

Centripetal Acceleration quiz 12-19-02

A roller coaster going 15 m/s goes into a dip whose radius is 12 m.  
Draw and label a good FBD.

- (a) What is the centripetal force on a 70 kg passenger?  
(b) What does the 70 kg passenger feel he weighs?

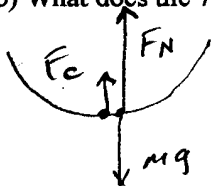
$$V = 15 \frac{m}{s}$$

$$F_c = \underline{\hspace{1cm}} N$$

$$r = 12 m$$

$$F_N = \underline{\hspace{1cm}} N$$

$$M = 70 kg$$



$$F_c = \frac{MV^2}{r}$$

$$= \frac{70kg(15\frac{m}{s})^2}{12m}$$

a)  $F_c = 1310 N$

$$\Sigma F = Mac$$

$$F_N - Mg = \frac{MV^2}{r}$$

$$F_N = \frac{MV^2}{r} + Mg$$

$$= \frac{70kg(15\frac{m}{s})^2}{12m} + 70kg(9.8\frac{m}{s^2})$$

b)  $F_N = 2000 N$

Centripetal Acceleration quiz 1-6-03

A roller coaster going 12 m/s goes into a dip whose radius is 15 m.  
Draw and label a good FBD.

- (a) What is the centripetal force on a 80 kg passenger?  
(b) What does the 80 kg passenger feel he weighs?

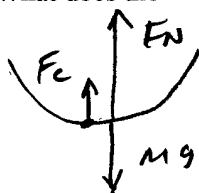
$$V = 12 \frac{m}{s}$$

$$F_c = \underline{\hspace{1cm}} N$$

$$r = 15 m$$

$$F_N = \underline{\hspace{1cm}} N$$

$$M = 80 kg$$



$$F_c = \frac{MV^2}{r}$$

$$= \frac{80kg(12\frac{m}{s})^2}{15m}$$

a)  $F_c = 768 N$

$$\Sigma F = Mac$$

$$F_N - Mg = \frac{MV^2}{r}$$

$$F_N = \frac{MV^2}{r} + Mg$$

$$= \frac{80kg(12\frac{m}{s})^2}{15m} + 80kg(9.8\frac{m}{s^2})$$

b)  $F_N = 1550 N$