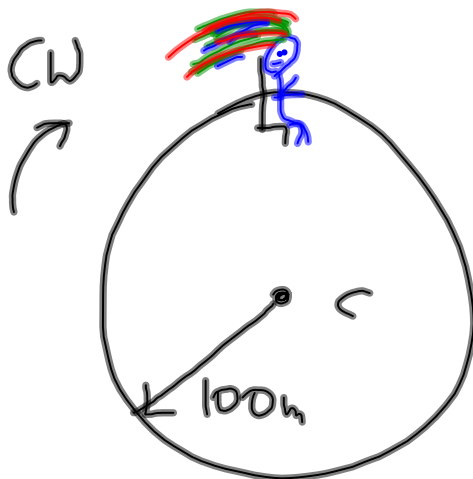


Ferris wheel: invented 1893 for the Chicago World Fair.



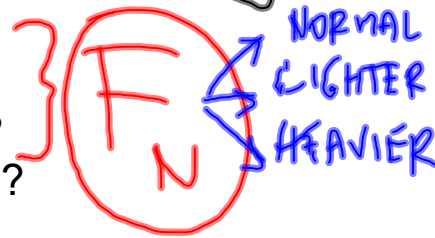
$$m = 100 \text{ kg}$$

$$R = 100 \text{ m}$$

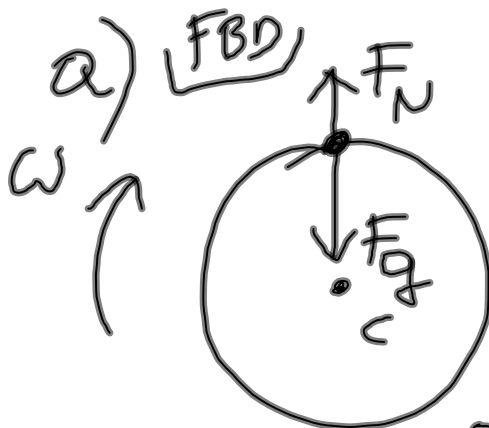
$$v = 15 \frac{\text{m}}{\text{s}}$$

LCM

- a) How do you feel at the top?
- b) How do you feel at the bottom?
- c) Find v_{max} . not to feel weightless?



Feb 25-9:57 AM



$$F_g = 980 \text{ N}$$

$$F_g - F_N = m \frac{v^2}{R}$$

$$980 - F_N = 100 \frac{15^2}{100}$$

$$980 - F_N = 225$$

$$-F_N = 225 - 980$$

$$-F_N = -755$$

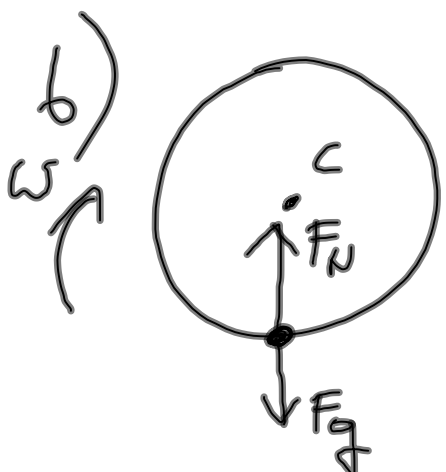
$$F_N = 755 \text{ N}$$

YOU FEEL LIGHTER!

$$F_N < F_g$$

Feb 26-9:34 AM

b)



FBD

$$F_N - F_g = m \frac{v^2}{R}$$

$$F_N = 1,205 \text{ N}$$

YOU FEEL HEAVIER

$$F_N > F_g$$

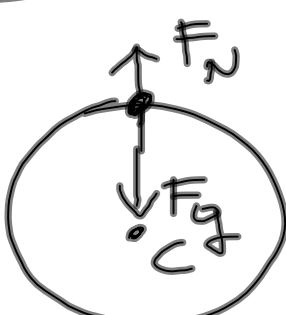
Feb 26-12:33 PM

c) TO FEEL (F_N) WEIGHTLESS
 $\Rightarrow F_N = 0!$
 MAX. v TO FEEL SAFE $\equiv \left. \begin{array}{l} \\ \\ \end{array} \right\} v_{\text{CRITICAL}}$
 MIN. v TO "FLY OFF"

\Rightarrow TOP

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(FBD)

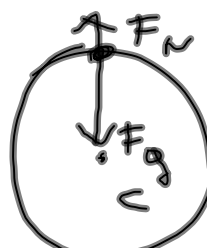


$$F_g - F_N = m \frac{v_{cr}^2}{R}$$

$$v_{cr} = 31.3 \frac{m}{s}$$

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d) Who is going to "fly off" first: toddler, you, sumo wrestler?

$$m_T < m_{you} < m_{sumo}$$


BUT $F_N = 0$ (FLY OFF.)

$$F_g - F_N = m \frac{v_{cr}^2}{R}$$

$$m \cdot g = m \frac{v_{cr}^2}{R}$$

$$v_{cr} = \sqrt{gR}$$

All 3 will fly off at the same time because v_{cr} does not depend on mass; mass is not in the equation for v_{cr} !

Feb 26-12:47 PM