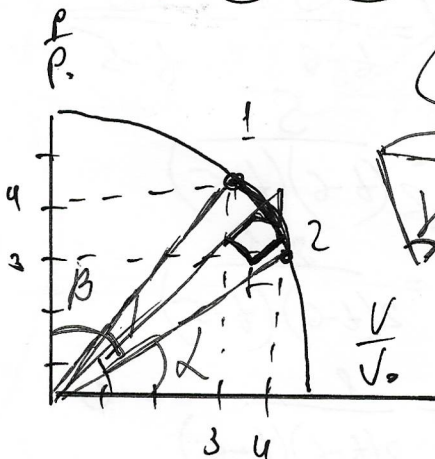
$x \text{с} - 1 \text{МБ.}$

$x = \frac{531}{13 \cdot 35} = \frac{531}{455} \text{с}$

$$\begin{array}{r} 24500 \overline{) 531} \\ 2120 \quad 46,130.. \\ \hline 3260 \\ - 3186 \\ \hline 740 \\ - 531 \\ \hline 2090 \\ 1593 \\ \hline 4970 \end{array}$$

3) $\frac{700}{13} : \frac{531}{455} = \frac{700 \cdot 455}{13 \cdot 531} = \frac{24500}{531} = 46,13 \text{МБ}$

Ответ: размер = 46,13 МБ ; Время кадра -
 - 11:59:19



N5

a) $\Delta = 0, \text{т.к. } \cos b = 0$
 $\theta_1 = \frac{P \cdot V_0}{PV} = \frac{P \cdot V_0}{\frac{3}{4} P \cdot \frac{4}{3} V_0} = 1$

$P = \frac{3}{4} P_0$



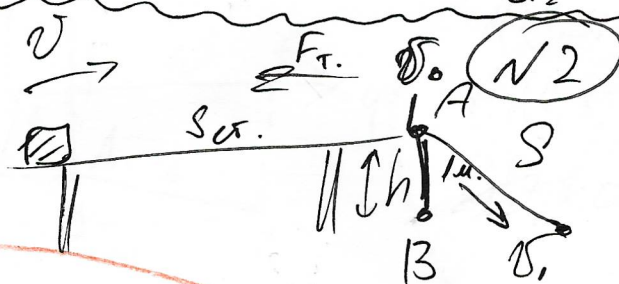
$V = \frac{4}{3} V_0$

Площадь сектора: $\frac{R^2}{2} (1 - \sin \alpha)$
 $S = \frac{1}{2} \cdot \frac{R^2}{2} ([\pi - 2\alpha - \sin(\pi - 2\alpha)] - [\pi - 2\beta - \sin(\pi - 2\beta)]) = \frac{25}{4} (2\beta - 2\alpha + \sin 2\beta - \sin 2\alpha)$
 $= \frac{25}{2} (\beta - \alpha) = \frac{25}{2} (\arcsin \frac{4}{5} - \arccos \frac{3}{5})$

$$a) A = \frac{25}{2} \left(\arcsin \frac{4}{5} - \arccos \frac{3}{5} \right)$$

ЧИСТОВИК

N5 Ответ: ~~$A = 0,8$~~ ~~Q_1~~ ~~Q_2~~



Дано: $v_x = 5$

$h = 0,8 \text{ м.}$

$\mu = 0,1$

$S_0 = 2 \text{ м.}$

$g = ?$ $v_z = 5$; $v_0 = 5$
 $\uparrow l = 2$

1) ~~$v_0 = \frac{3 \text{ м}}{\text{с.}} = 0,6 \text{ м/с}$~~

$$v_z^2 = v_0^2 - 2gl\mu + 2gh$$

$$t = \sqrt{\frac{2h}{g}} = 0,4 \text{ с.}; \quad v_p \cdot g t = 4 \frac{\text{м}}{\text{с}}$$

2) ~~$v_1 = v_0 + \frac{a^2 t}{2}$~~ $\Rightarrow \sin \alpha = \frac{4}{5}$

За 1 сек. из A в B (длина) ~~Скорость~~ $v_1 = v_2 \cdot \cos \alpha = 3 \frac{\text{м}}{\text{с}}$

~~$S = v t = 50 \cdot 1 = 50 \text{ м.}$~~

~~$v_{\text{м.}} = v_0 + \frac{a^2 t}{2} = 50 \frac{\text{м}}{\text{с.}}$~~

~~$0,8 \text{ м.} \times$~~

~~$50 \text{ м.} = 1 \text{ с.}$~~

~~$\frac{0,8}{50} = x$~~

~~$x = \frac{0,8}{100} = 0,008 \text{ с.}$~~

$v_1 = v_2 \cdot \cos \alpha = 3 \frac{\text{м}}{\text{с}}$

$S = v_1 \cdot t = 1,2 \text{ м}$

Ответ: $1,2 \text{ м}$

3) ~~$S = v_0 t + \frac{a^2 t^2}{2}$~~

~~$S = v_0 t = \left(v_0 + \frac{g^2 t}{2} \right) t = \left(3 + \frac{100 \cdot 0,016}{2} \right) \cdot 0,016 =$~~

~~$= 3,8 \cdot 0,016 = 0,0608 \text{ м.} = 6,08 \text{ см}$~~

Чистовик.