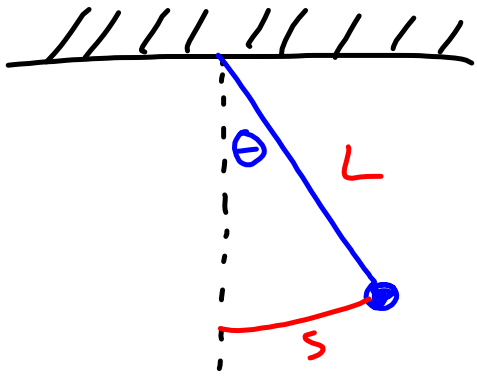


$$\theta = \frac{s}{L}$$

$$\frac{d^2\theta}{dt^2} = -a_g\theta$$

$$\theta(t) = \theta_{max}\cos(\omega t + \varphi)$$

$$\dot{\theta}(t) = -\theta_{max}\,\omega\sin(\omega t + \varphi)$$

$$\ddot{\theta}(t) = -\theta_{max}\,\omega^2\cos(\omega t + \varphi)$$

derivative with respect to time

$$\omega = 2\pi f$$

$$\omega = \sqrt{\frac{g}{L}}$$

angular frequency

$$f = \frac{1}{2\pi}\sqrt{\frac{g}{L}}$$

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

1) $v(t) = -\theta_{max}\,\omega \sin(\omega t + \varphi)$ 1

A

$v = -\theta_{max}\sqrt{\frac{g}{L}}$ $\qquad \omega = \sqrt{\frac{g}{L}}$

A

$\theta_{max} \cdot v\sqrt{\frac{L}{g}}$ $\qquad v = 0.25\ m/s$

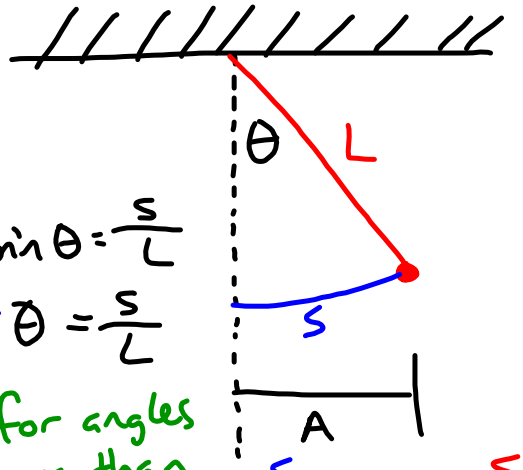
$L = 0.3\ m$

$A = (0.25\ m/s)\sqrt{\frac{0.3\ m}{9.8\ m/s^2}}$

$= 0.0437\ m$

$A = s_{max} = \theta_{max} L$

$\theta_{max} = \frac{s_{max}}{L} = \frac{0.0437\ m}{0.3\ m} = 0.146\ rad$



$\sin\theta = \frac{s}{L}$

$\theta = \frac{s}{L}$

for angles less than 10°

$s(t) = A\cos(\omega t + \varphi)$

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

$a(t) = -A\omega^2\cos(\omega t + \varphi)$

$s = A = \theta L$

$s_{max} = A = \theta_{max} L$

$v_{max} = A\omega = A\sqrt{\frac{g}{L}} = \theta_{max} L\sqrt{\frac{g}{L}}$

$a_{max} = A\omega^2 = \frac{Ag}{L} = \theta_{max} g$