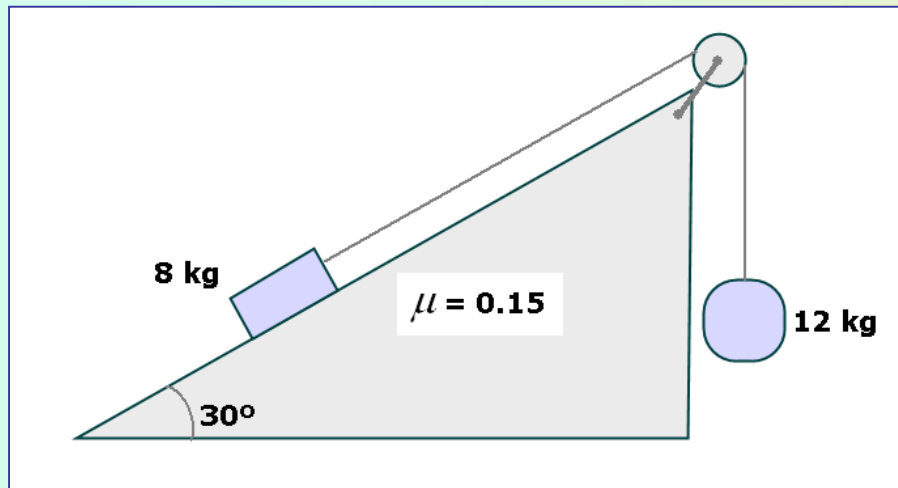


Inclined plane: exercise

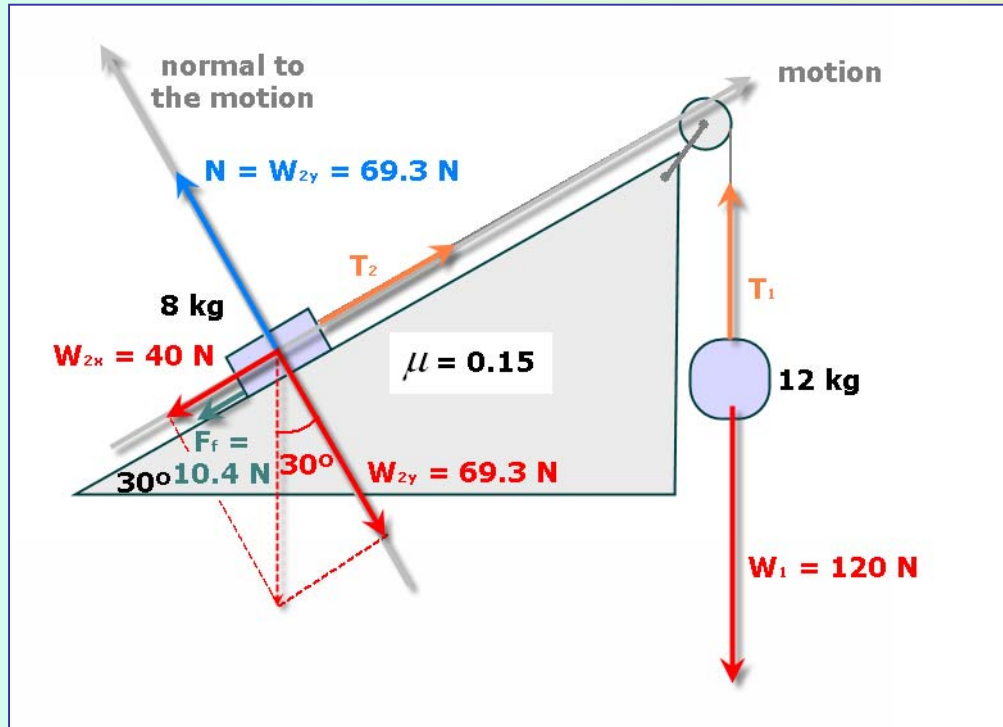
Exercise

In this picture, calculate

- the acceleration of the system
- the value of the tensions



Inclined plane: exercise



Determination of the forces along the normal axis:

$$F_{\text{net (normal)}} = 0 = N - W_{2y}$$

$$N = W_{2y} = W_2 * \cos 30^\circ =$$

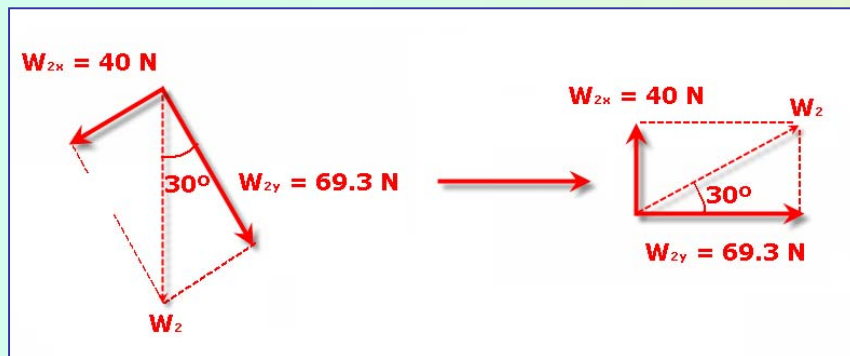
$$= 80\text{ N} * \cos 30^\circ = 69.3\text{ N}$$

Determination of the forces along the axis of motion:

$$W_{2x} = W_2 * \sin 30^\circ = 80\text{ N} * \sin 30^\circ = 40\text{ N}$$

$$F_f = \mu * N = 0.15 * 69.3\text{ N} = 10.4\text{ N}$$

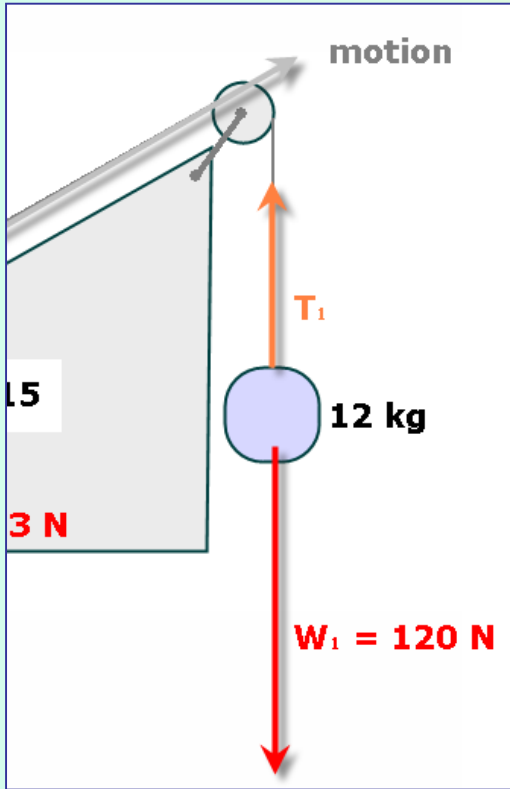
Determination of the acceleration of the system (applying Newton's 2nd law to the whole system):



$$F_{\text{net}} = 120\text{ N} - T_1 + T_2 - 40\text{ N} - 10.4\text{ N} = 20\text{ kg} * a$$

$$a = \frac{69.6\text{ N}}{20\text{ kg}} = 3.48 \frac{\text{m}}{\text{s}^2}$$

Inclined plane: exercise



Determination of the tensions
(applying Newton's 2nd law to an
isolated body):

$$F_{\text{net}} = 120 \text{ N} - T_1 = 12 \text{ kg} * 3.48 \frac{\text{m}}{\text{s}^2} = 41.8 \text{ N}$$

$$T_1 = T_2 = 78.2 \text{ N}$$