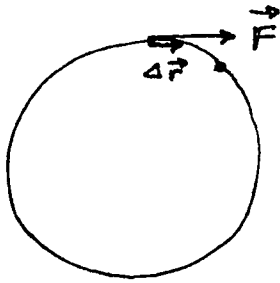


Problem 8-40



During any small time interval as the donkey walks, the force \vec{F} exerted by the donkey is in the same direction as the displacement $\Delta\vec{r}$.

$$\begin{aligned} \therefore \text{Work done} = W &= F \Delta r \cos \theta \\ &= F \Delta r \quad (\because \theta = 0) \end{aligned}$$

Consider a time of 1 s.

$$\begin{aligned} \Delta r &= v \Delta t = \left(3 \frac{\text{km}}{\text{h}} \times \frac{1 \text{h}}{3600 \text{s}} \times \frac{1000 \text{m}}{1 \text{km}} \right) 1 \text{s} \\ &= 0.8333 \text{ m} \end{aligned}$$

The work done becomes grav. P.E. of the water.

$$\therefore F \Delta r = mgy$$

$$\therefore F (0.8333 \text{ m}) = (100 \text{ kg})(9.80 \text{ m/s}^2)(2.00 \text{ m})$$

$$\therefore F = 2.35 \times 10^3 \text{ N}$$