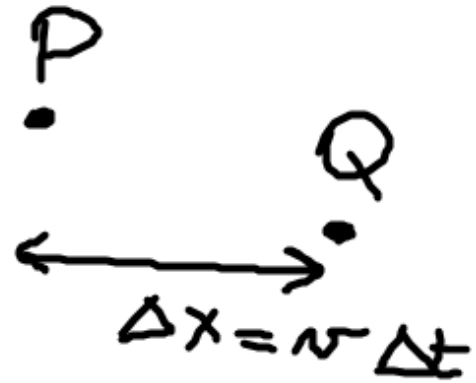
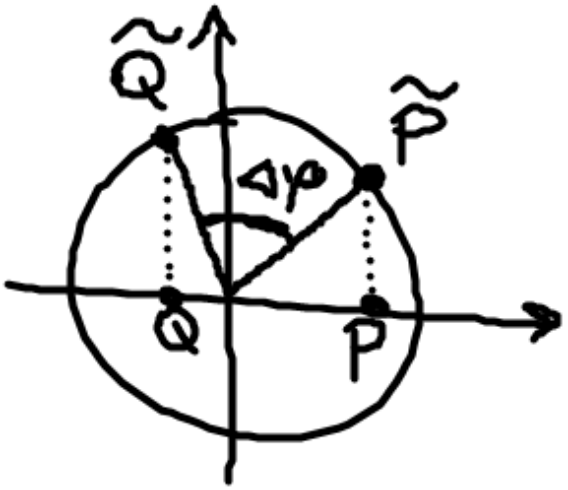
15 | $f = 200\,Hz$ $\quad v = 340\,\frac{m}{s}$

$\Delta\varphi = \frac{\pi}{3}$ $\qquad \Delta x = ?$





$$\omega = \frac{\Delta\varphi}{\Delta t}$$

$$\Downarrow$$

$$\Delta t = \frac{\Delta\varphi}{\omega} = \frac{\Delta\varphi}{2\pi f}$$

$$\Delta x = v\,\frac{\Delta\varphi}{2\pi f} = \left(340\,\frac{m}{s}\right)\frac{\pi/3}{2\pi\cdot 200\,Hz} = 0{,}283\,m$$

$$\Delta t = \frac{\Delta\varphi}{\omega} = \frac{\Delta\varphi}{2\pi\nu}$$

$$\Delta\varphi = 2\pi\nu\,\Delta t = 2\pi\cdot(200\,\mathrm{Hz})\cdot(1{,}0\cdot10^{-3}\,\mathrm{s}) =$$

$$= 1{,}3\,\mathrm{rad}$$

13]

$a = 0{,}21\ m$

$\omega = 10\pi\ \frac{rad}{s}$

$A = 0{,}36\ m$

$\Delta\varphi = ?$

equazione $= ?$

$$A = 2a\cos\left(\frac{\Delta\varphi}{2}\right)$$

$$\Downarrow$$

$$\cos\frac{\Delta\varphi}{2} = \frac{A}{2a}$$

$$\frac{\Delta\varphi}{2} = \arccos\frac{A}{2a}$$

$$\Delta\varphi = 2\arccos\frac{A}{2a}$$

$$\Delta\varphi = 2\arccos\frac{A}{2a} = 2\arccos\frac{0{,}36}{2\cdot 0{,}21} =$$

$$= \boxed{62°} = \frac{62\pi}{180}$$

$$y_1 = a\cos(\omega t + \varphi_1)$$
$$y_2 = a\cos(\omega t + \varphi_2)$$

$$y = 2a\cos\frac{\varphi_2 - \varphi_1}{2}\cos\left(\omega t + \frac{\varphi_1 + \varphi_2}{2}\right)$$

$\Delta\varphi = \varphi_2 - \varphi_1$ IPOTIZZIAMO CHE $\varphi_1 = 0$

$$y = 2a\cos\frac{\varphi_2}{2}\cos\left(\omega t + \frac{\varphi_2}{2}\right)$$

$$y = (0{,}36\ m)\cos\left(10\pi\ \frac{rad}{s}\,t + \frac{31\pi}{180}\right)$$

:2