

How much power does Billy use pulling a 45 kg box across the floor 13 m using 250 N directed along a rope that makes an angle of 36° if it takes 1.5 minutes?

How much power does Billy use pulling a 45 kg box across the floor 13 m using 250 N directed along a rope that makes an angle of 36° if it takes 1.5 minutes?

$$P = W/t = [\cos 36(250\text{N})13\text{m}]/90. \text{ s}$$

$$P = 29\text{W}$$

How much work does gravity do moving a 45 kg box down a 9.0 m ramp that's at a 22° angle?

How much work does gravity do moving a 45 kg box down a 9.0 m ramp that's at a 22° angle?

$$W = \sin 22(45\text{kg})g(9.0 \text{ m}) = 1500 \text{ N}$$

A 77% efficient winch (lever) operates a 66% efficient lever that lifts a 2200 kg crate. What velocity does it lift at if 6.33 kW of power is delivered to the winch?

A 77% efficient winch (lever) operates a 66% efficient lever that lifts a 2200 kg crate. What velocity does it lift at if 6.33 kW of power is delivered to the winch?

$$E_1 = 77\%$$

$$E_2 = 66\%$$

$$P = Fv$$

$$E_T = 51\%$$

$$v = P/t = 3230 \text{ W}/22000 \text{ N}$$

$$m_r = 2200 \text{ kg}$$

$$v = .15 \text{ m/s}$$

$$22000 \text{ N}$$

$$P = 6.33 \text{ kW}$$

$$P_u = 3.23 \text{ kW}$$

$$v = ?$$

A ramp is 7.7 m long and 2.7 m high.

- a) What force is needed to slide a 33 kg box up the ramp?
- b) What force is needed to slide a 33 kg box up the ramp if its efficiency is 77%?

A ramp is 7.7 m long and 2.7 m high.

- a) What force is needed to slide a 33 kg box up the ramp?
- b) What force is needed to slide a 33 kg box up the ramp if its efficiency is 77%?

$$Eff = \frac{W_o}{W_i} \times 100 \quad \begin{matrix} Eff = Frdr/Fede \\ Fe = Frdr/Eff(de) = 320N(2.7m)/1(7.7m) = 112N \end{matrix}$$

$$Eff = \frac{W_o}{W_i} \times 100 \quad \begin{matrix} Eff = Frdr/Fede \\ Fe = Frdr/Eff(de) = 320N(2.7m)/.77(7.7m) = 145N \end{matrix}$$

