GRAVITY & SATELLITE MOTION

Physics Notes
Chapter 12 - 14

Equations:

Force of Gravity: $F_g = \frac{G \cdot m_1 \cdot m_2}{d^2}$

m_1 and m_2 = masses
d = distance between centers of gravity

Acceleration of Gravity: $a_g = \frac{G \cdot m}{r^2}$

m = mass of the planet
r = radius of the planet

Tangential Velocity: $v_t = \sqrt{\frac{G \cdot m}{r}}$

m = mass in the orbit center
r = radius of the orbit

Definitions:

Tangential Velocity:
Velocity of a satellite as it moves in its orbit.

Time Period:
Time for a satellite to complete one revolution.

Data:

G = 6.67×10^{-11} N·m^2/kg^2

Earth Mass = 5.98×10^{24} kg

Earth Radius = 6.38×10^{6} m

Name	Symbol	Unit	Notes
Gravitational Force	F_g	Newton	
Gravitational Acceleration	a_g or g	m/s^2	
Tangential Velocity	v_t	m/s	
Distance	d	meters	
Radius	r	meters	
Time Period	T	second/day/year	
Mass	m	kilogram	

Helpful Equations:

$d = \frac{1}{2} \cdot a \cdot t^2$

$v_t = \frac{2 \cdot \pi \cdot r \cdot (\#rev)}{t}$