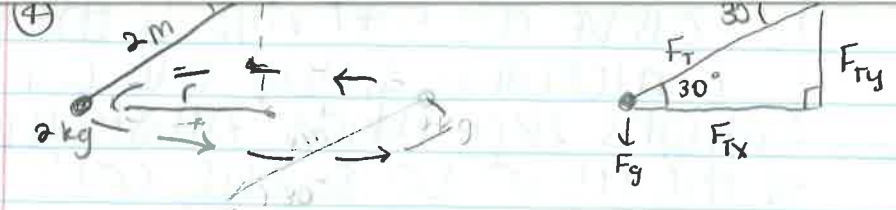
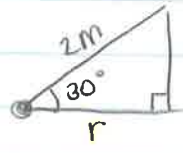


a)



$r = (2m)\cos 30°$

$r = 1.73\ m$

$\Sigma F_x = ma_x = ma_c \rightarrow a_c = \frac{v^2}{r}$ $\quad \Sigma F_y = 0$

$F_{Tx} = (2kg)\,a_c = 34.6N$ $\quad F_y = F_{Ty} - F_g$

$34.6N = (2kg)\left(\frac{v^2}{1.73m}\right)$ $\quad F_{Ty} = F_g = mg = (2kg)(10\ m/s^2) = 20N$

$\tan 30° = \frac{F_{Ty}}{F_{Tx}}$

$V = 5.47\ m/s$

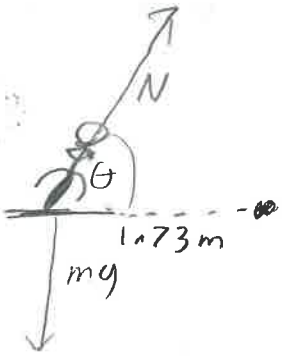
$F_{Tx} = \frac{F_{Ty}}{\tan 30°} = \frac{20N}{\sqrt{3}/3} = 34.6N$

$F_T^2 = F_{Tx}^2 + F_{Ty}^2$

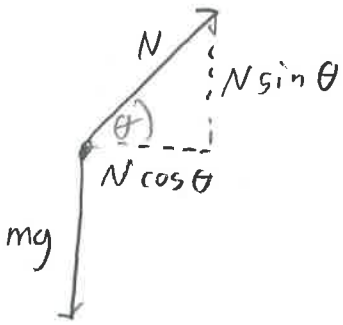
$= (34.6N)^2 + (20N)^2$

$F_T = \sqrt{1,597.16\ N^2} = 39.96\ N$

b.)



A 2kg mini bike rounds a corner making an angle with the pavement. The radius of the turn is 1.73m and the bikes velocity is 5.47 m/s. Find the angle

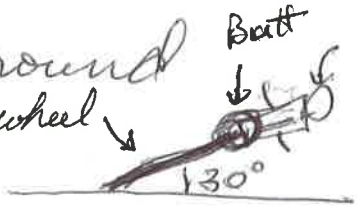


$\Sigma F_y = N\sin\theta - mg = 0$

$\Sigma F_x = N\cos\theta = \frac{mv^2}{r}$

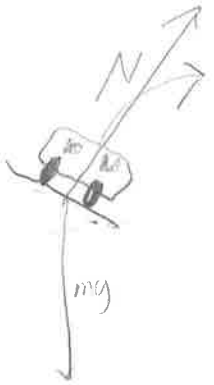
$\tan\theta = \frac{gr}{v^2} \rightarrow \boxed{\theta = 30°}$

θ is between the bike + the ground



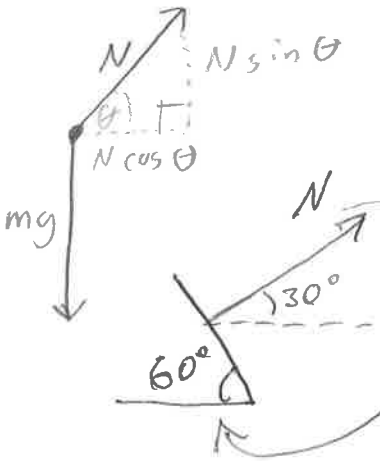
very dangerous!

C.)



A toy car rounds a banked turn at 5.47 m/s. The turn has a radius of 1.73 m.

What must be the bank of the curve?



$$\sum F_y = N\sin\theta - mg = 0$$

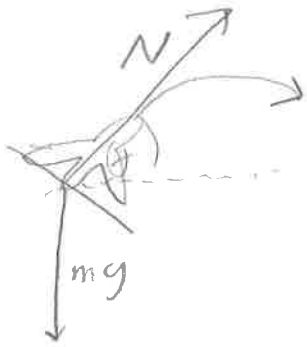
$$\sum F_x = N\cos\theta = m\frac{v^2}{r}$$

$$\tan\theta = \frac{gr}{v^2} = \frac{(10\ m/s^2)(1.73\ m)}{(5.47\ m/s)^2}$$

$$\boxed{\theta = 30^\circ}$$

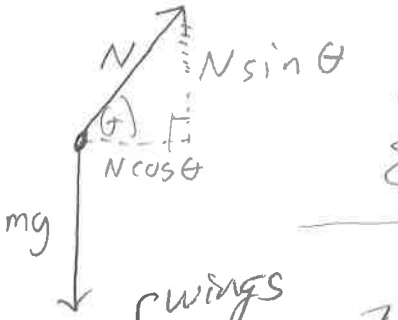
or the curve is banked at 60°

D.)



A toy airplane banks a turn with radius 1.73 m at a velocity of 5.47 m/s.

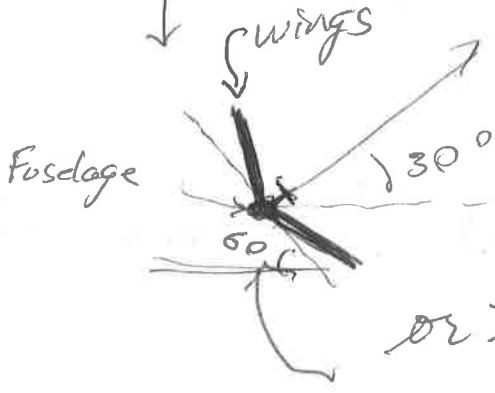
What must be the bank of the wings?



$$\sum F_y = N\sin\theta - mg = 0$$

$$\sum F_x = N\cos\theta = m\frac{v^2}{r}$$

$$\tan\theta = \frac{gr}{v^2} = \frac{(10\ m/s^2)(1.73\ m)}{(5.47\ m/s)^2}$$



$$\boxed{\theta = 30^\circ}$$

or the plane is banked at 60°!