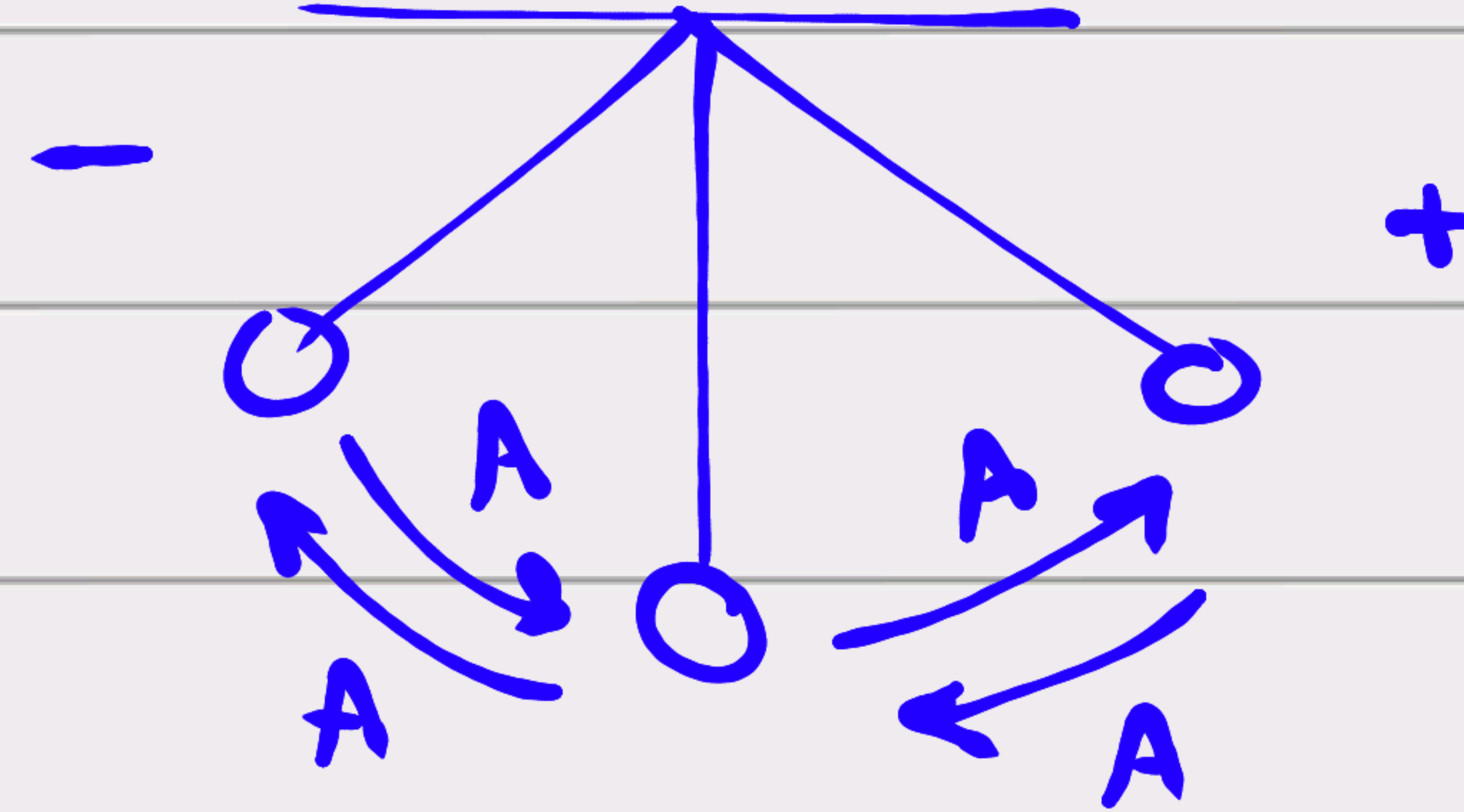


الاهتزازية

للمرآة المخفية

$$\bar{X} = 4 A$$



لا اهتزازية $\bar{X} = N \cdot X$ عددية
لا اهتزازية

$$A = \frac{X}{4}$$

انقضاء

انقضاء

d

A

o

h

↑

o

v

o

↑

P_e

↑

o

K_e

o

↑

E

P_e

K_e

E_f

اخر

اخر

F_r

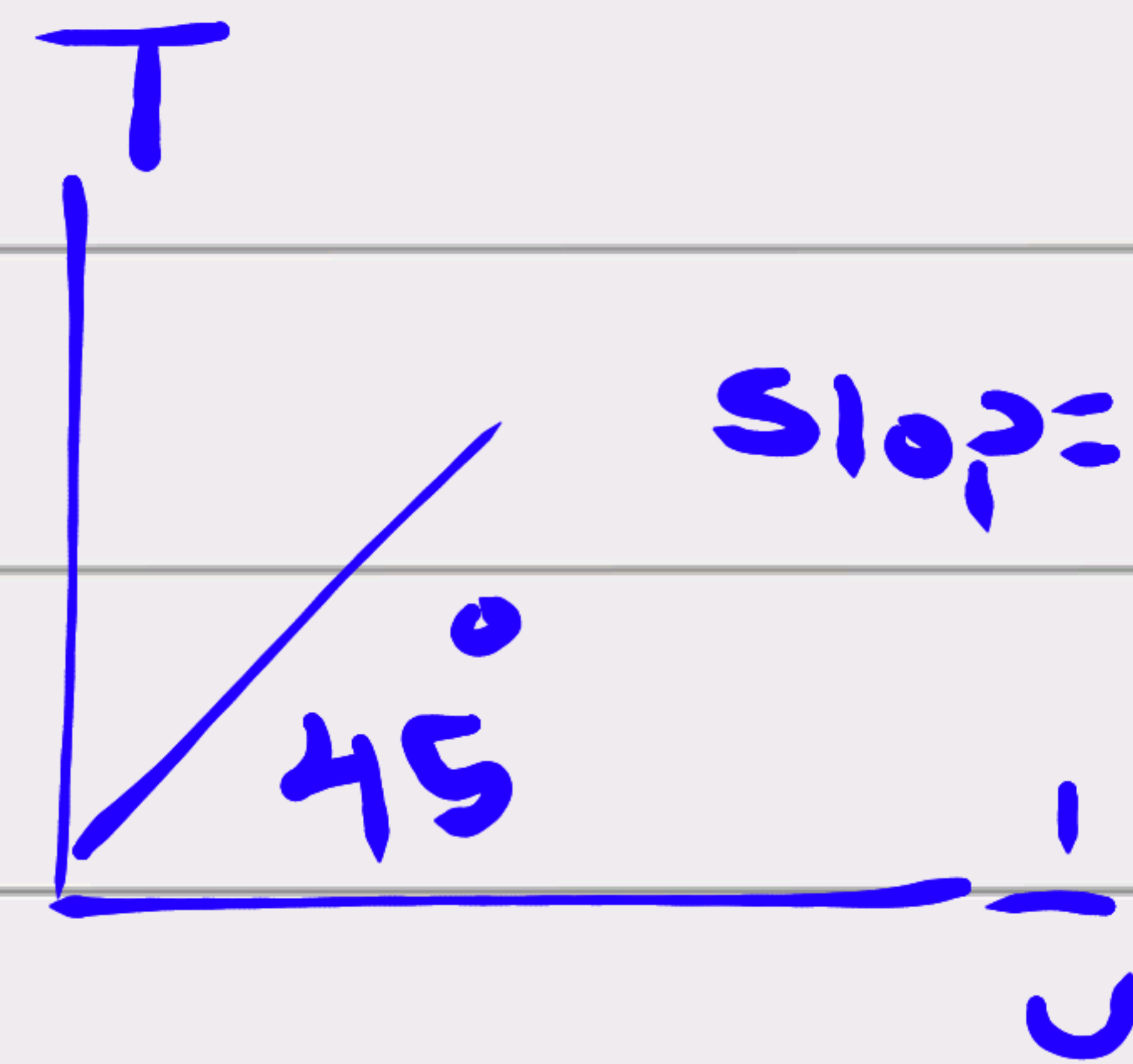
اخر

اخر

$$T = \frac{t}{N} = \frac{1}{\nu}$$

$$T = 2\pi \sqrt{\frac{L}{g}}$$

$T \propto t$ ^{عند N}
 $T \propto \frac{1}{N}$ ^{عند t}
 مختلفين
 بزيادة



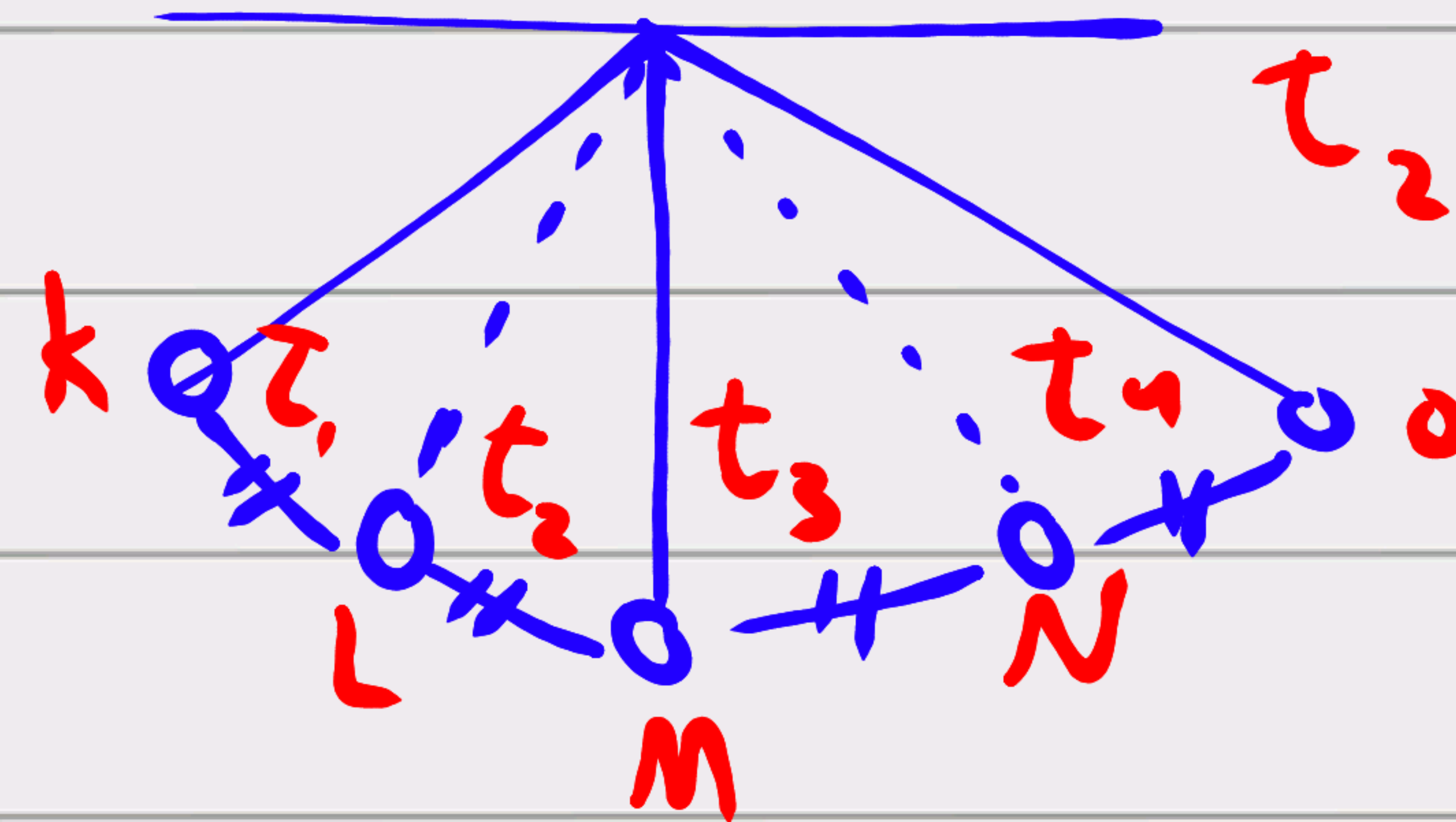
$$T = 4 \cdot t_A$$

$$t_1 = t_4$$

$$t_2 = t_3$$

$$t_3 < t_4$$

$$t_2 < t_1$$



$$t_1 = \frac{t_A}{3}$$

$$t_2 = \frac{2t_A}{3}$$

$$t_A = 3t_1$$

$$T = 4t_A$$

$$= 4 \times 3t_1$$

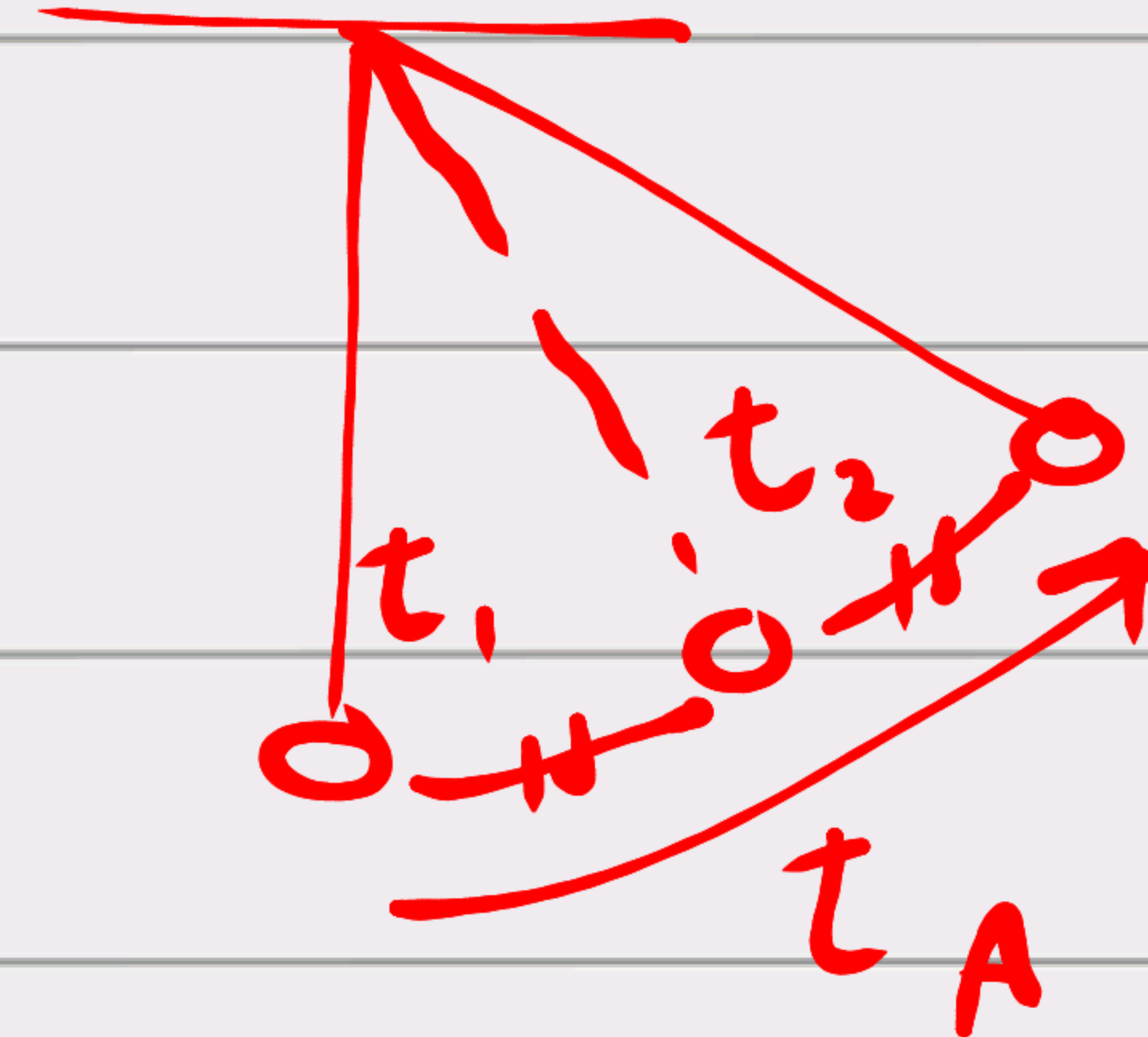
$$= 12t_1$$

$$t_A = \frac{3}{2}t_2$$

$$T = 4t_A$$

$$= 4 \times \frac{3}{2}t_2$$

$$= 6t_2$$



$$U = \frac{N}{t} = \frac{1}{T} \quad \left| \begin{array}{l} \text{حجم اهتزازات في وحدة الزمن} \\ \text{التردد} \end{array} \right.$$

$$U \cdot T = 1$$

$$T = \frac{1}{U}$$

$$T_A = \frac{T}{4}$$

$$T = \frac{1}{9}$$

$$T^2 = \frac{1}{81}$$

$$T = \sqrt{\frac{1}{81}} = \frac{1}{9}$$

$$T_A = \frac{1}{36} \text{ s}$$

$$= 0,0277 \text{ s}$$

$$\lambda = \frac{x}{N}$$

قيم ← قام
تضاف ← تخلص

$$N = \frac{4}{2}$$

الرقم
المرتبة

قام ← قيم
عاشد ← تضاف
(الرقم) - 1 - 2 ولا

$$N = \frac{x}{\lambda}$$

$$T = \frac{t}{N}$$

$$N = \frac{\text{الرقم}}{\text{المرتبة}}$$

م. ب. N

$$\therefore v = \frac{N}{t}$$

$$N = v \cdot t$$

$$N = \frac{t}{T}$$

قيم ← قيم
قام ← قام
تضاف ← تضاف
عاشد ← عاشد

$$\lambda = \frac{x}{n}$$

$$\therefore \lambda = \frac{v}{n}$$

$$\lambda = T \cdot v$$

$$v = n \cdot \lambda = \frac{x}{t} = \frac{\lambda}{T}$$

$$\frac{\lambda_1}{\lambda_2} = \frac{v_2}{v_1}$$

$$\frac{\lambda_1}{\lambda_2} = \frac{v_1}{v_2}$$

v في الوسط الواحد ثابت ←

n مع كل جهة ثابت ←

$$v = \frac{N}{t} = \frac{1}{T} = \frac{v}{\lambda}$$

$$T = \frac{t}{N} = \frac{1}{v} = \frac{\lambda}{v}$$

$$= 4T_A = 12T_{A_{\text{نزد}}\frac{1}{2}} = 6T_{A_{\text{نزد}}\frac{1}{2}}$$

$$\lambda = \frac{x}{N} = T \cdot v = \frac{v}{v}$$

$$= 2 \times \frac{\text{طول موج}}{\text{طول موج}}$$

$$A = \frac{x}{4}$$

$$v_s > v_L > v_g$$

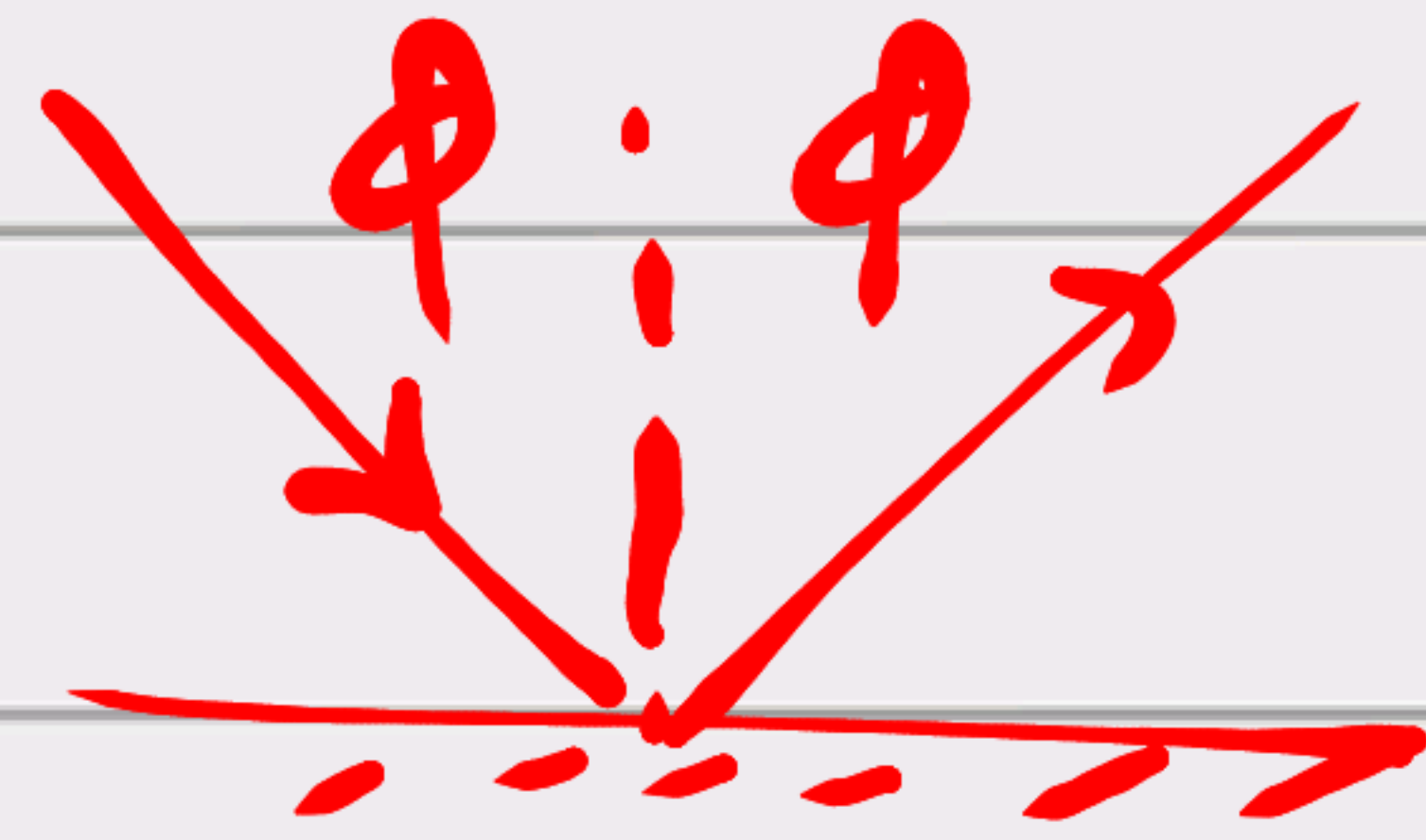
$$A = \frac{\text{مساحة رأسه بموجته دماغ}}{2}$$

$$v = v \cdot \lambda = \frac{\lambda}{T} = \frac{x}{t}$$

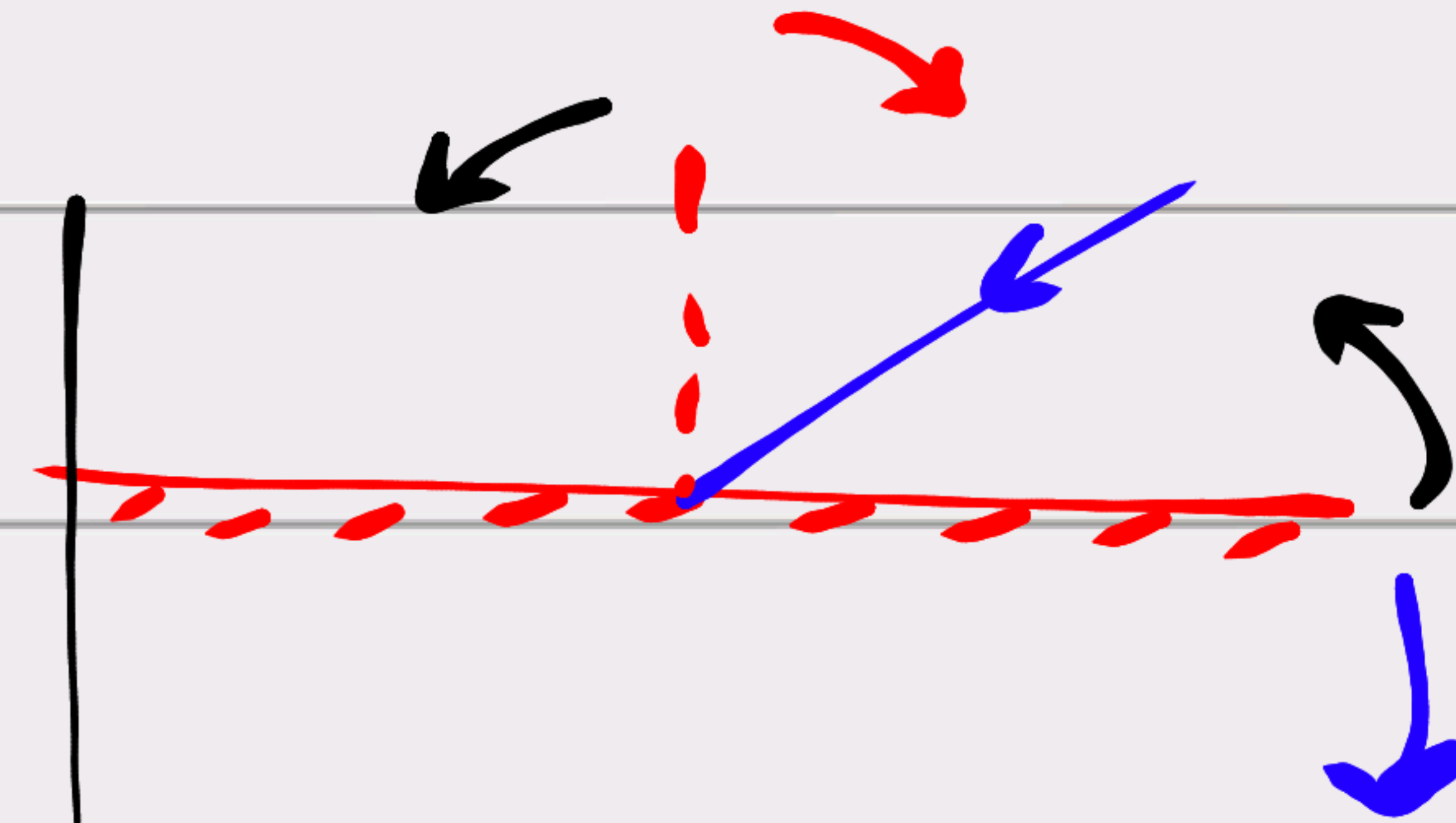
$$v_2 = 3v_1 \quad \text{زاد التردد. الضعف}$$

$$v_1 = v_1 + \frac{4v_1}{100} \quad \text{زاد التردد. نسبة 4٪}$$

$$= 1.04v_1$$

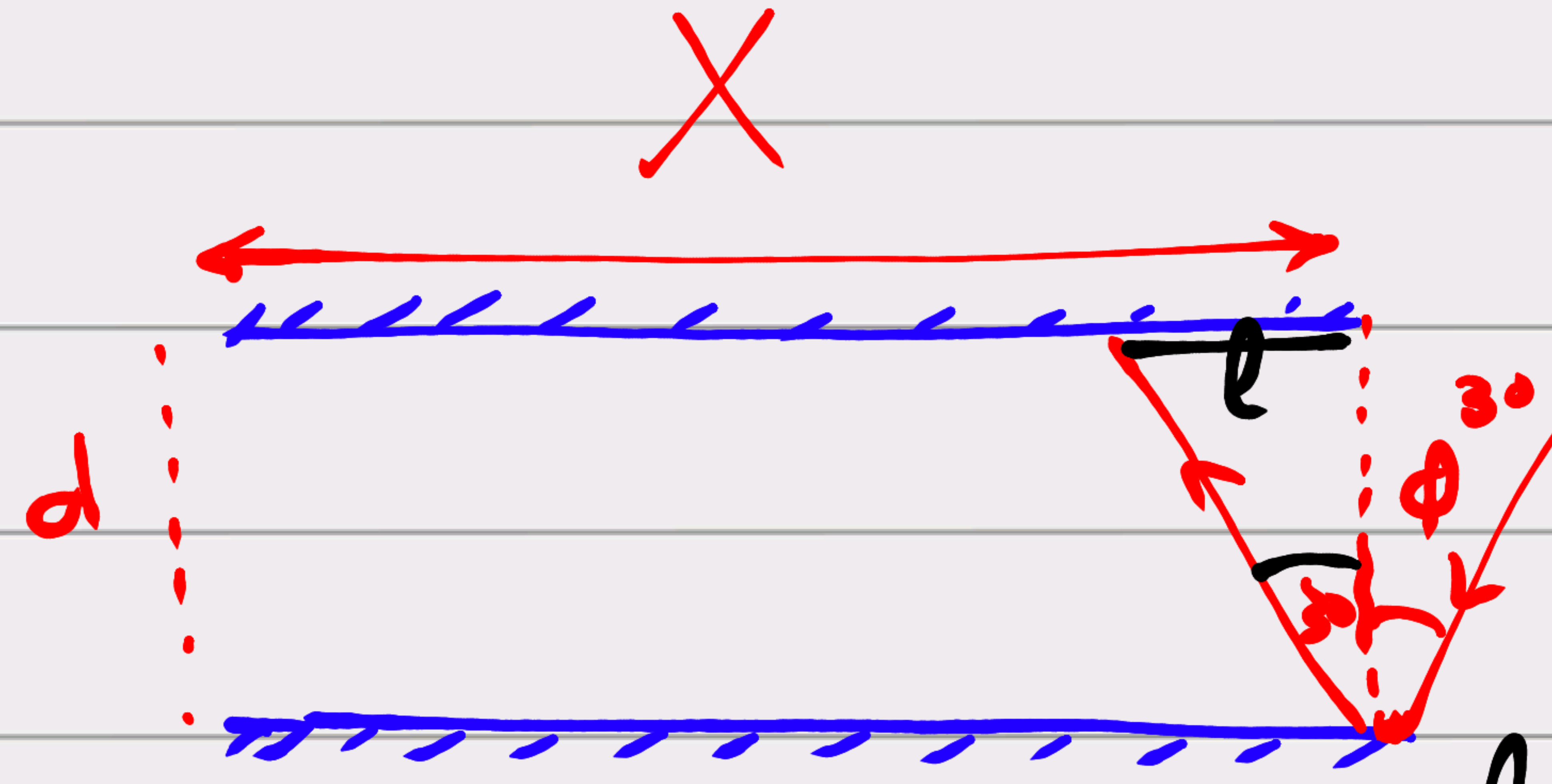
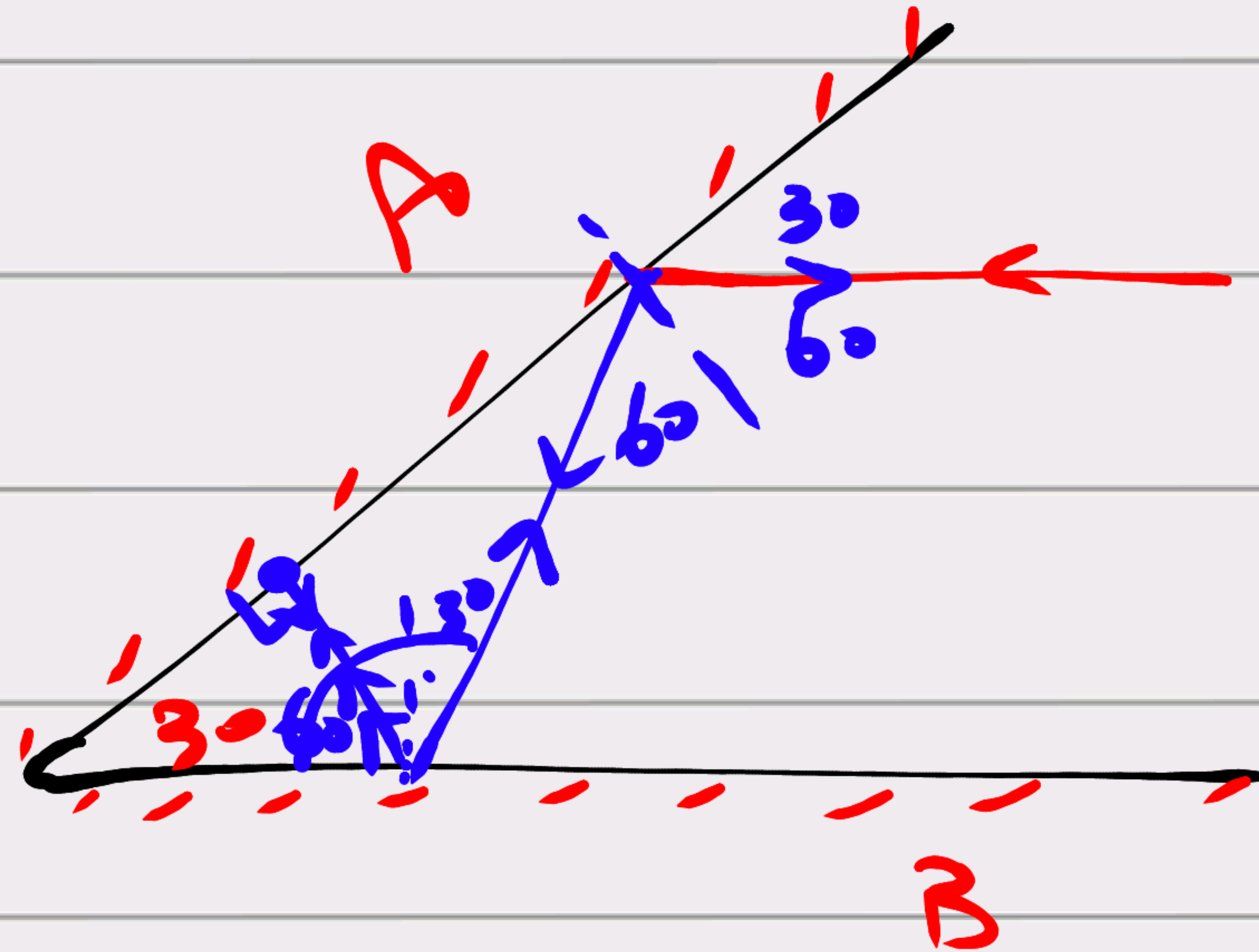


الضوء منتشر
بزاوية 2θ



الضوء متناثر
بزاوية θ

الضوء متناثر
بزاوية θ



$$\tan \phi = \frac{l}{d}$$

$$l = d \cdot \tan \phi$$

$$N = \frac{\quad}{l}$$

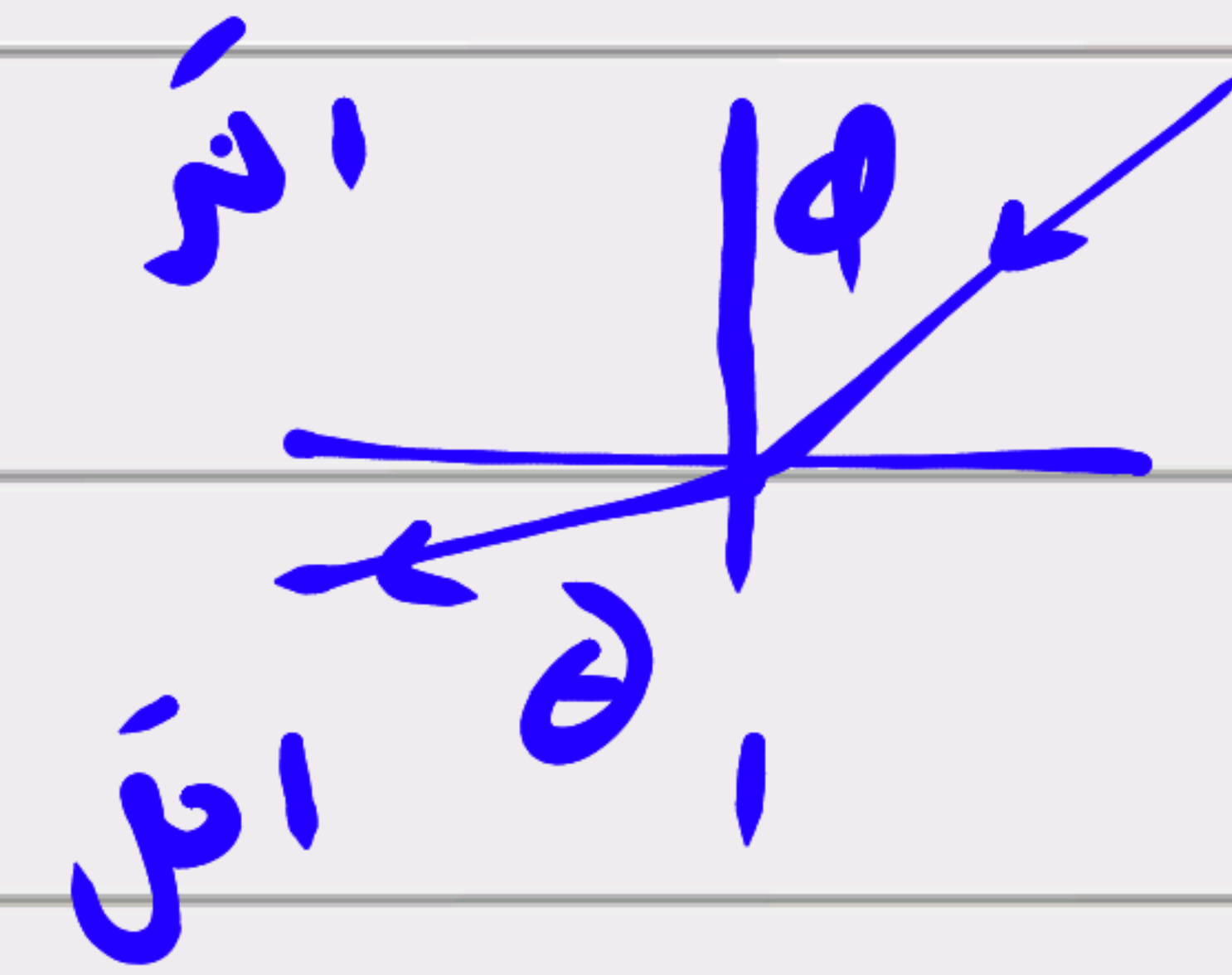
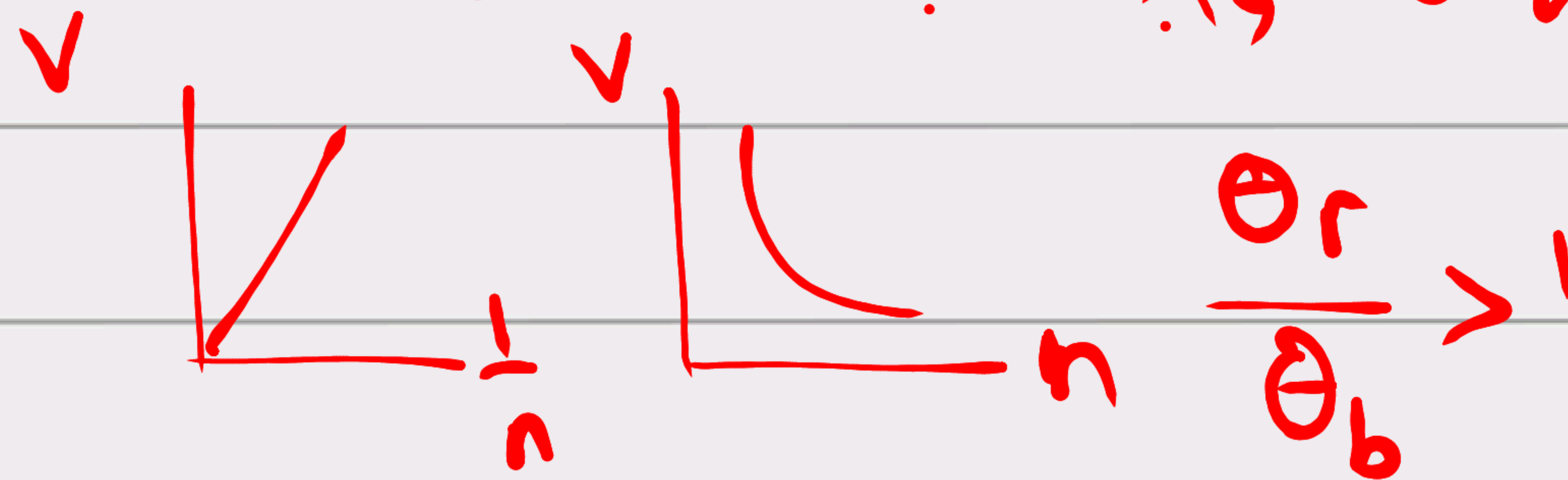
الافتراض

$$n_2 = \frac{v_1}{v_2} = \frac{\sin \phi}{\sin \theta} = \frac{\lambda_1}{\lambda_2} = \frac{n_2}{n_1} = \frac{1}{n_1}$$

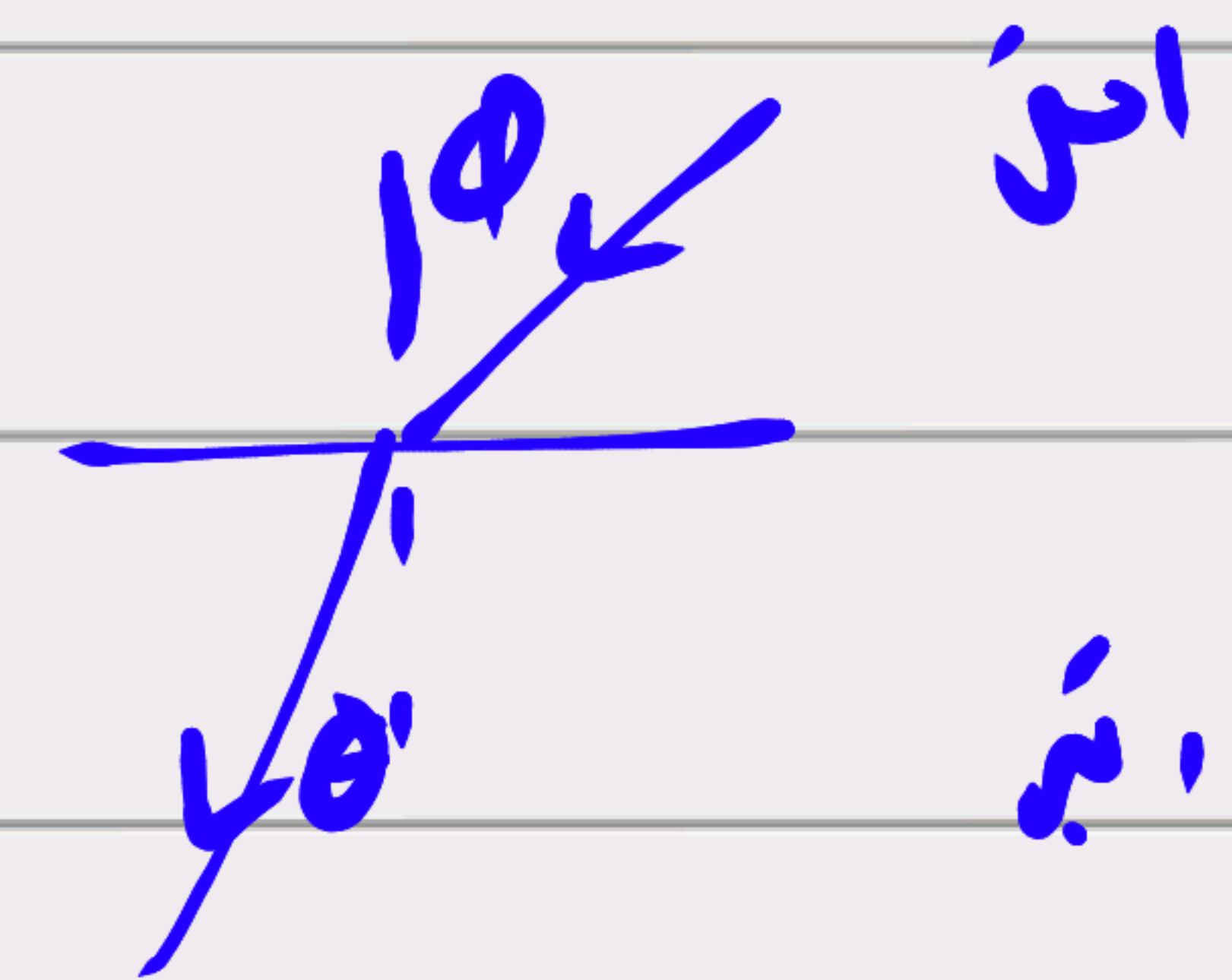
$$= \sin \phi_c$$

$$n = \frac{c}{v} = \frac{\sin \phi}{\sin \theta} = \frac{\lambda_0}{\lambda}$$

تغير λ مع v



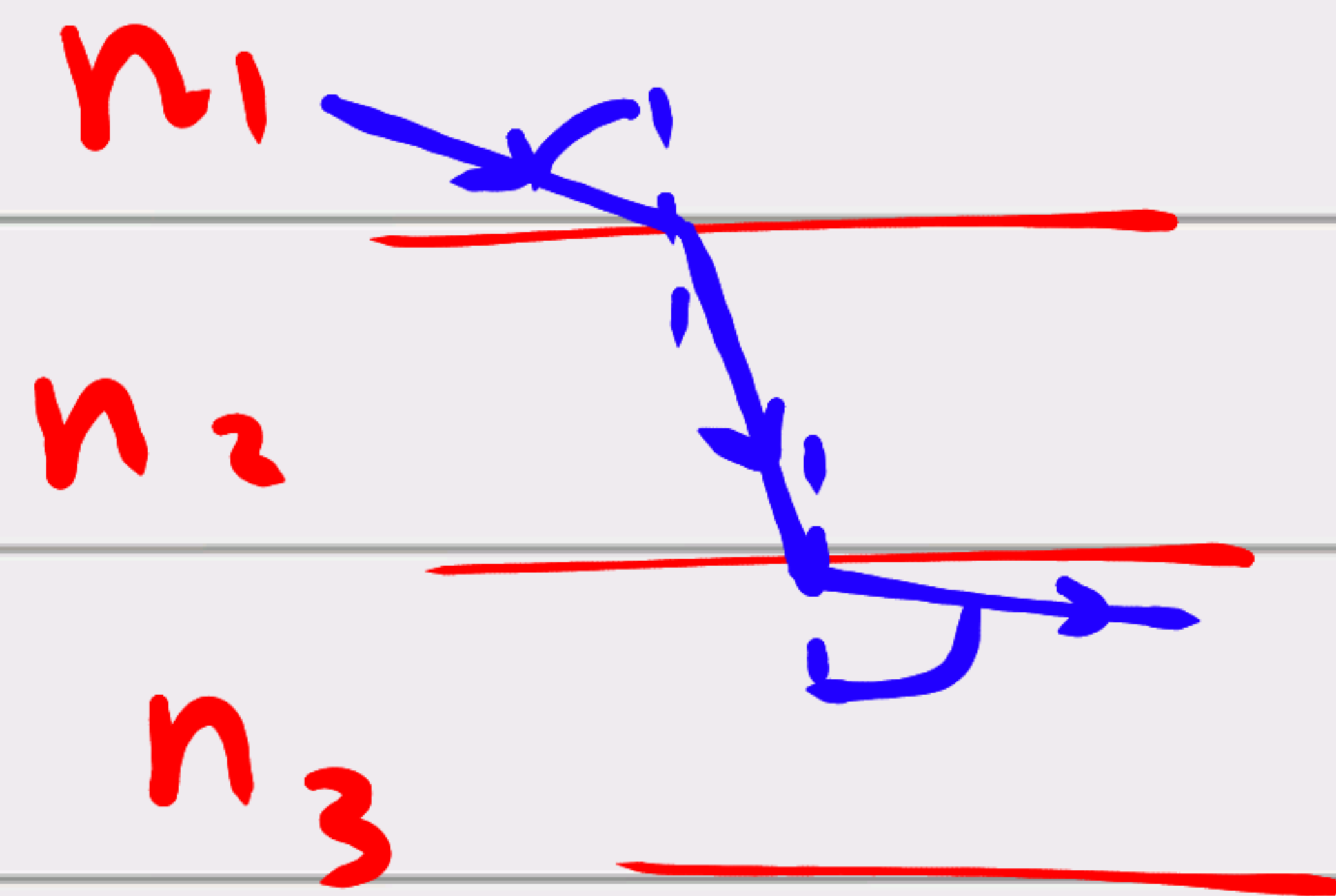
$$\alpha = \theta - \phi$$



$$\alpha = \phi - \theta$$

$$\frac{v_1}{v_2} = \frac{\sin \phi}{\sin \theta}$$

$$n_1 \cdot \sin \phi_1 = n_2 \cdot \sin \theta$$



$$n_2 > n_1$$

$$n_2 > n_3$$

$$n_1 > n_3$$

$$n_2 > n_1 > n_3$$

$$v_2 < v_1 < v_3$$

$$\lambda_2 < \lambda_1 < \lambda_3$$

$$v_2 = v_1 = v_3$$

البناء

فرق $m \lambda$

بناء

رقم الترتيب m = رقم الترتيب n = رقم الترتيب

فرق $(m + \frac{1}{2}) \lambda$

هدام

رقم الترتيب m = رقم الترتيب $n + \frac{1}{2}$

الترتيب m = رقم الترتيب $n - \frac{1}{2}$

$2 \rightarrow 1$

$$\Delta y = \frac{\lambda \cdot R}{d} = \frac{c \cdot R}{v \cdot d} = \frac{\lambda}{N}$$

$$\frac{\lambda_1}{\lambda_2} = \frac{N_2}{N_1}$$

$$\frac{\lambda}{1.5\lambda} = \frac{N_2}{9}$$

$$N_2 = 6$$

$$N = \frac{\text{الخارج}}{\text{الدخول}}$$

التي
مضيق
مظلم

بداء
مضيق
مظلم

$$N = \frac{1}{2} - \frac{\text{الخارج}}{\text{الدخول}}$$

مظلم

مضيق

$$N = \frac{1}{2} + \frac{\text{الخارج}}{\text{الدخول}}$$

مضيق

مظلم

البعاد بفتحة

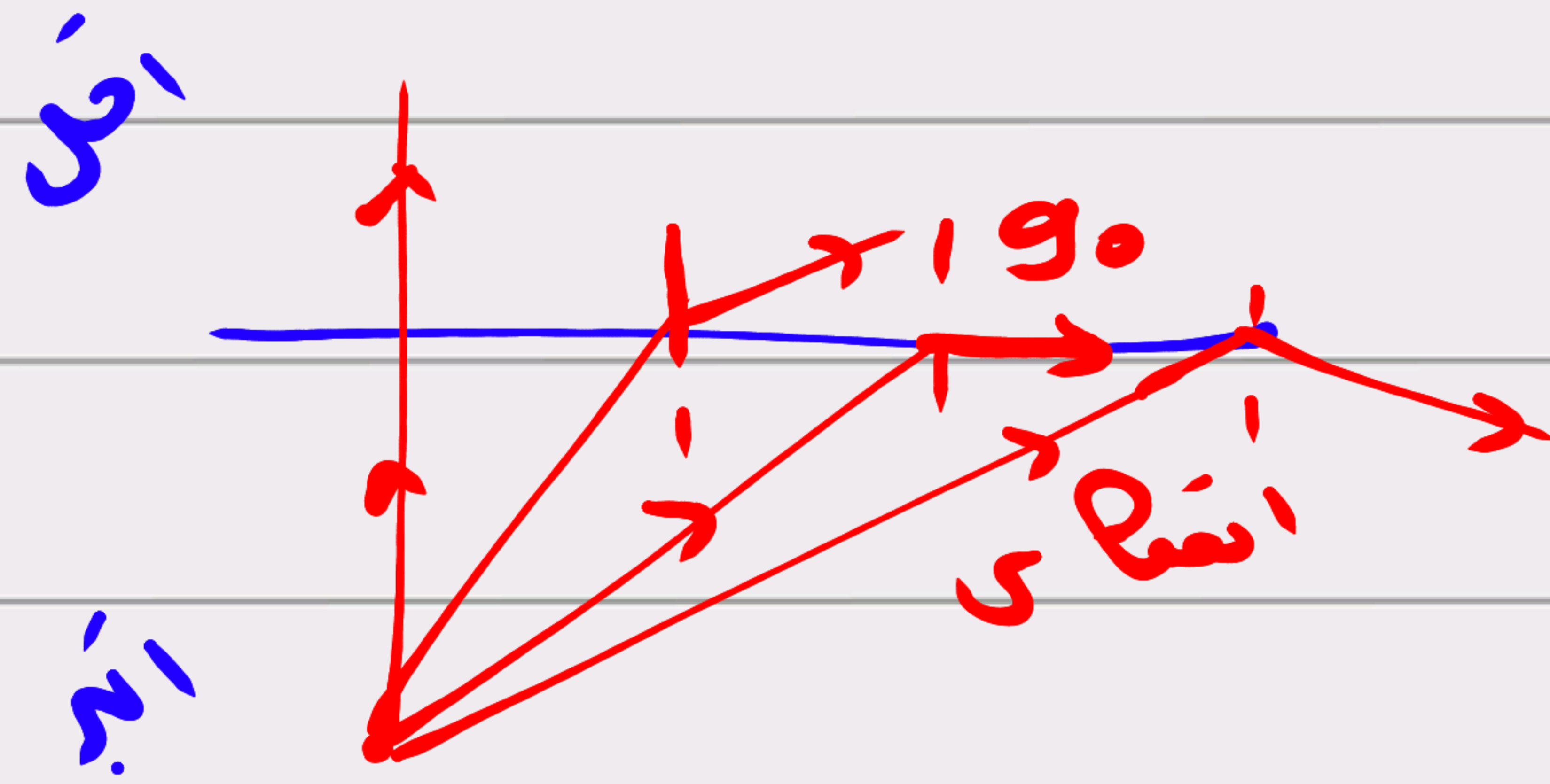
$$6 \times 10^{-4} \text{ m} \times 10^6 = 6 \times 10^2 = 600 \text{ nm}$$

650 nm

550 nm

450 nm

400 nm



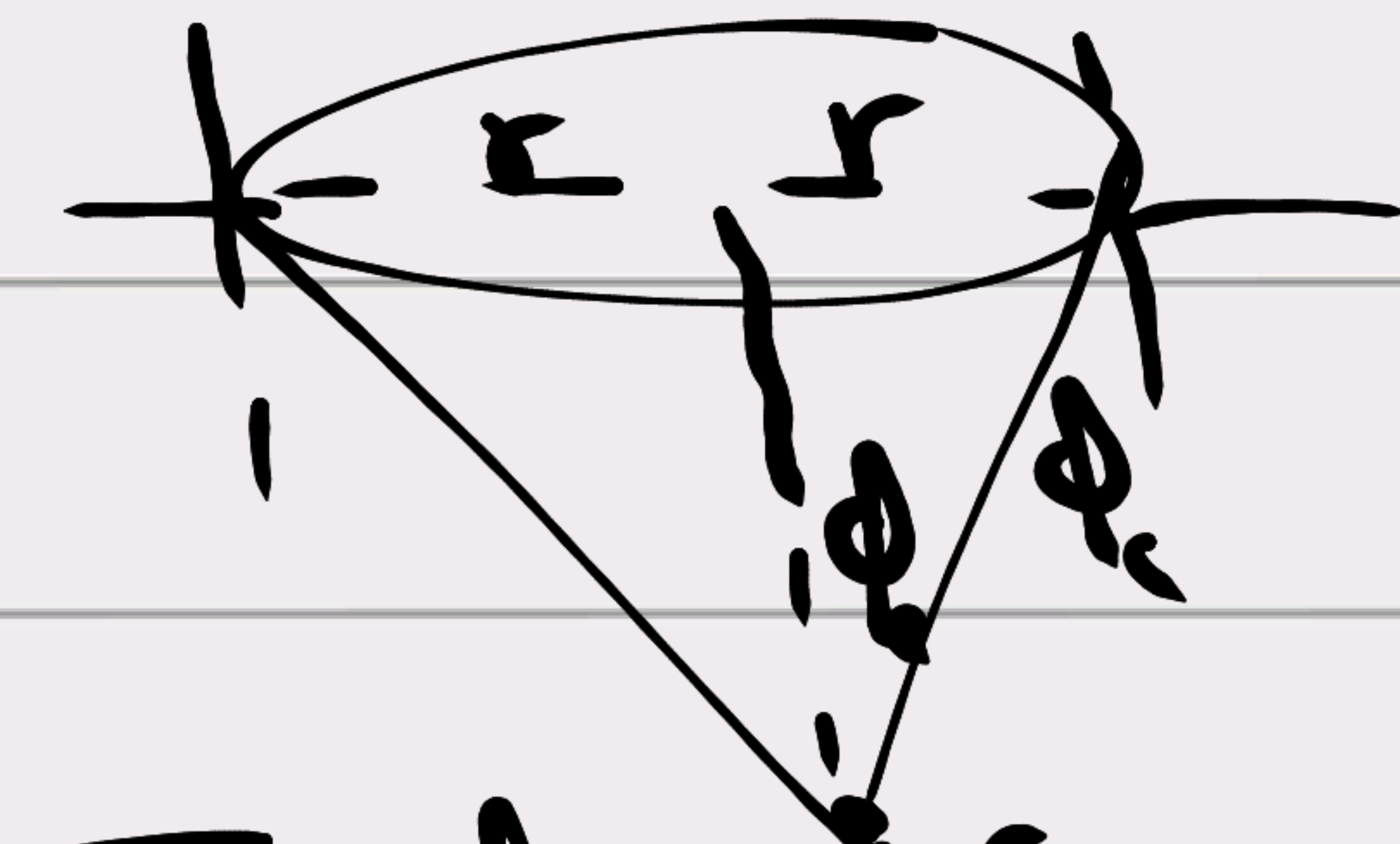
$$\sin \phi_c = \frac{1}{n}$$

$$\sin \phi_c = \frac{v}{v_n}$$

$$v_n = \frac{1}{\sin \phi_c}$$

$$\phi_c \propto \lambda$$

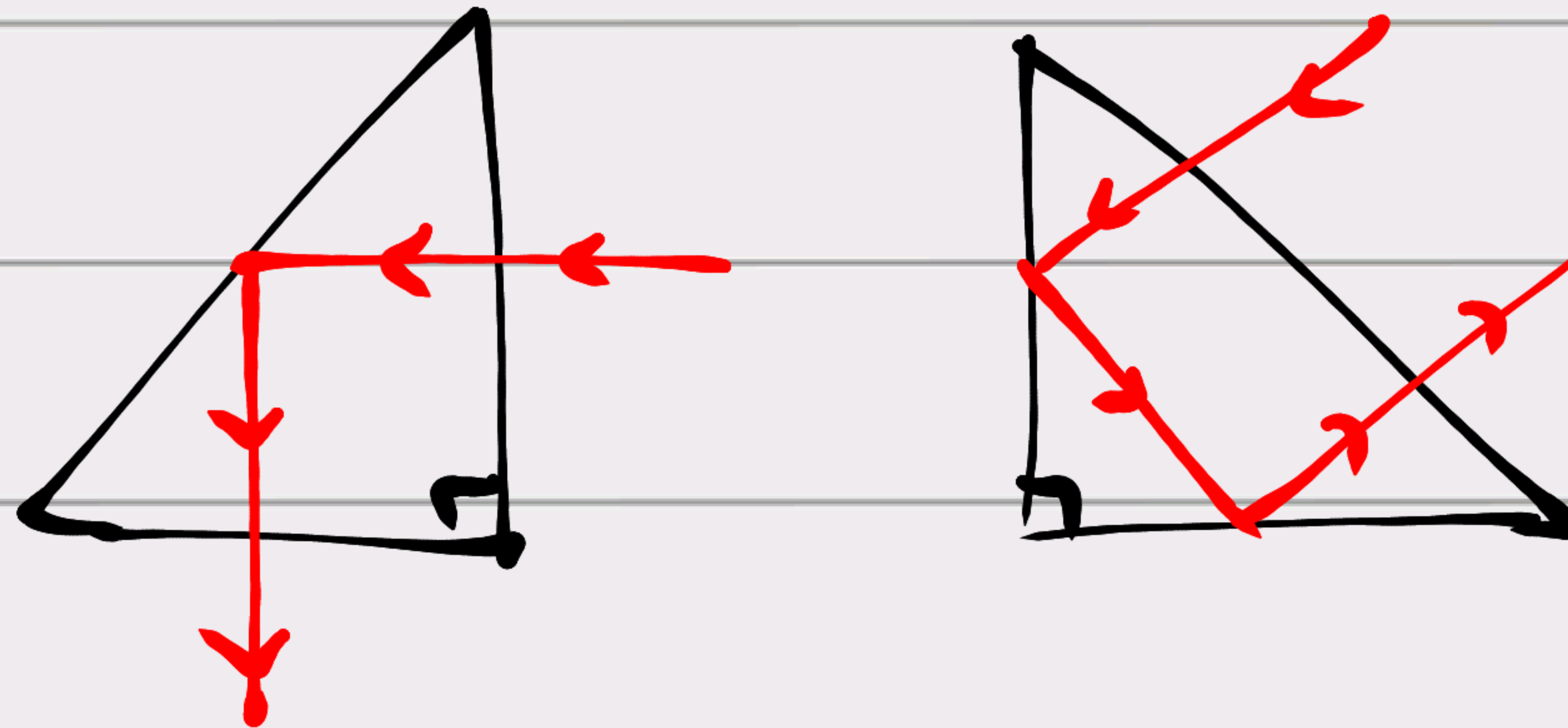
$$\phi_c \propto v$$

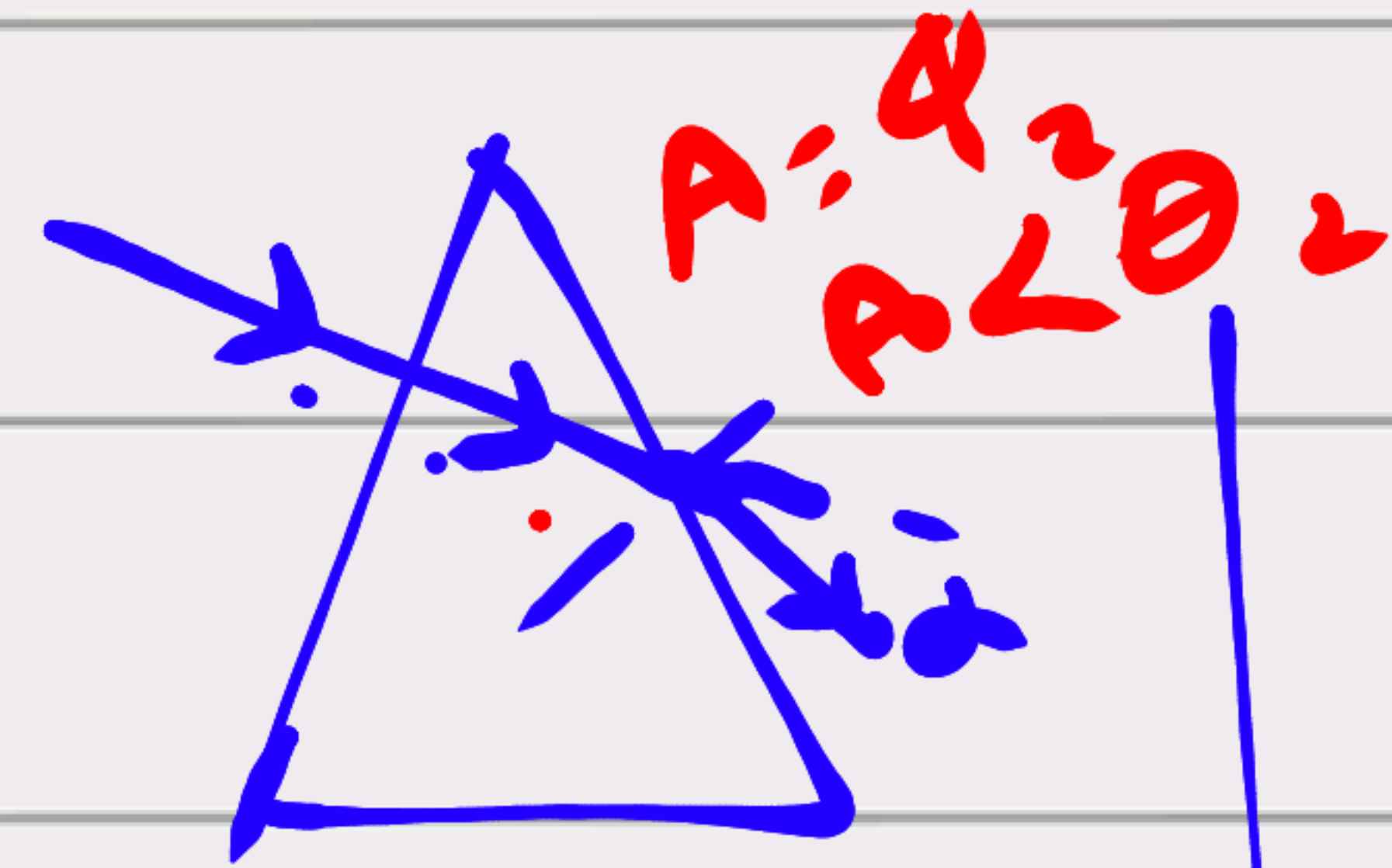


$$\tan \phi_c = \frac{r}{d}$$

$$r = d \cdot \tan \phi_c$$

$$\frac{n}{n_i} > 1 \quad \frac{n}{n_i} < 1$$





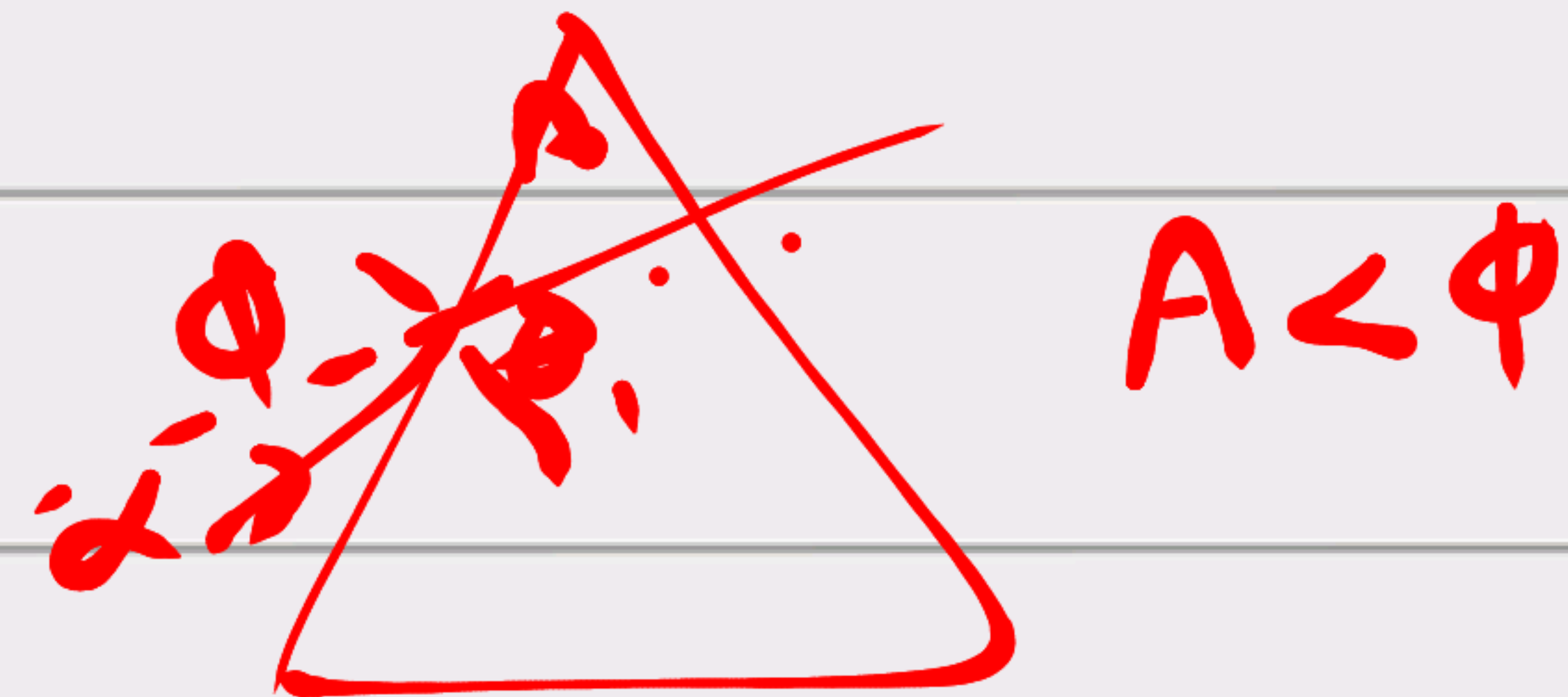
$$A = \phi_2$$

$$\alpha = \theta_2 - \phi_2$$

$$= \theta_2 - A$$

$$n = \frac{\sin \theta_2}{\sin \phi_2}$$

$$= \frac{\sin \theta_2}{\sin A}$$



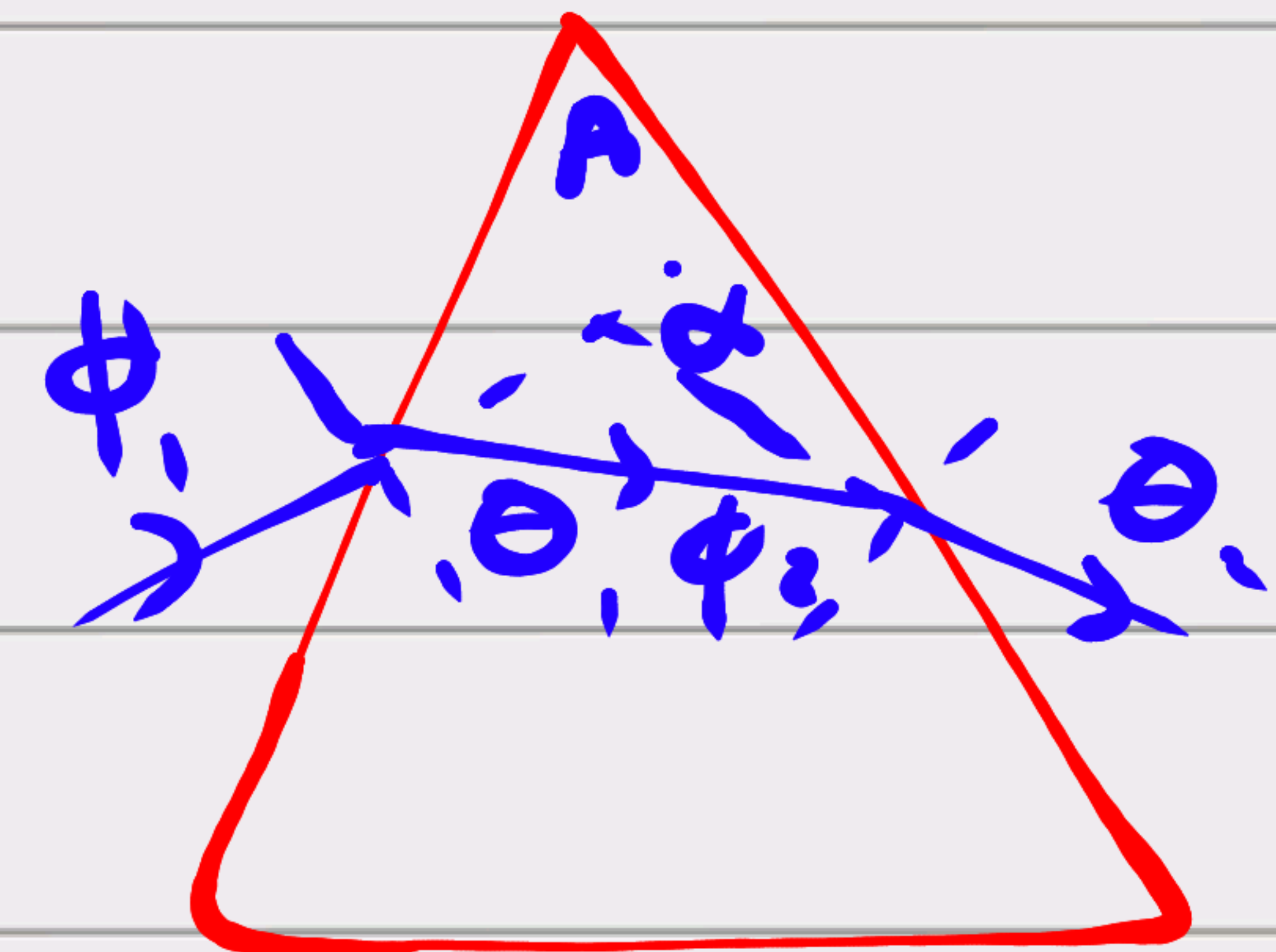
$$A = \theta_1$$

$$\alpha = \phi_1 - \theta_1$$

$$= \phi_1 - A$$

$$n = \frac{\sin \phi_1}{\sin \theta_1} = \frac{\sin \phi_1}{\sin A}$$

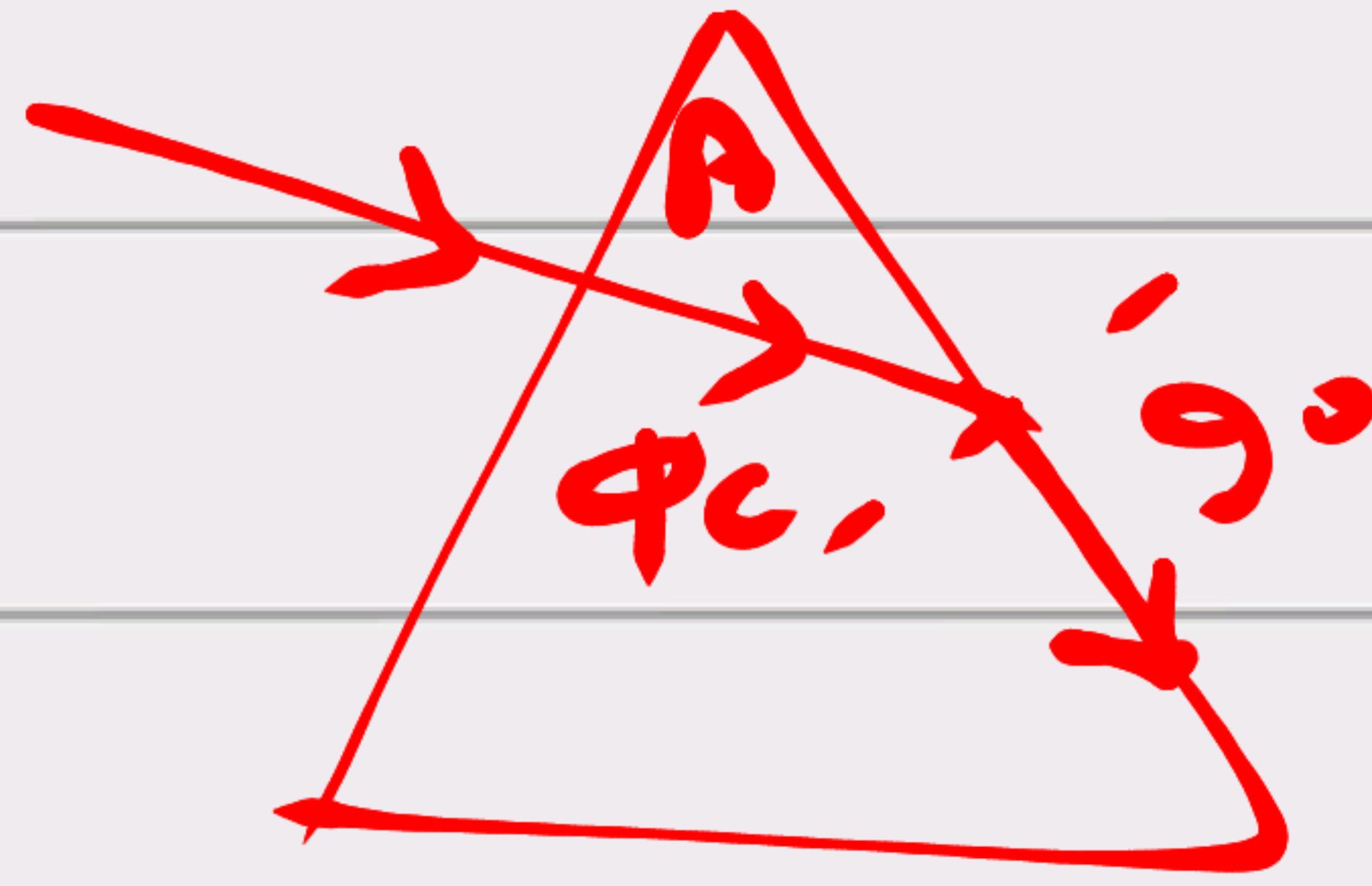
المستورد



$$\frac{\sin \phi_1}{\sin \theta_1} : n = \frac{\sin \theta_2}{\sin \phi_2}$$

$$A = \theta_1 + \phi_2$$

$$\alpha = \phi_1 + \theta_2 - A$$



قانون سنيل

$$A = \phi_2 = \phi_c$$

$$\theta_2 = 90$$

$$\alpha = \theta_2 - A$$

$$n = \frac{\sin 90}{\sin \phi_2}$$

$$\frac{1}{\sin \phi_c} = \frac{1}{\sin A}$$

النسبة

$$n = \frac{\sin \theta_2}{\sin \theta_1}$$

$$n = \frac{\sin \theta_2}{\sin \theta_1}$$

$$\alpha = \phi_1 + \theta_2 - A$$

$$A = 2 \times 60 - 60 = 60$$

$$70 = 40 + \phi_x - 60$$

$$130 = 40 + \phi_x$$

$$\phi_x = 130 - 40 = 90^\circ$$

$$\alpha_0 = 2\phi_0 - A$$

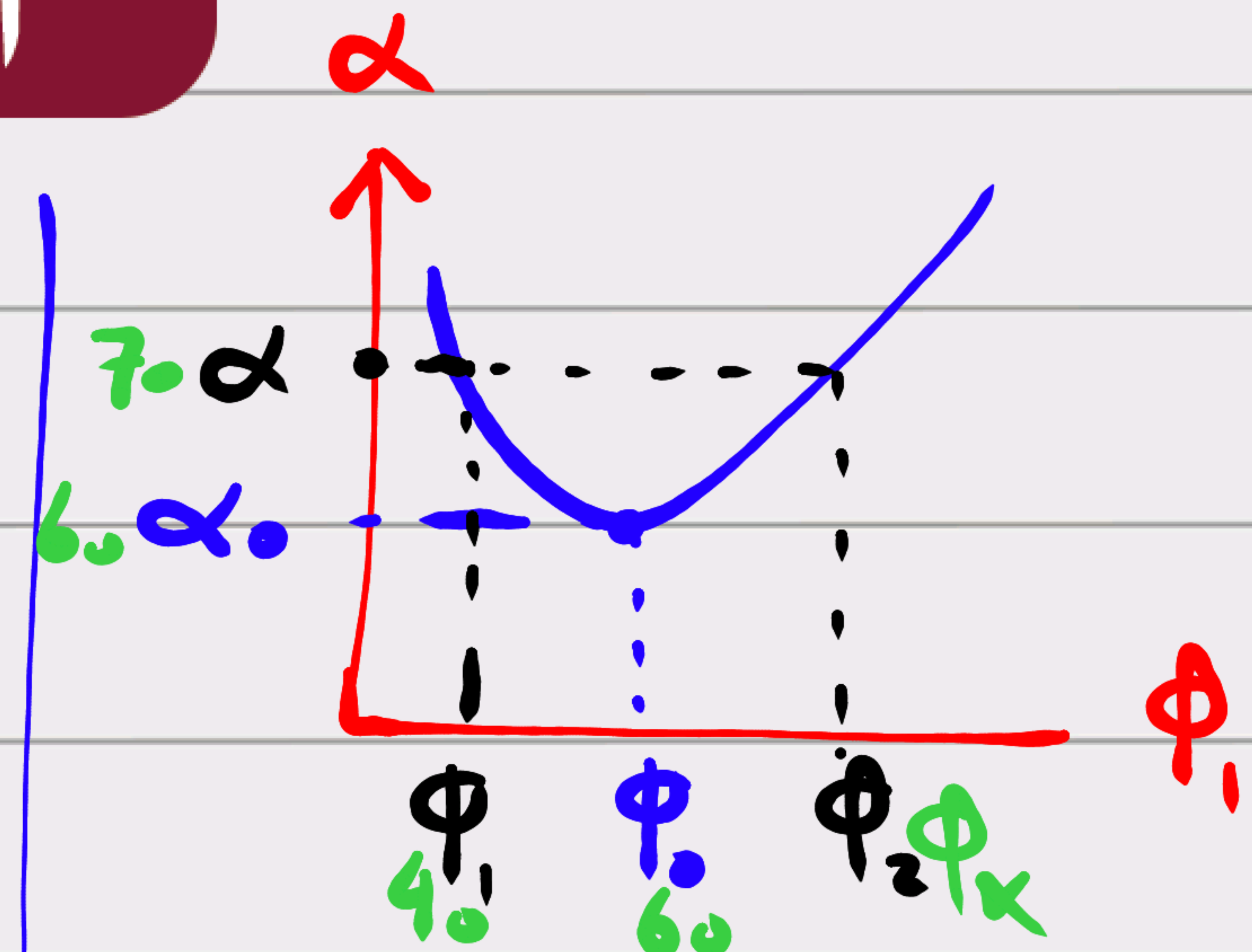
$$A = 2\phi_0 - \alpha_0$$

$$\phi_0 = \frac{\alpha_0 + A}{2}$$

$$A = 2\theta_0$$

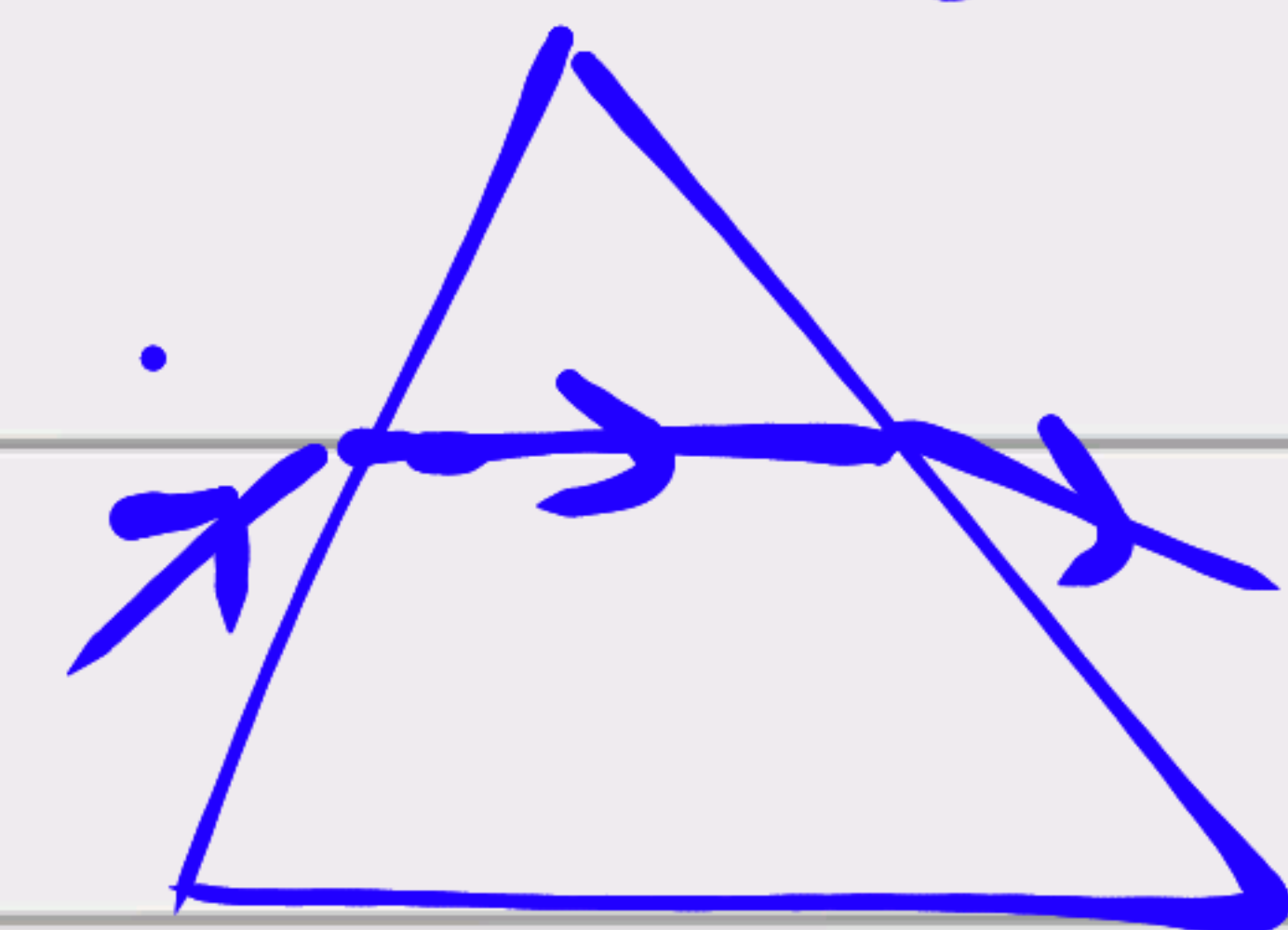
$$\theta_0 = \frac{A}{2}$$

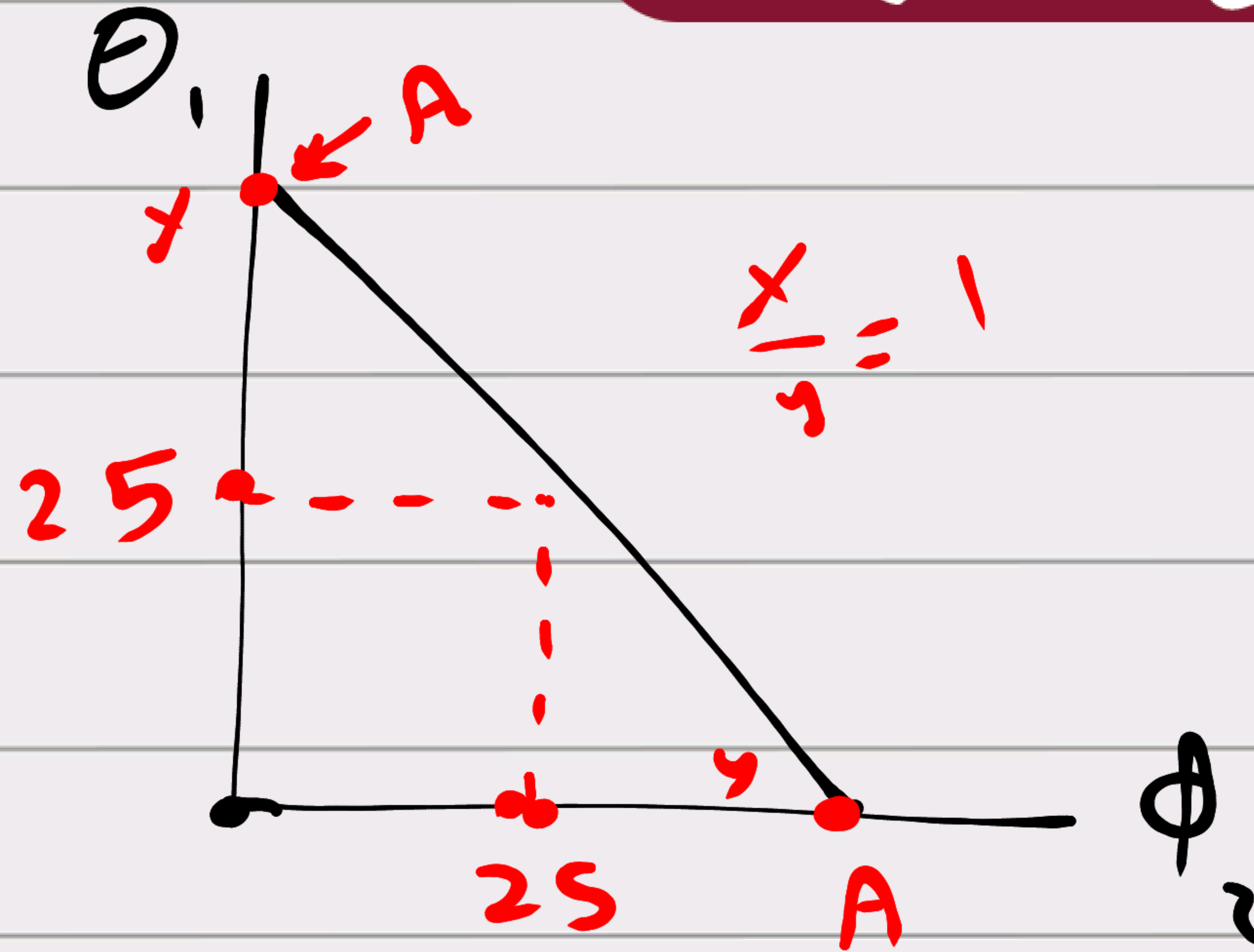
$$n = \frac{\sin \phi_0}{\sin \theta_0} = \frac{\sin(\frac{\alpha_0 + A}{2})}{\sin(\frac{A}{2})}$$



$$\phi_1 = \theta_2 = \phi_0$$

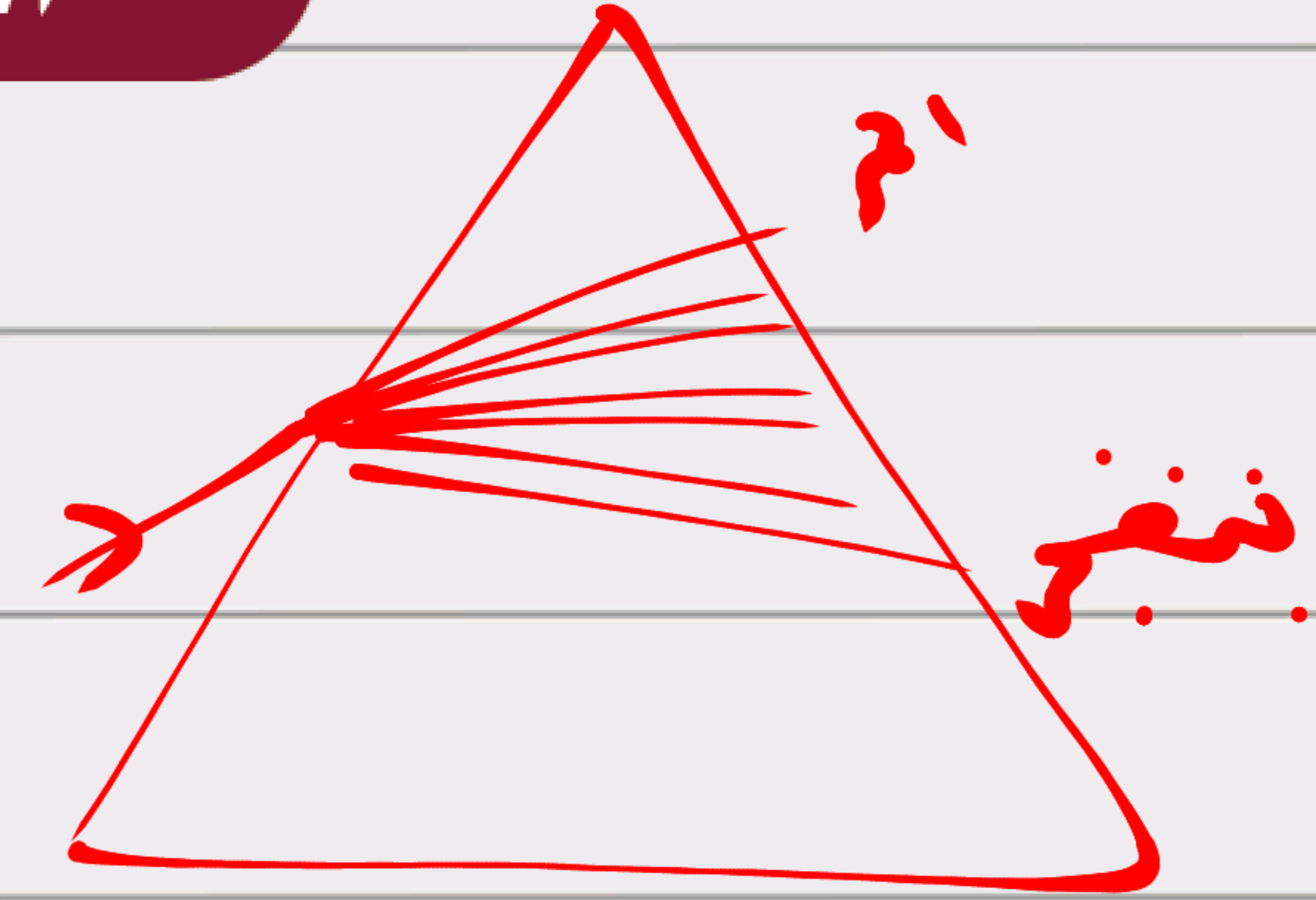
$$\theta_1 = \phi_2 = \theta_0$$





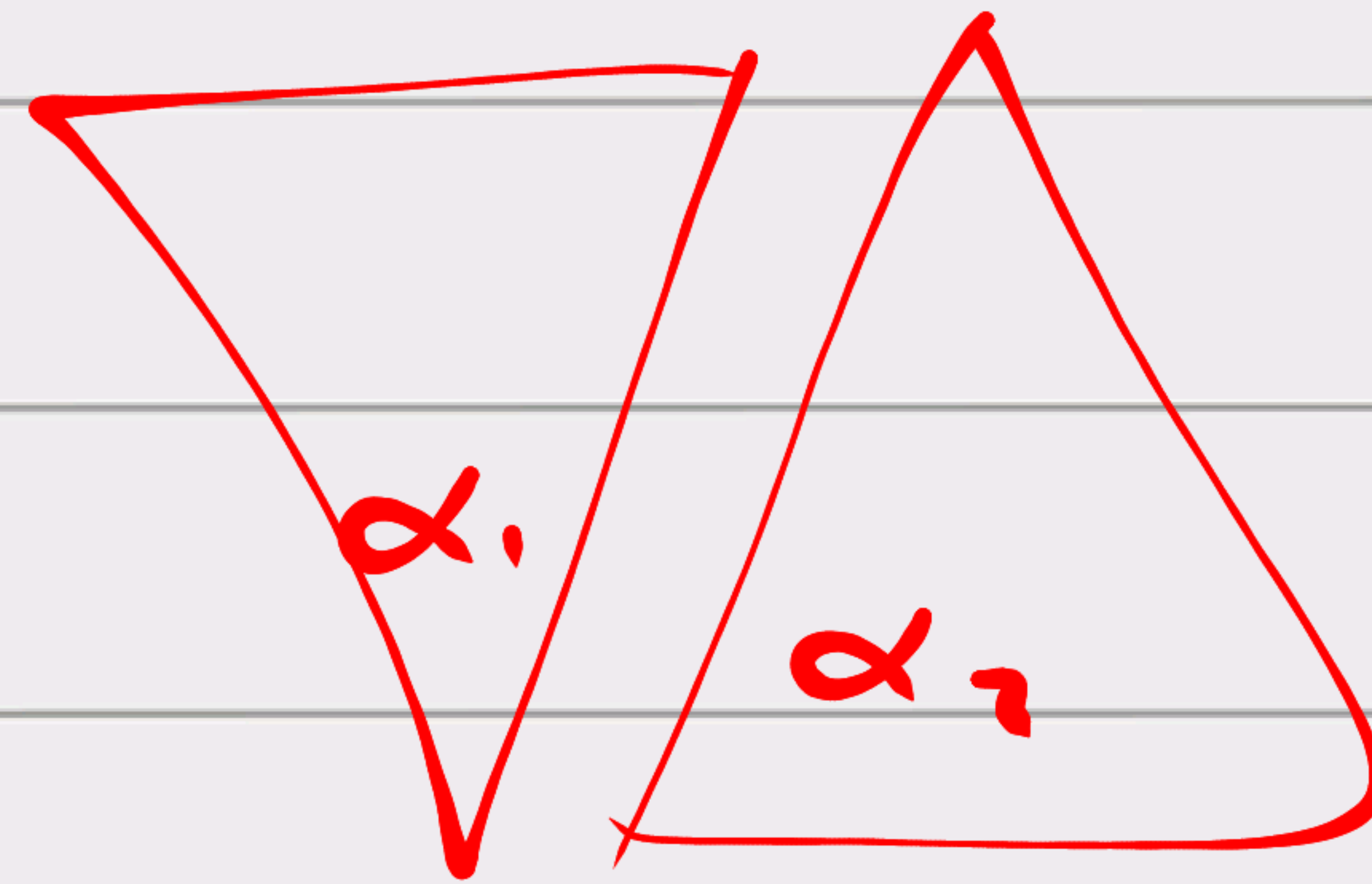
$$A = 2\theta_0 = 50^\circ$$

$$\frac{x}{y} = 1$$

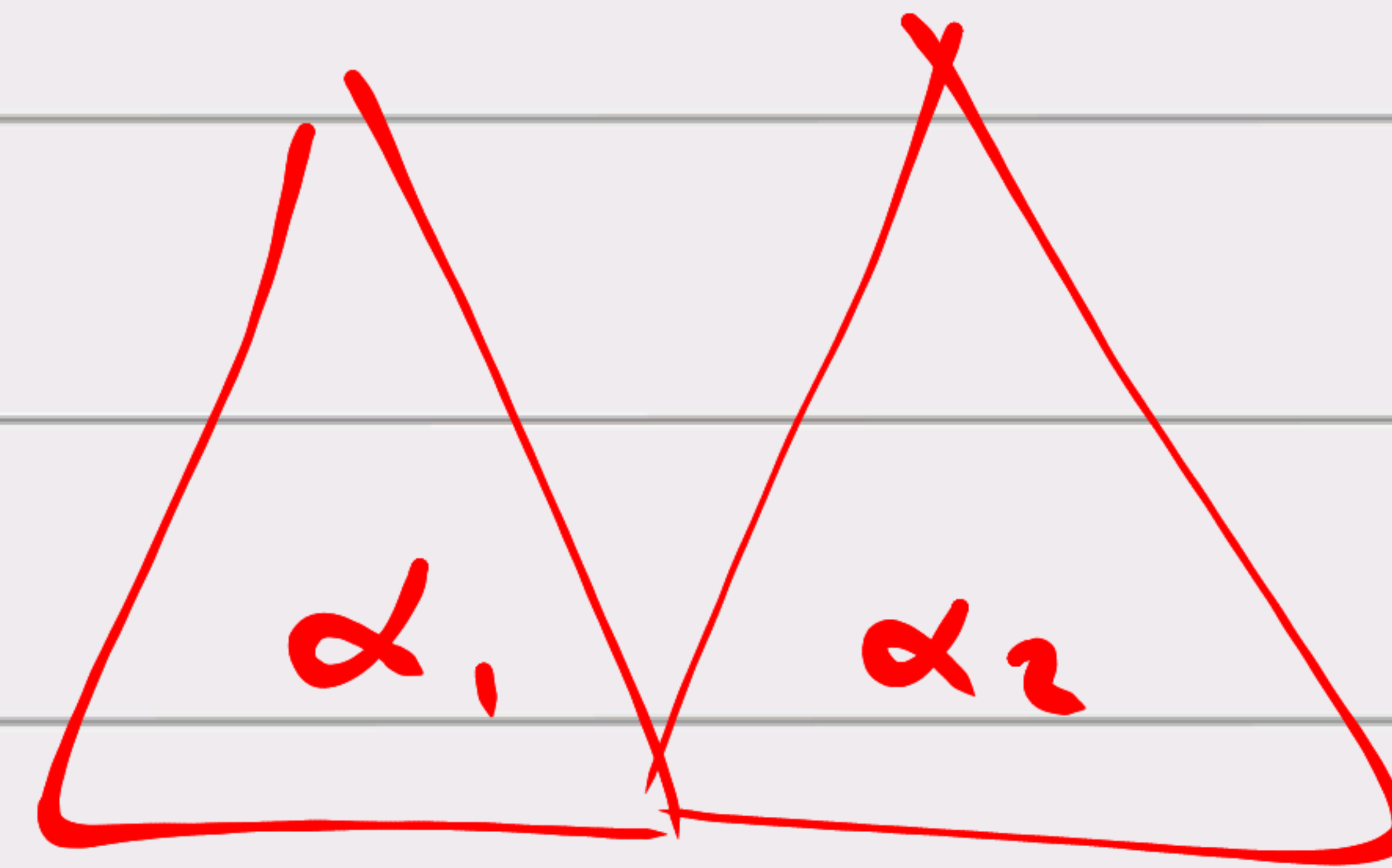


بنفسه
فأمره استور

أمر
الطالع
جاءه
أمر
الطالع
جاءه
أمر
الطالع
جاءه



$$\alpha = |\alpha_1 - \alpha_2|$$



$$\alpha = \alpha_1 + \alpha_2$$

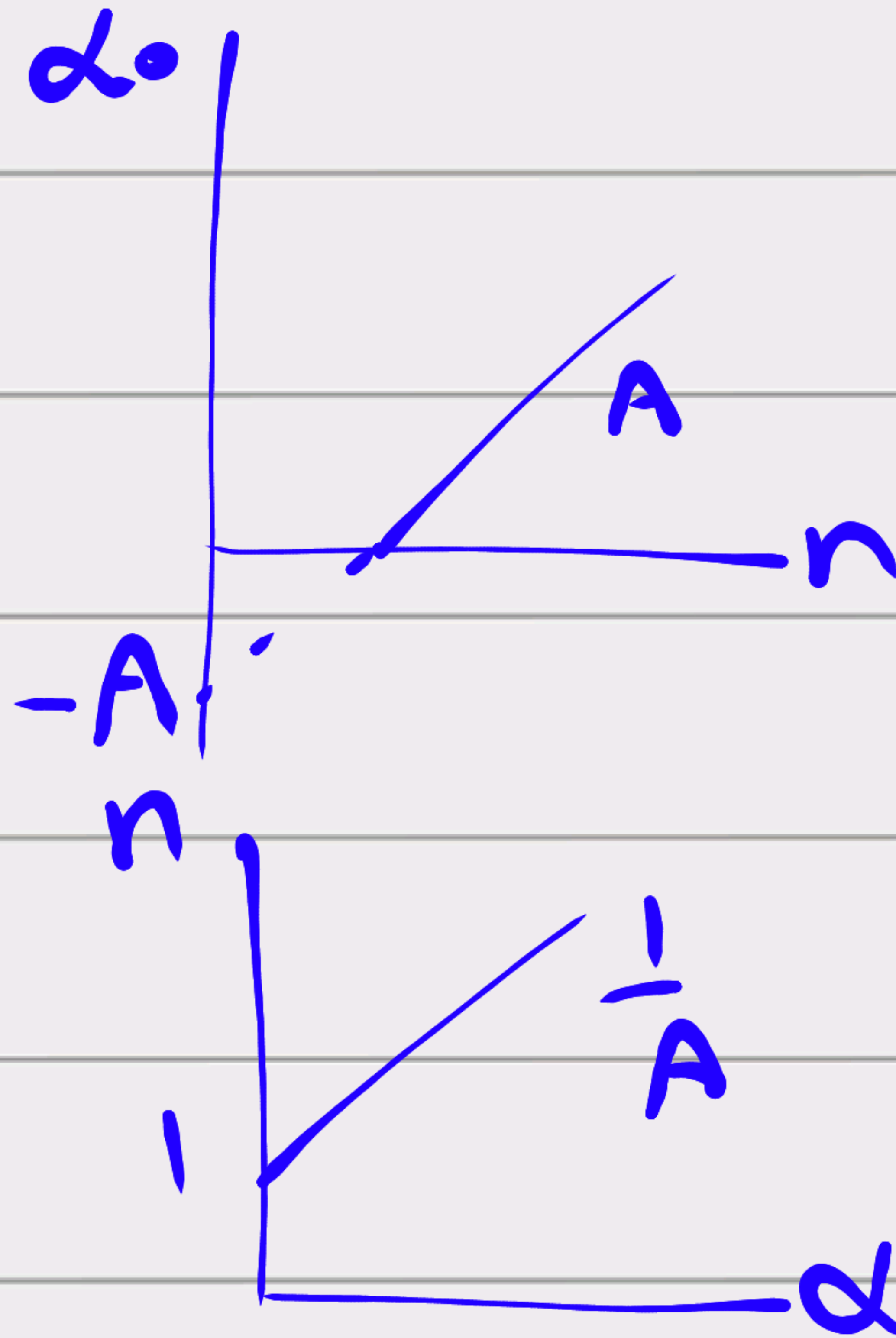
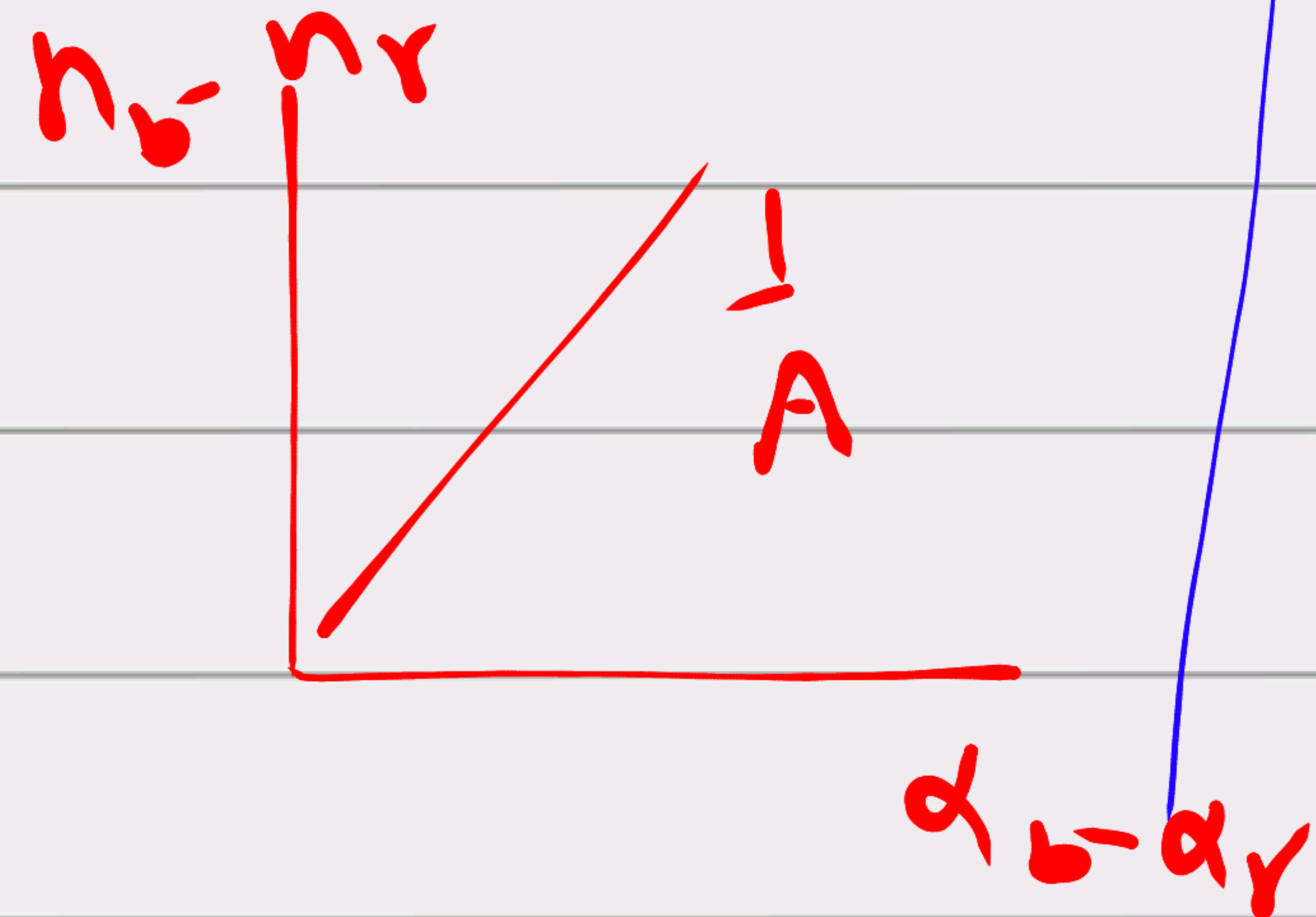


الفيزيائي أحمد رضا

الانفراج الزاوي
المع

$$\alpha_b - \alpha_r =$$

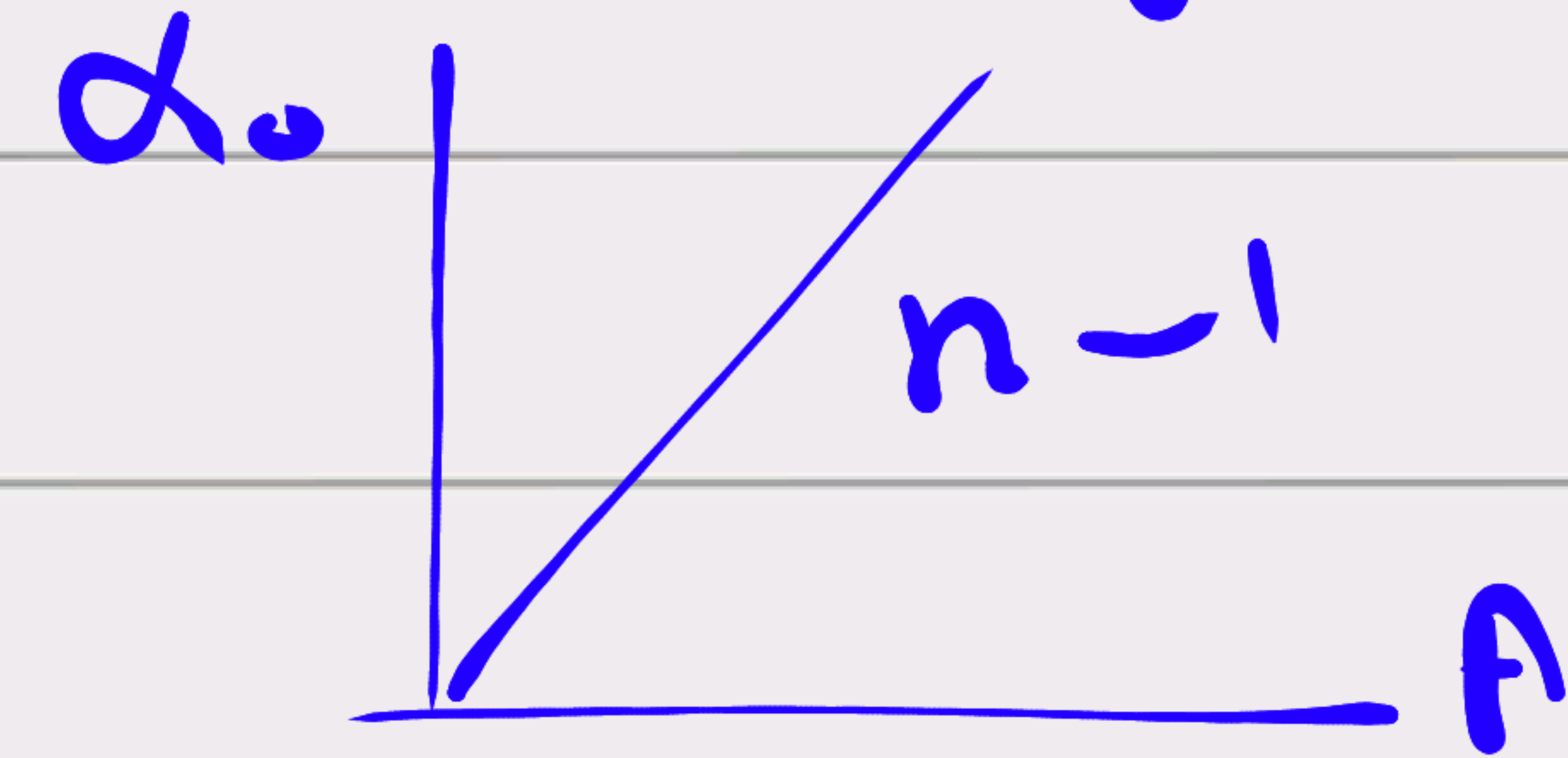
$$A(n_b - n_r)$$



المسود المربع

$$\alpha_0 = A(n - 1)$$

$$\alpha_0 = A\left(\frac{n}{n_v} - 1\right)$$



$$W_{\alpha} = \frac{\alpha_b - \alpha_r}{\alpha_y} = \frac{n_b - n_r}{n_y}$$

$$\alpha_y = \frac{\alpha_b + \alpha_r}{2}$$

$$n_y = \frac{n_b + n_r}{2}$$

$$Q_{V_{OL}} = \frac{V_{OL}}{t} = A \cdot v = \pi r^2 \cdot v = \frac{Q_m}{\rho}$$

$$V_{OL} = Q_{V_{OL}} \cdot t = A \cdot v \cdot t = \pi r^2 \cdot v \cdot t = \frac{Q_m \cdot t}{\rho}$$

$$Q_m = \frac{m}{t} = \frac{\rho \cdot V_{OL}}{t} = \rho \cdot A \cdot v = \rho \cdot \pi r^2 \cdot v = \rho \cdot Q_{V_{OL}}$$

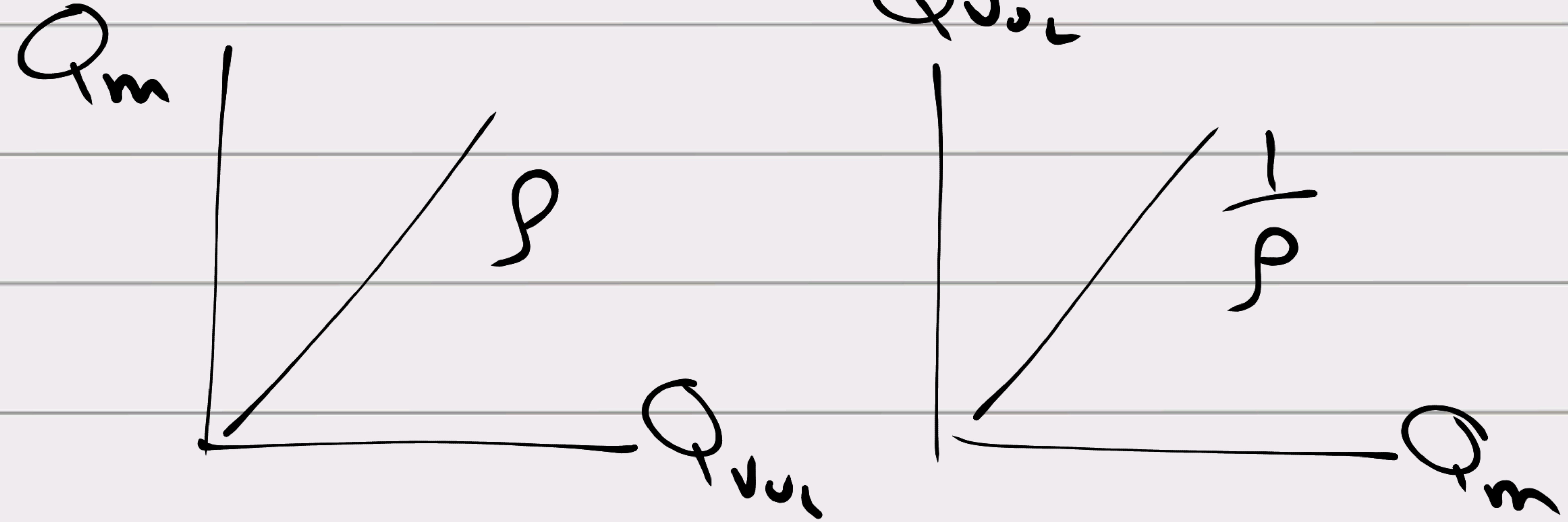
kg/s

$$m = Q_m \cdot t = \rho \cdot V_{OL} = \rho \cdot A \cdot v \cdot t = \rho \cdot \pi r^2 \cdot v \cdot t = \rho \cdot Q_{V_{OL}} \cdot t$$

Diagram showing unit conversion:

$\frac{m^3}{s}$ is converted to $\frac{L}{min}$ using the factor $\times \frac{10^{-3}}{60}$.

$$Q_m = \rho \cdot Q_{\text{دور}} \cdot Q_{\text{دور}}$$



$$A_1 \cdot V_1 = A_2 \cdot V_2 \rightarrow \frac{V_1}{V_2} = \frac{A_2}{A_1}$$

$$r_1^2 \cdot V_1 = r_2^2 \cdot V_2 \rightarrow \frac{V_1}{V_2} = \frac{r_2^2}{r_1^2}$$

$$\frac{r_1}{r_2} = \sqrt{\frac{V_2}{V_1}}$$

قوة مغناطيسية

$$A_{\text{مغناطيسية}} = N A_{\text{مغناطيسية}}$$

$$r^2 \cdot V = N \cdot r^2 \cdot V_1$$

قوة مغناطيسية

$$Q_{\text{مغناطيسية}} = Q_{\text{مغناطيسية}} + Q_{\text{مغناطيسية}} - \dots$$

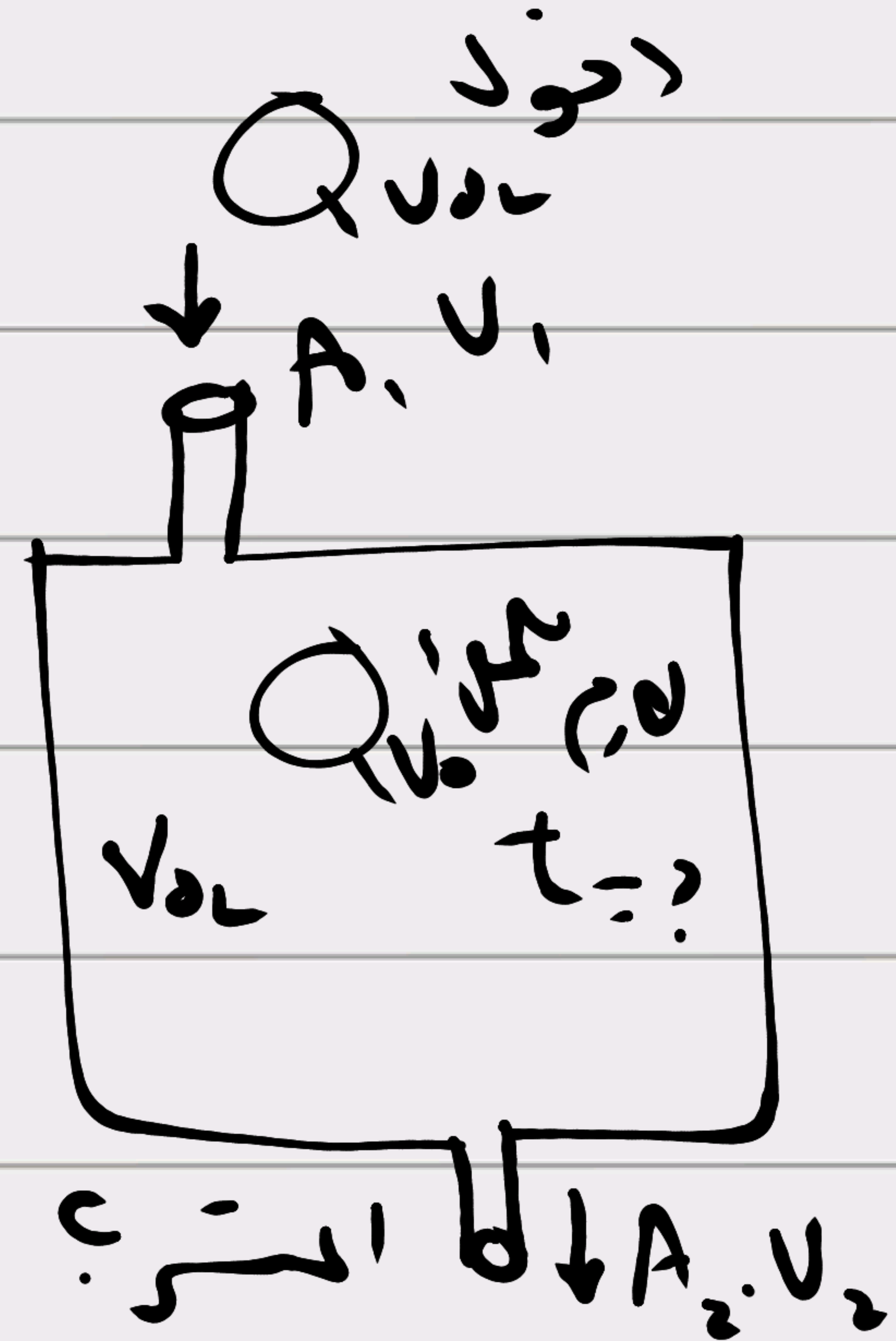
$$A_{\text{مغناطيسية}} = A_{\text{مغناطيسية}} + A_{\text{مغناطيسية}} - \dots$$

$$r^2 \cdot V = r^2 \cdot V_1 + r^2 \cdot V_2 - \dots$$

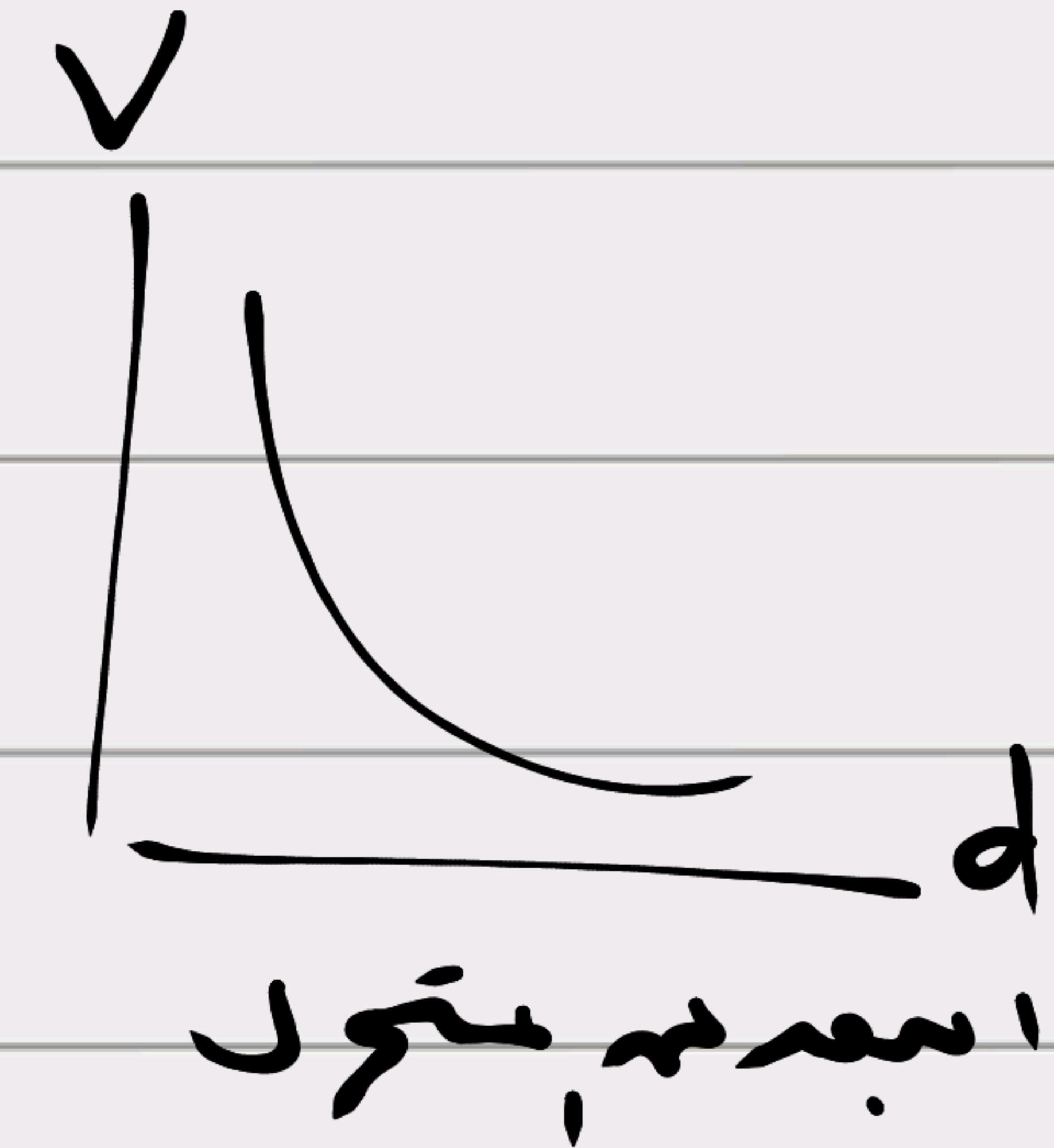
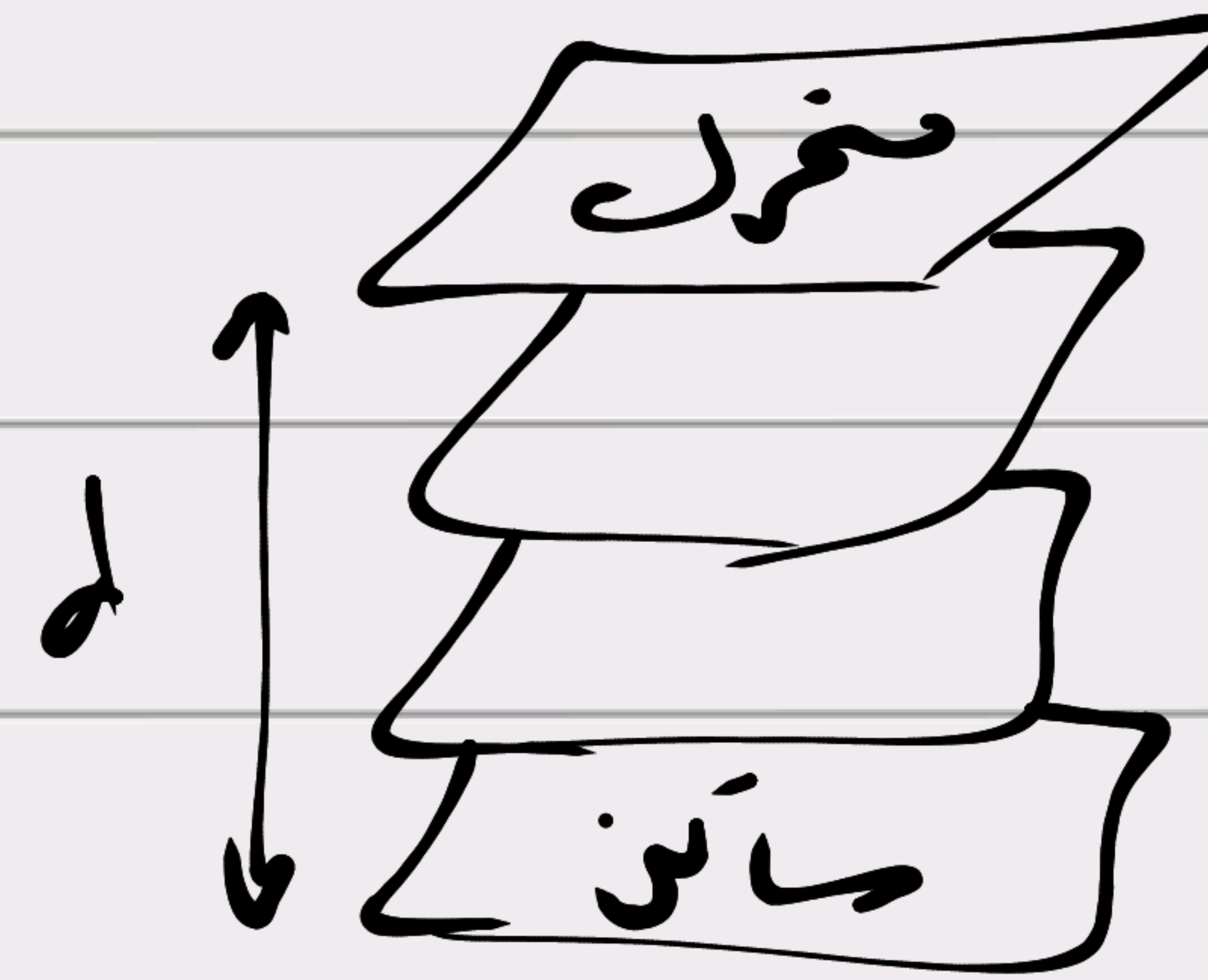
$$\frac{1}{t} = \frac{1}{t_1} + \frac{1}{t_2} + \frac{1}{t_3}$$

فناء $Q_{V_2} = \frac{V_2}{t}$
 الزمن لل
 الخزان

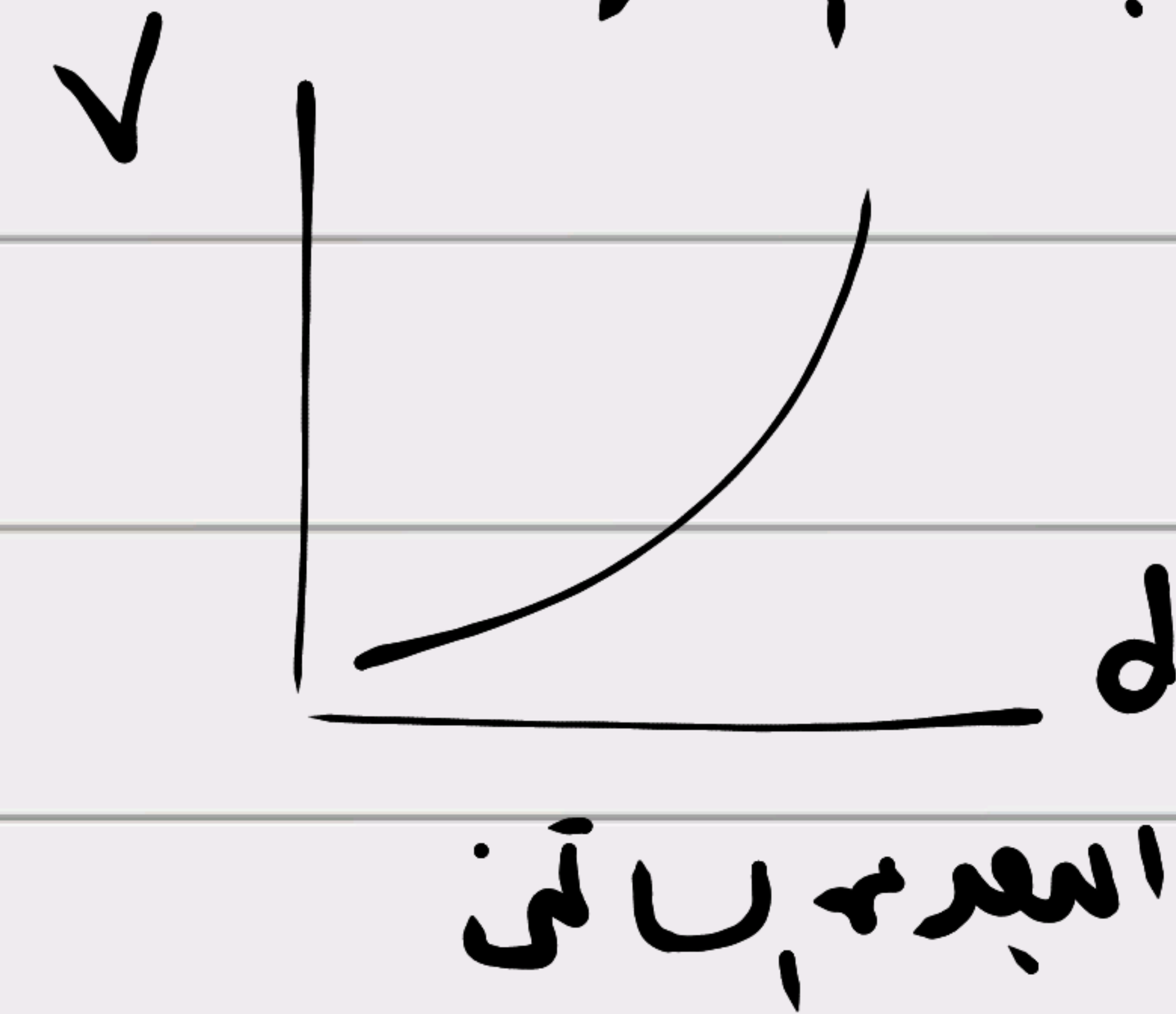
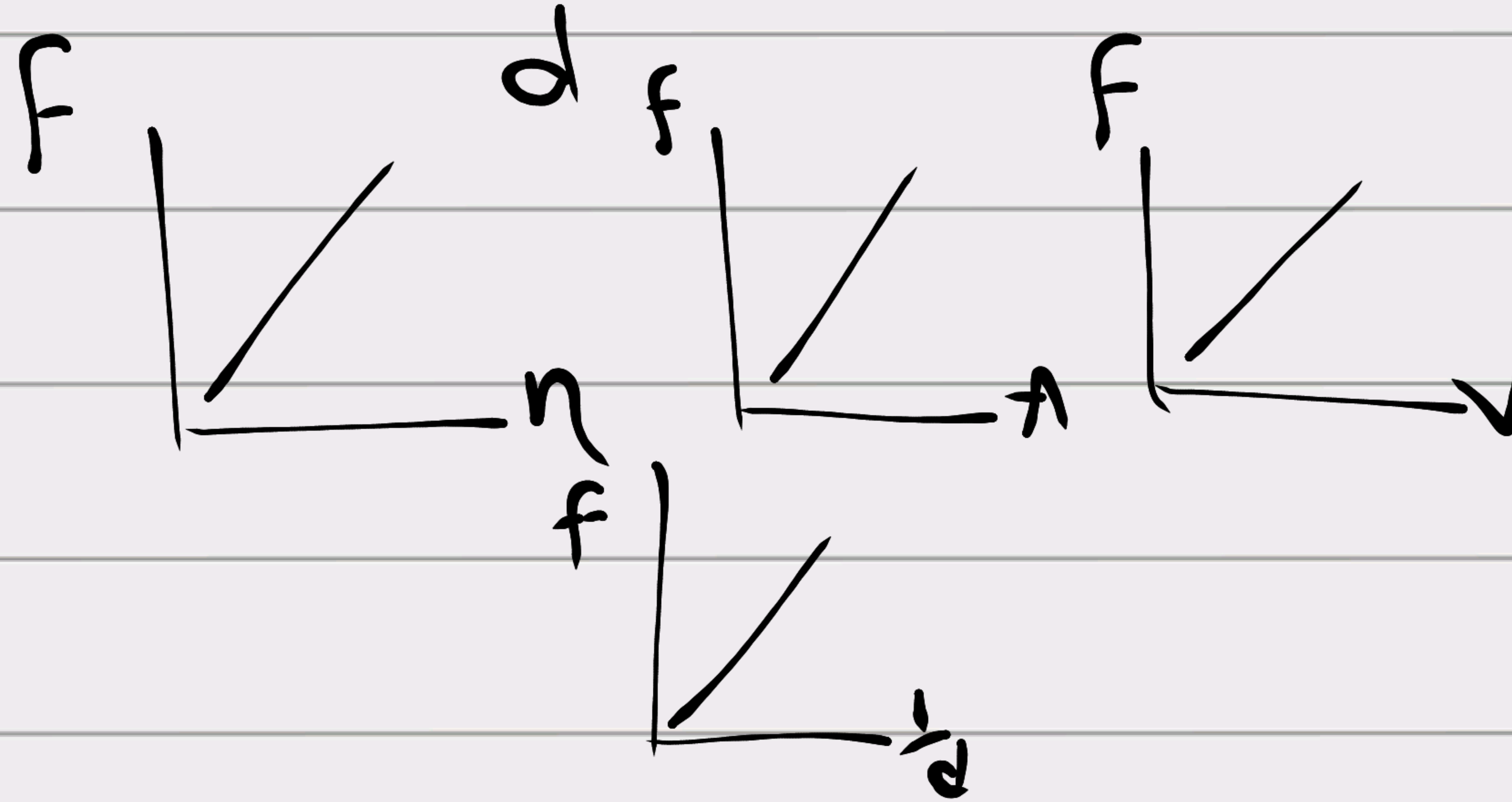
دخول $Q_{V_1} = Q_{V_2} + Q_{V_3}$
 المخرج
 الزمن



$$\eta = \frac{f \cdot d}{A \cdot v}$$



$$F = \frac{\eta \cdot A \cdot v}{d}$$



$$\eta = \frac{f \cdot d}{A \cdot v} = \frac{N \cdot m \cdot s}{m^2 \cdot m}$$

$$N \cdot s/m^2$$

$$N = kg \cdot m/s^2$$

$$\frac{kg \cdot m \cdot s}{s^2 \cdot m^2}$$

$$kg/m \cdot s$$

$$\frac{J \cdot s}{m \cdot m^2}$$

$$J \cdot s/m^3$$

