1. How much work must be done to stop a 1000 kg car traveling at 110 km/h?

\[ W = \Delta KE = \frac{1}{2}mv^2 - \frac{1}{2}mv_0^2 = 0 - \frac{1}{2}(1000 \text{ kg})(110 \text{ km/h})(3600 \text{ s/h})^2 = -4.67 \times 10^5 \text{ J}. \]

1. a) Find the force required to give a helicopter of mass M an acceleration of 0.10g upward.

\[ \Sigma F_y = ma_y; \]
\[ F - Mg = Ma \rightarrow F = M(a + g) = 1.10Mg \]

b) Find the work done by this force as the helicopter moves a distance h upward.

\[ W_F = Fh \cos 0^\circ = 1.10Mgh \]

2. What is the minimum work needed to push a 1000 kg car 300 m up a 17.5-degree incline?

\[ \text{y-component: } F_N - mg \cos \theta = 0; \]
\[ \text{x-component: } F_{\text{min}} - mg \sin \theta = 0. \]

For a distance d along the incline, we have

\[ W_{\text{min}} = F_{\text{min}}d \cos 0^\circ - mgdsin \theta \]
\[ = (1000 \text{ kg})(9.8 \text{ m/s}^2)(300 \text{ m}) \sin 17.5^\circ = 8.8 \times 10^5 \text{ J}. \]