① Isolated oscillating system along x-axis

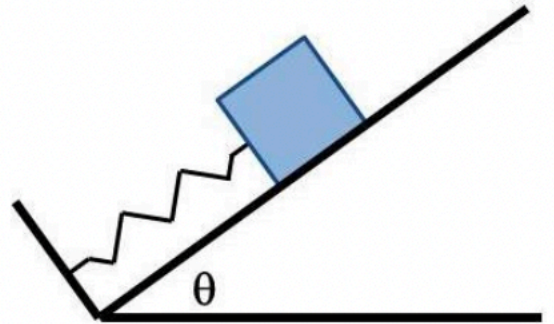$$E = (3 kg) \cdot v_x^2 + \left(12 \frac{J}{m^2}\right) x^2$$

What is the angular frequency?

Solution: (Solved by everyone on their own).

(1) A 7.5 kg block is attached to a horizontally-mounted spring with a spring constant of 750 J/m². The block is released from rest with the spring extended by 15 cm from its normal length of 27 cm. The horizontal surface along which the block moves is frictionless. How long (in s) will it take this system to complete one full oscillation?

(2) A simple harmonic oscillator is created by attaching a spring with a spring constant of 8 J/m² to a 2 kg mass as shown in the figure. The angle of the ramp is $\theta = 55°$ and the surface of the ramp is frictionless. What is the angular frequency (in rad/s) of oscillations of this system?

② $\omega = \sqrt{\dfrac{k}{m}}$ and $\omega = 2\pi f = 2\pi \dfrac{1}{T}$

$\Rightarrow T = \dfrac{2\pi}{\omega} = \dfrac{2\pi}{\sqrt{\dfrac{k}{m}}} = \dfrac{2\pi}{\sqrt{\dfrac{75}{750}}} = \dfrac{2\pi}{10}$

$\approx 0.63 s$

③ $\omega = \sqrt{\dfrac{k}{m}} = \sqrt{\dfrac{8}{2}} = \sqrt{4} = 2$