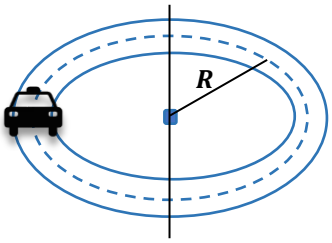
CONCEPT: FLAT CURVE

● When objects travel around horizontal (flat) curves, the force that keeps them in circular motion is _____.

EXAMPLE**:** Find the maximum speed that an 800kg car can have while driving around flat curve of radius 50m ***without slipping*** if the coefficient of static friction between the car and the road is 0.5.



CENTRIPETAL FORCES

1) Draw FBD
2) Write $\Sigma F_c = ma_c$
(rewrite $a_C \Rightarrow v^2/R$)
3) Solve

Circ. Motion / Centripetal Forces

$a_C = \frac{v_T^2}{R} = \frac{4\pi^2 R}{T^2} = 4\pi^2 R f^2$

$T = \frac{1}{f} \Leftrightarrow f = \frac{1}{T}$

$v_T = \frac{C}{T} = \frac{2\pi R}{T} = 2\pi R f$

PROBLEM: A truck can go around a flat curve of radius 150m with a maximum speed of 32m/s before slipping. Calculate the maximum speed it can go around a tighter curve of radius 75m.

A) 32 m/s
B) 515 m/s
C) 3.8 m/s
D) 22.7 m/s

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Flat Curve: $v^2 = gR\mu_s$