

48. Eq. 4-32 describes an inverse proportionality between r and a , so that a large acceleration results from a small radius. Thus, an upper limit for a corresponds to a lower limit for r .

(a) The minimum turning radius of the train is given by

$$r_{\min} = \frac{v^2}{a_{\max}} = \frac{(216 \text{ km/h})^2}{(0.050)(9.8 \text{ m/s}^2)} = 7.3 \times 10^3 \text{ m}.$$

(b) The speed of the train must be reduced to no more than

$$v = \sqrt{a_{\max} r} = \sqrt{0.050(9.8)(1.00 \times 10^3)} = 22 \text{ m/s}$$

which is roughly 80 km/h.