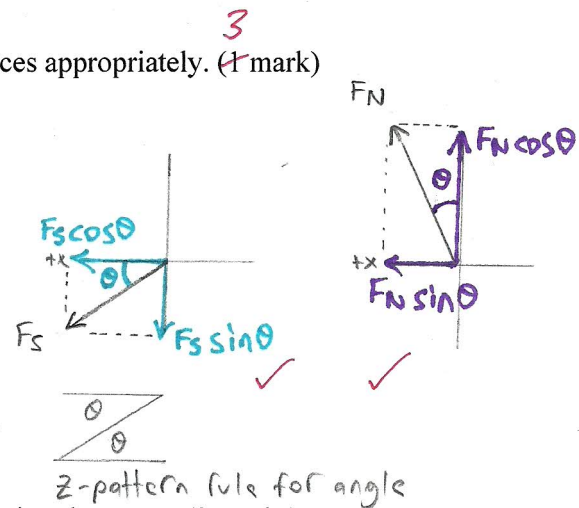
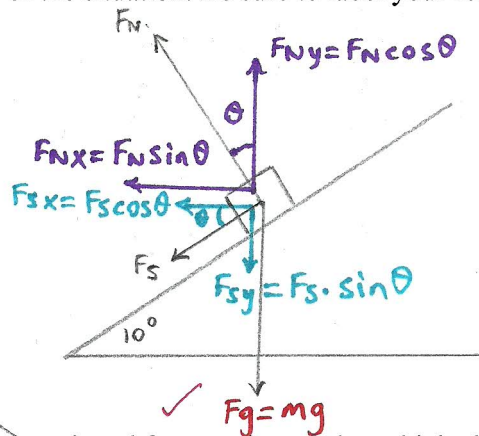


Chapter 3 – Centripetal Force and Banked Curves

A 1000 kg car is travelling on the highway at a constant speed of 110 km/h. The highway makes a turn that is banked at an angle of 10.0° and has a radius of 160 m.

- a) Draw an FBD of the situation. Be sure to label your forces appropriately. (1 mark)

$V = 110 \text{ km/h}$
 $\theta = 10^\circ$
 $r = 160 \text{ m}$



- b) Determine the centripetal force acting on the vehicle during the curve. (2 marks)

$$F_c = \frac{mv^2}{r} \quad \checkmark \quad \rightarrow \quad 110 \frac{\text{km}}{\text{h}} \times \frac{1 \text{ h}}{3600 \text{ s}} \times \frac{1000 \text{ m}}{1 \text{ km}} = 30.556 \text{ m/s}$$

$$F_c = \frac{(1000)(30.556)^2}{160 \text{ m}}$$

$$F_c = 5835.4 \text{ N [towards the centre]} \quad \checkmark$$

- c) What is the coefficient of friction between the car tires and the pavement in the curve? (5 marks)