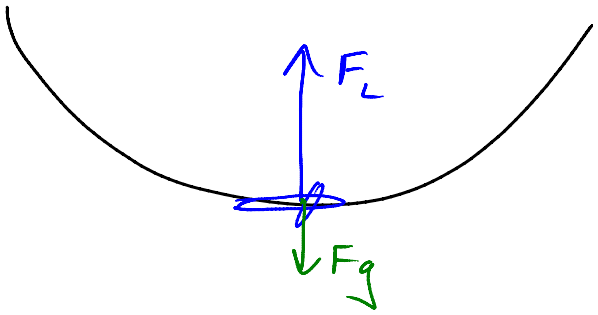


$$v = 840\,\text{km/h} \times \frac{1\,\text{h}}{3600\,\text{s}} \times \frac{1000\,\text{m}}{1\,\text{km}}$$

$$= 233.33\,\text{m/s}$$

$$a_{max} = 6g's \times \frac{9.8\,\text{m/s}^2}{g}$$

$$= 58.8\,\text{m/s}^2$$

$$\frac{r}{a_c} \times a_c = \frac{v^2}{r} \times \frac{r}{a_c}$$

a) $$r = \frac{v^2}{a_c} = \frac{(233.33\,\text{m/s})^2}{58.8\,\text{m/s}^2} = 925.90$$

$$\approx 930\,\text{m}$$

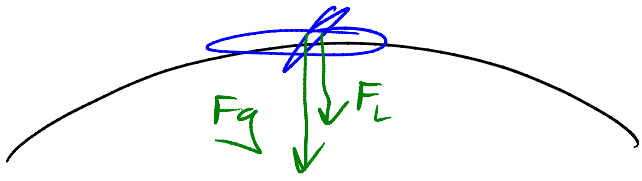
b) $$F_L - F_g = ma_c \quad (+F_g \text{ on both sides})$$

$$F_L = ma_c + F_g = ma_c + mg$$

$$= m(a_c + g) = (78\,\text{kg})(58.8\,\text{m/s}^2 + 9.8\,\text{m/s}^2)$$

$$= 5400\,\text{N}$$

c)



$$F_g + F_L = ma_c$$

$$mg + F_L = \frac{mv^2}{r} \quad (-mg \text{ on both sides})$$

$$F_L = \frac{mv^2}{r} - mg$$

$$F_L = \frac{mv^2}{r} - mg$$

$$= m\left(\frac{v^2}{r} - g\right)$$

$$= (78\,kg)\left(\frac{(233.33\,m/s)^2}{925.90\,m} - 9.8\,m/s^2\right)$$

$$= 3800\,N$$