

$$5. \quad V(t) = \frac{50}{3} \pi \sin\left(\frac{\pi}{3} t\right) \\ a(t) = \frac{50}{9} \pi^2 \cos\left(\frac{\pi}{3} t\right)$$

$$F_{\max} = m(g + a_{\max}) \\ = 2(9.8 + \frac{50}{9} \pi^2) \\ \approx 129 \text{ N}$$

$$E = \frac{1}{2} m \left(\frac{10}{3} \pi\right)^2 \\ \approx 2741 \text{ J}$$

$$6. \quad x(t) = A \cos(\omega t + \varphi)$$

$$V(t) = -A \sin - A \omega \sin(\omega t + \varphi)$$

$$T = \frac{1}{2} m v^2 = \frac{A^2 \omega^2 m \sin^2(\omega t + \varphi)}{2}$$

$$\Pi = \frac{k A^2 \cos^2(\omega t + \varphi)}{2}$$

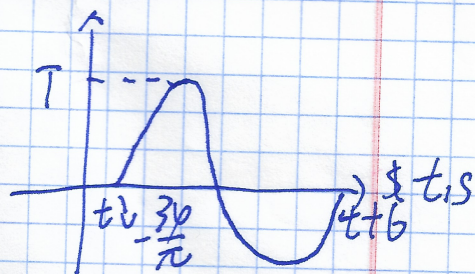
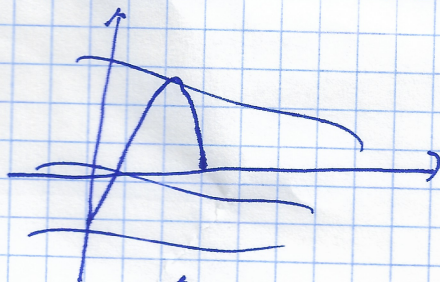
$$\frac{T}{\Pi} = \frac{m \omega^2 \sin^2(\omega t + \varphi)}{k A^2 \cos^2(\omega t + \varphi)} = \frac{\sin^2(\omega t + \varphi)}{\cos^2(\omega t + \varphi)}$$

$$\alpha \quad \varphi = \omega t + \varphi$$

$$\frac{T}{\Pi} = \tan^2 \varphi, \text{ где } \varphi \text{ — фаза}$$

$$7. \quad T = \frac{2\pi}{\omega} \Rightarrow \omega = \frac{2\pi}{T} = \frac{\pi}{3}$$

$$\text{Поэтому } x(t) = A \sin\left(\frac{\pi}{3} t + \varphi\right)$$



$$\text{Когда } x(t) = A$$

$$t_1 = \frac{3}{2} - \frac{3\varphi}{\pi}$$

$$\text{Когда } x(t) = \frac{A}{2}$$

$$t_2 = \frac{1}{2} - \frac{3\varphi}{\pi}$$

$$t_1 - t_2 = 1 \text{ s}$$