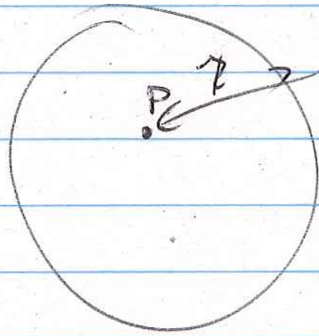
$$I = \frac{P}{4\pi r^2} \quad \text{in units } \frac{W}{m^2}$$



$$\rightarrow I = \frac{P}{4\pi r^2}$$

$$A = 4\pi r^2$$

$$r \rightarrow \frac{1}{10} r \quad (\text{10 times closer})$$

$$r^2 \rightarrow \frac{1}{100} r^2 \Rightarrow I \rightarrow 100\, I \ , \ \text{100x larger intensity}$$

factor 10 $\rightarrow$ 10 dB increase
factor 100 $\rightarrow$ <u>20 dB</u> increase

$$40\,dB \rightarrow 60\,dB$$

$$E = P\Delta t = IA\Delta t = \cancel{4\pi}\left(10^{-8}\frac{W}{m^2}\right)\left(\cancel{4\pi}\,\pi\left(\frac{1cm}{2}\right)^2\right)(60\,s)$$

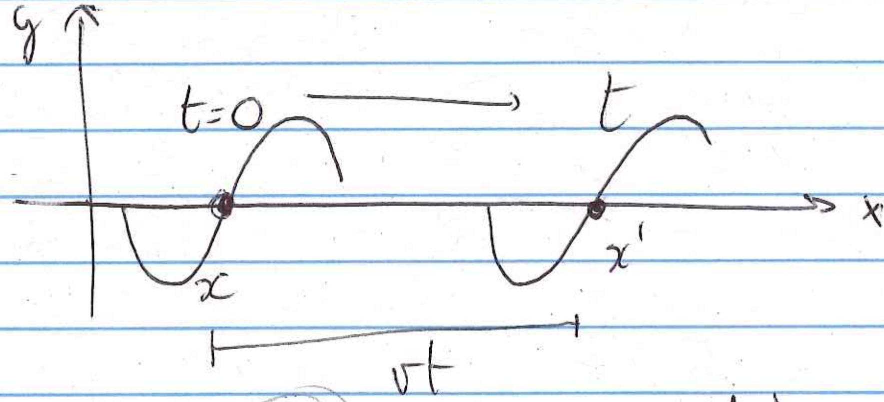
$$= 4.7 \times 10^{-11}\, J$$

$$\log(A \cdot B) = \log A + \log B$$

$$\log\left(\frac{A}{B}\right) = \log A - \log B \qquad {}^{10}\log 10^n = n$$

$$\log A^n = n \log A$$

$$\log A^{-1} = -\log A$$



$y(x,t)$ $\qquad$ $y(x',t)$

$= 0$

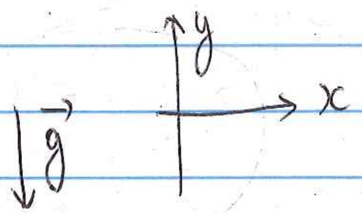
$x - vt = 0$ $\qquad$ $x' - vt$

x $\qquad$ $x' - vt$

$y((x - vt))$ $\qquad$ $y(x - vt)$

$\vec{g} \Rightarrow$ magnitude $= \underline{10 \, m/s^2}$ $(\approx \underline{9.8 \, m/s^2}) = g$
> 0

direction = downwards (to the center of earth)



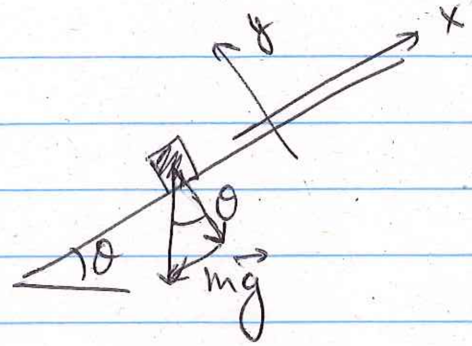
$\vec{g}\,(0, -g)$

$\underline{g} = +9.8 \, m/s^2 \approx +10 \, m/s^2$
scalar, number

$\vec{a} = \vec{g}\,(0, -g)$

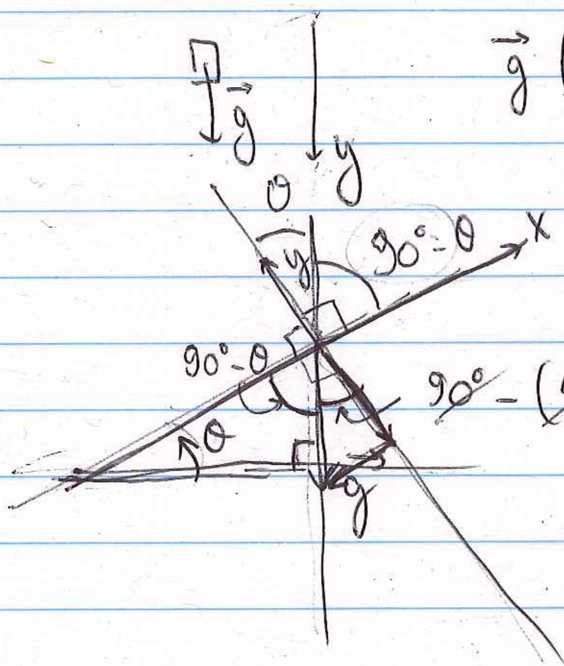
$|\vec{g}| = g > 0$ $\qquad$ $a_y = -g$

$$y = y_0 + v_{0,y} t + \frac{1}{2} a_y t^2 = y_0 + v_{0,y} t + \frac{1}{2}(-g) t^2$$



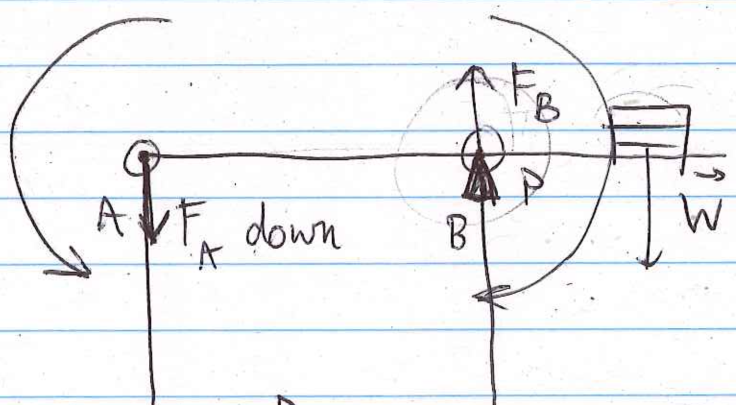
$$\vec{a} = \vec{g}\,(-g\sin\theta, -g\cos\theta)$$

$+9.8\ m/s^2$



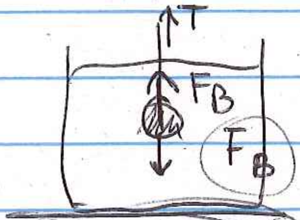
$$\vec{g}\,(0, g) = (0, +9.8\ m/s^2)$$

$$\cancel{90^\circ} - (\cancel{90^\circ} - \theta) = \theta$$



$$\tau^{P}_{net} = 0 = \underset{\text{negative}}{\tau_W} + \underset{\text{positive}}{\tau_A}$$

$$F_{net} = 0 = \underset{\text{negative}}{F_A} + \underset{\text{negative}}{W} + \underset{\text{positive}}{F_B}$$



$\Delta m = 0.054 kg$

displaced liquid

$$F_B = \rho_{H_2O} V g \rightarrow \Delta m = \rho_{H_2O} V$$

$$V = \frac{\Delta m}{\rho_{H_2O}} = \frac{0.054}{\cancel{1000}\; 10^3}$$

$$= 5.4 \times 10^{-5} m^3$$

$$\vec{F}_{net} = 0 = \vec{F}_B + \vec{T} + \vec{W}$$

positive positive negative

$$\rho_{H_2O} V g + T - \underset{\rho_{Al} V}{\underset{\|}{m}} g = 0$$

$$T = \rho_{Al} V g - \rho_{H_2O} V g = 0.9 N$$

$$\sqrt{\frac{g}{l}} : \text{units}: \sqrt{\frac{m/s^2}{m}} = \sqrt{\frac{1}{s^2}} = \frac{1}{s}$$

ω in units $\frac{rad}{s}$

T in units s