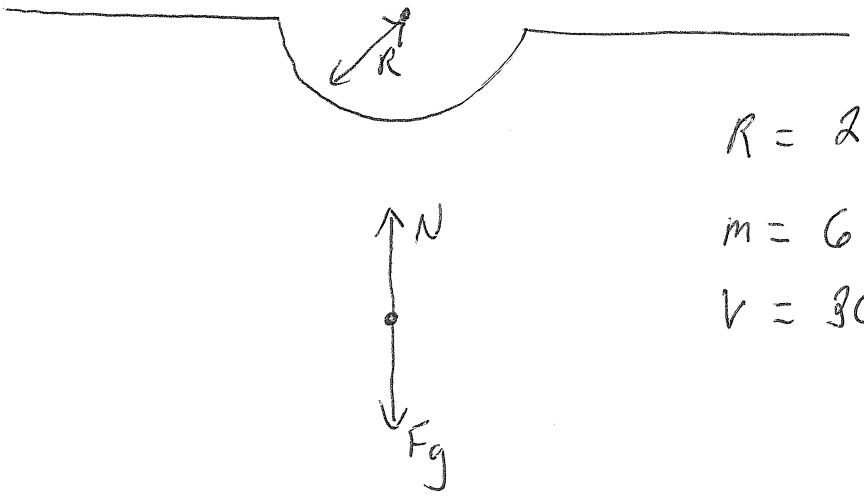
Example

Determine the apparent weight of a person riding in ~~a~~ a car that passes through a low point in the road.



$R = 27\,m$

$m = 69\,kg$

$V = 30.\,m/s$

$$\Sigma F_g = \frac{mv^2}{r} = N + F_g$$

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

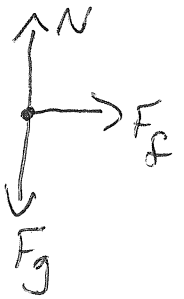
$$\frac{mv^2}{r} + mg = N$$

$$\frac{69kg\,(30.\,m/s)^2}{27\,m} + 69kg\left(9.81\,\frac{N}{kg}\right) = 2977N$$

$$\boxed{3000\,N}$$

Example

Determine the coefficient of friction required for a car traveling at 30. m/s to safely negotiate a curve with radius 170m.



$$\Sigma F_x = \frac{mv^2}{r} = F_f = \mu N$$

* Note: Friction must provide the Centripetal force

$$\Sigma F_y = m\cancel{a}^{0} = N + F_g$$

$$|N| = |9.81\,N/kg \;\; m|$$

$$\frac{\cancel{m}v^2}{r} = \mu \cancel{m}\, 9.81\,N/kg$$

$$\frac{(30\,m/s)^2}{170m\,(9.81\,N/kg)} = \mu = \boxed{0.54}$$