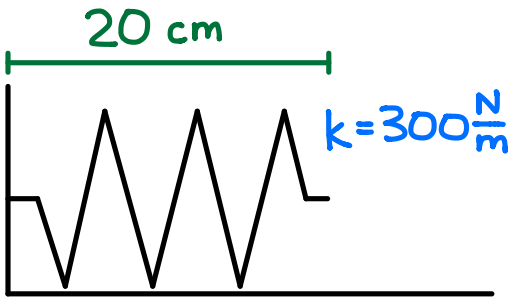
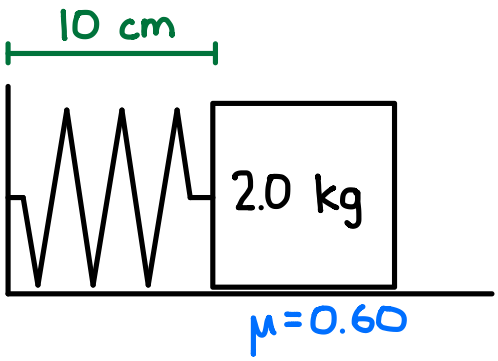
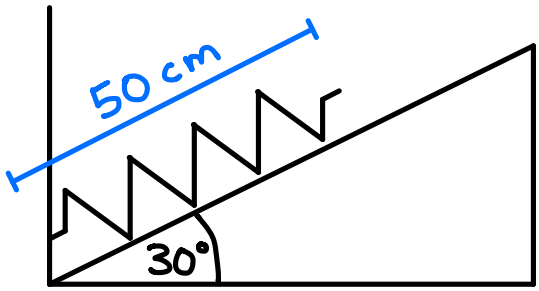
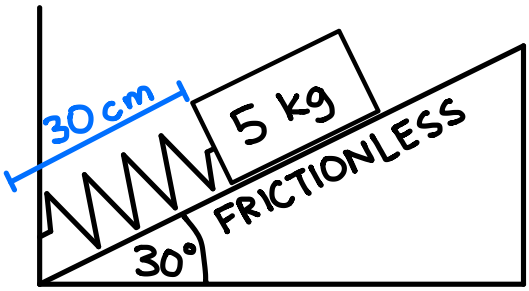
A spring is attached to a wall. A 2.0 kg block is pressed against the spring. Determine the acceleration of the block immediately after it is released.



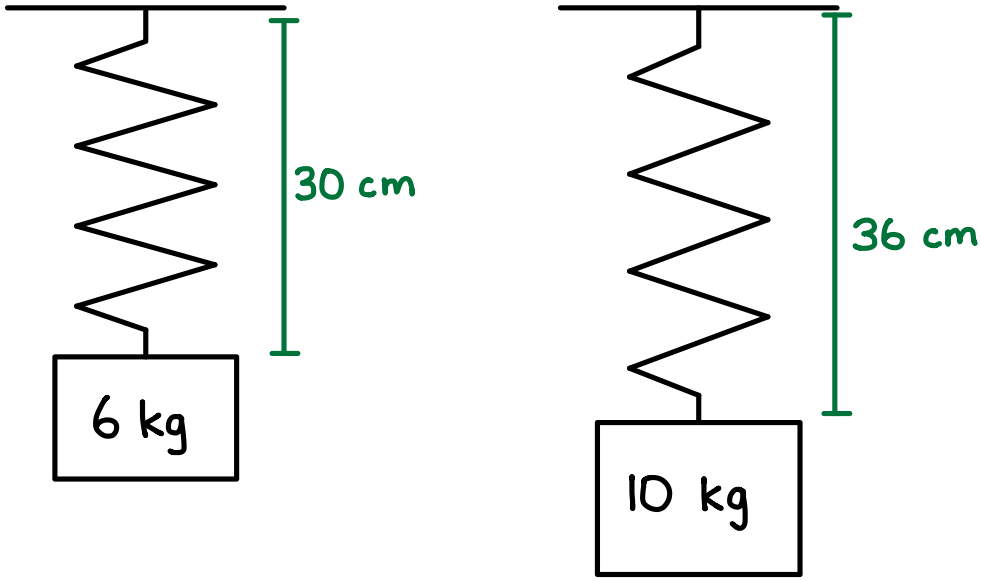


A spring is attached to a wall. When a 5 kg block is placed on the slope, the block remains at rest in the position shown. Determine the spring constant of the spring.

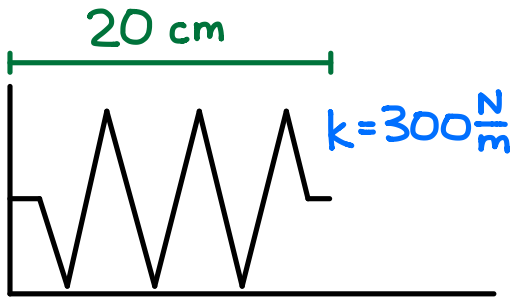


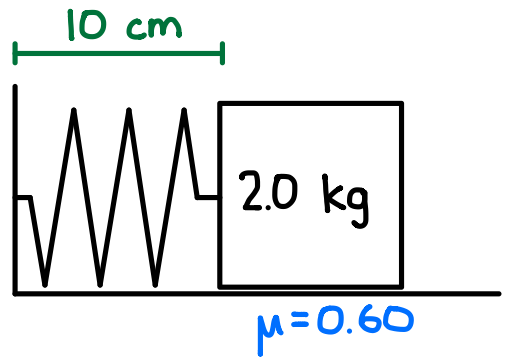


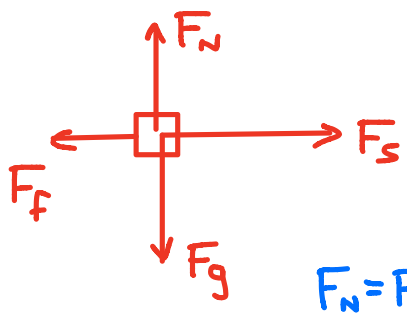
A spring has a length of 30 cm when a 6 kg object hangs from the bottom. When a 10 kg object hangs from the spring, it has a length of 36 cm. Determine the spring constant and the length in equilibrium.



A spring is attached to a wall. A 2.0 kg block is pressed against the spring. Determine the acceleration of the block immediately after it is released.



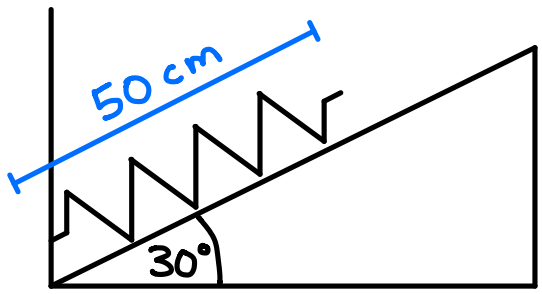


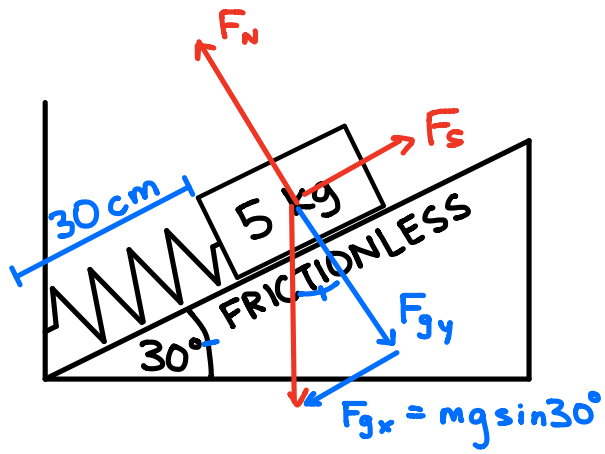


$F_N = F_g$
$= mg$

$$F_{NET} = ma$$
$$F_s - F_f = ma$$
$$k\Delta x - \mu F_N = ma$$
$$k\Delta x - \mu mg = ma$$
$$a = \frac{k\Delta x - \mu mg}{m}$$
$$= \frac{300(0.2-0.1) - (0.60)(2.0)(9.8)}{2.0}$$
$$= \boxed{9.12\ \frac{m}{s^2}\ \text{RIGHT}}$$

A spring is attached to a wall. When a 5 kg block is placed on the slope, the block remains at rest in the position shown. Determine the spring constant of the spring.





$$F_{gx} = F_s$$

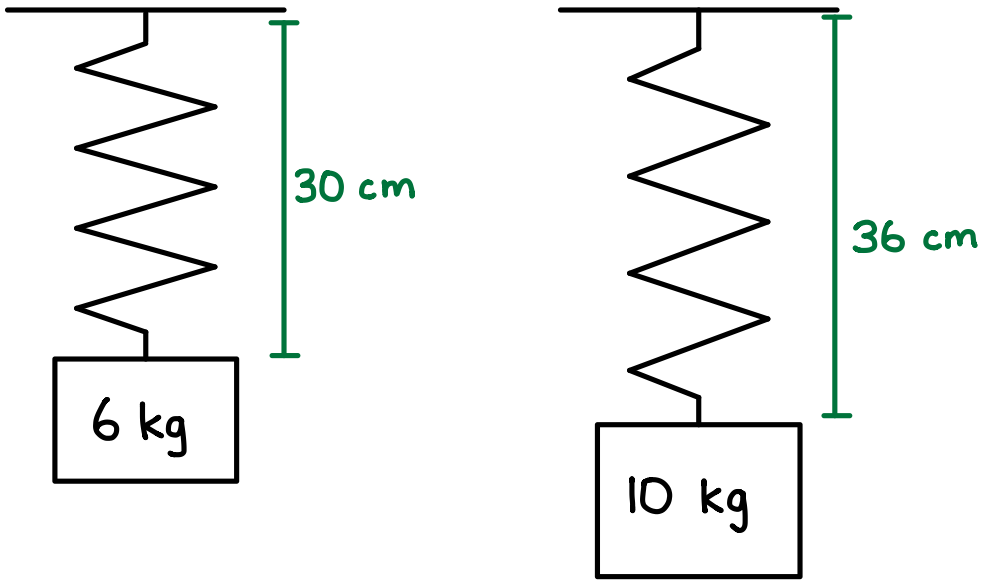
$$mg\sin 30° = k\Delta x$$

$$k = \frac{mg\sin 30°}{\Delta x}$$

$$= \frac{(5)(9.8)\sin 30°}{0.5-0.3}$$

$$= \boxed{123\ \frac{N}{m}}$$

A spring has a length of 30 cm when a 6 kg object hangs from the bottom. When a 10 kg object hangs from the spring, it has a length of 36 cm. Determine the spring constant and the length in equilibrium.



$$F_s = F_g$$
$$k\Delta x = mg$$
$$k(x - x_0) = mg$$
$$kx - kx_0 = mg$$
$$k(0.30) - kx_0 = 6g$$

$$F_s = F_g$$
$$k\Delta x = mg$$
$$k(x - x_0) = mg$$
$$kx - kx_0 = mg$$
$$k(0.36) - kx_0 = 10g$$

$$k(0.36) - kx_0 = 10g$$
$$-\left(k(0.30) - kx_0 = 6g\right)$$
$$0.06k = 4g$$
$$k = \boxed{653\,\tfrac{N}{m}}$$

$$kx - kx_0 = mg$$
$$x_0 = x - \frac{mg}{k}$$
$$= 0.30 - \frac{(6)(9.8)}{653} = \boxed{0.21\,m}$$