

Ch 8  
 Sec 8.2 HW: Rev Con 11,22,23, Pro 50,55  
 obj: Solve problems involving orbital speed and period.

### Satellites

- Objects that follow a circular path whose centripetal force is caused by gravitational force btw it + the earth.

$$F = F_c = \frac{G M_E m_s}{d^2} \quad F_c = m a_c \quad a_c = \frac{v^2}{r}$$

$$= \frac{m v^2}{r}$$

$$\frac{m v^2}{r} = \frac{G M_E m_s}{d^2} \quad r = d$$

$$v = \sqrt{\frac{G M_E}{d}}$$

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### Orbital Period

- Period is time for 1 revolution ( $T$ )

$$T = 2\pi \sqrt{\frac{r^3}{G m_p}}$$

### Weightlessness

- Weight is a force caused by the gravitational attraction btw an object + earth.

- Two types of weight
  - 1) gravitational weight  $\Rightarrow$  Calculated value.

$$F_g = m g$$

- 2) Apparent weight
  - \* The result of balanced forces.
  - \* Is measured.

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- To be weightless the object  
must be in free fall. (Accelerating)  
\* Apparent weight equals zero.

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