HW D $T = 0.45\,s$

f : frequency

ω : angular frequency

$\omega = 2\pi f$

we won't use this

- Don't write $0.3\overline{3}$ T infinite significant digits

- use 2 or 3 sigdigs in your final answer

- keep more sigdigs while you're calculating to avoid rounding errors

$$\frac{1}{3} \times 4.5$$

$0.3 \times 4.5 = 1.35 \rightarrow 1.4$

$0.33 \times 4.5 = 1.485 \rightarrow 1.5$

$0.333 \times 4.5 = 1.4985 \rightarrow 1.5$

$$\frac{4.5}{3} = 1.5$$

HW 2)

Oscillator has $f = 3\,Hz$ ($\frac{cyc}{s}$)

How long (time) does it take to complete 8 cycles?

$$3\,\frac{cyc}{s} \times \frac{1}{8\,cyc} = \frac{3}{8}/s$$

Systematic approach

$$= \frac{3}{8s} \quad \frac{8s}{3}$$

$f = 3\,Hz = 3\,cyc/s$

$N = 8\,cyc$

$t = ?\ s$

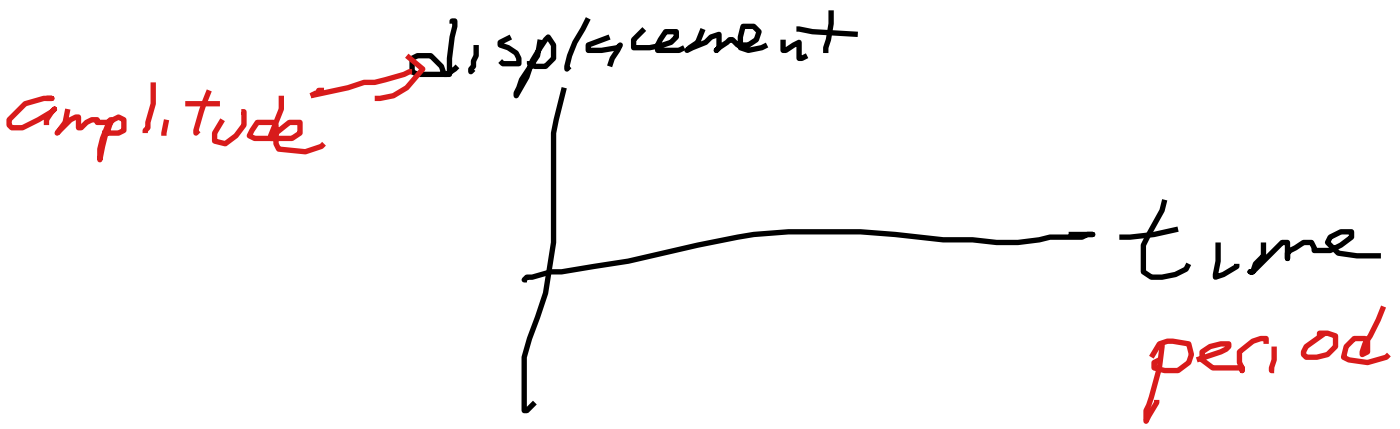
$$= \frac{8}{3}\,s$$

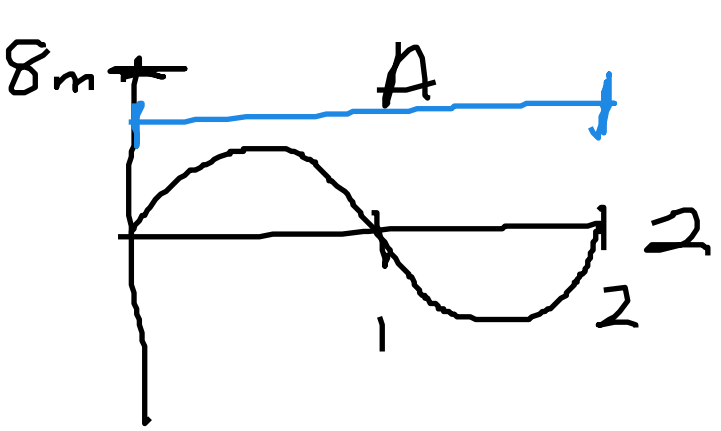
$$= 2.67\,s$$

Hw 3)

History graphs

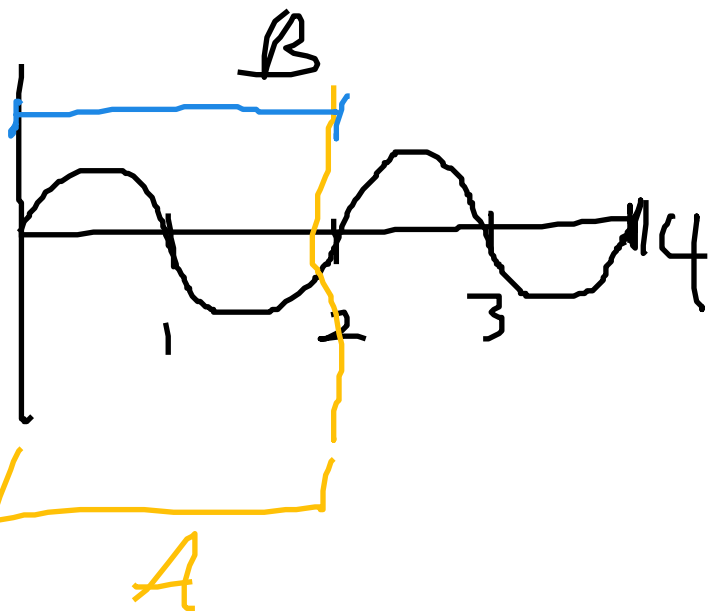
For Φ₀ see textbook





1 cycle in 2 seconds

$T = \frac{2s}{1cyc} = 2\,s/cyc$



2 cycles in 4 seconds

$T = \frac{4s}{2cyc} = 2\,s/cyc$

hw 4)

$$y(t) = A\cos(2\pi f t + \phi_0)$$

$$y(t) = 2\cos(3t + 4)$$

$A = 2$

$\phi_0 = 4$

$2\pi f = 3$

$\rightarrow f = \frac{3}{2\pi} = 0.48\,Hz$

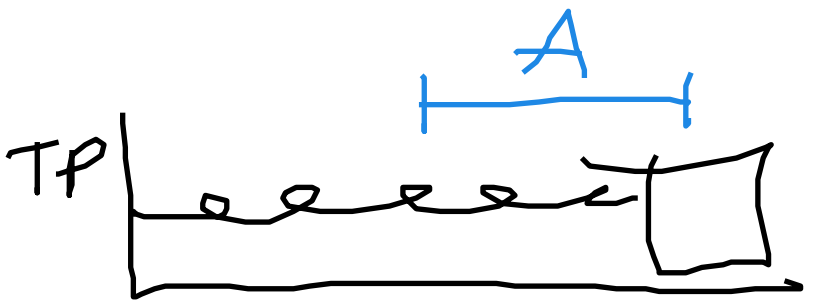
4c) equilibrium point: $y = 0$

eq. $A\cos(2\pi f t + \phi_0) = 0$

$\cos\theta = 0 : \theta = \frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{2}, \ldots$

$\sin\theta = 0 : 0, \pi, 2\pi, 3\pi, \ldots$

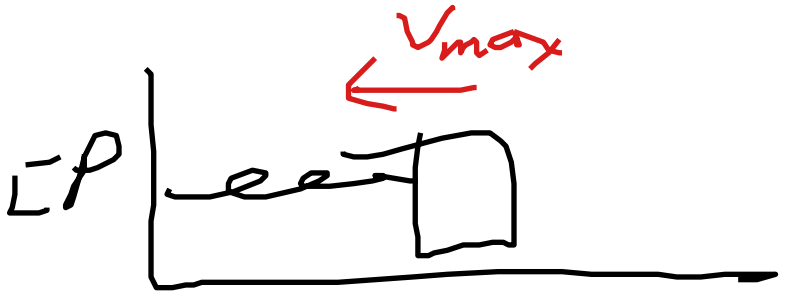
Energy of Block on Spring



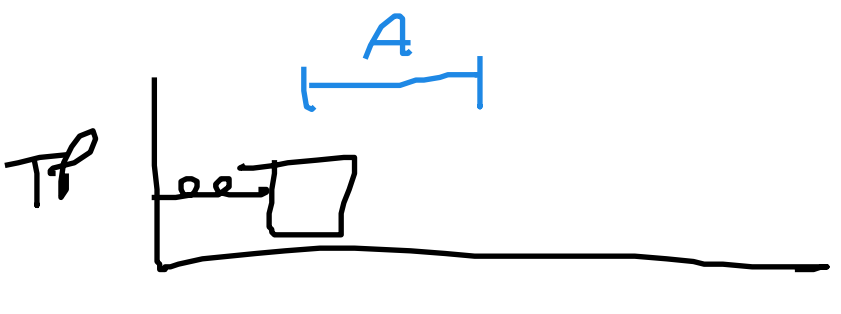
Spring PE

$\frac{1}{2}kA^2$

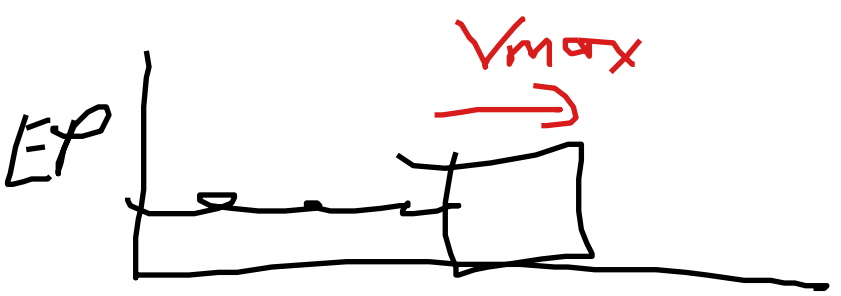
Kinetic energy



$\frac{1}{2}mV_{max}^2$



$\frac{1}{2}kA^2$



$\frac{1}{2}mV_{max}^2$

IF No energy loss,

$E_{tot} = KE + PE = \frac{1}{2}mv^2 + \frac{1}{2}ky^2$

E_{tot} stays the same

$$E_{tot} = \frac{1}{2}kA^2 = \frac{1}{2}mv_{max}^2$$

↑

energy in an oscillator is proportional to its amplitude squared