CONSERVATION OF MOMENTUM FOR A PERFECTLY INELASTIC COLLISION *This is a simplified version of the conservation of momentum equation valid only for perfectly inelastic collisions between two bodies.*	$m_1\mathbf{v_{1,i}} + m_2\mathbf{v_{2,i}} = (m_1 + m_2)\,\mathbf{v_f}$
CONSERVATION OF KINETIC ENERGY FOR AN ELASTIC COLLISION *No collision is perfectly elastic; some kinetic energy is always converted to other forms of energy. But if these losses are minimal, this equation can provide a good approximation.*	$\frac{1}{2}m_1v_{1,i}^2 + \frac{1}{2}m_2v_{2,i}^2 = \frac{1}{2}m_1v_{1,f}^2 + \frac{1}{2}m_2v_{2,f}^2$

Chapter 7 Circular Motion and Gravitation

CENTRIPETAL ACCELERATION	$a_c = \frac{v_t^2}{r}$
CENTRIPETAL FORCE	$F_c = \frac{mv_t^2}{r}$
NEWTON'S LAW OF UNIVERSAL GRAVITATION *The constant of universal gravitation (G) equals 6.673×10^{-11} N•m²/kg².*	$F_g = G\frac{m_1m_2}{r^2}$
KEPLER'S LAWS OF PLANETARY MOTION	**First Law:** Each planet travels in an elliptical orbit around the sun, and the sun is at one of the focal points. **Second Law:** An imaginary line drawn from the sun to any planet sweeps out equal areas in equal time intervals. **Third Law:** The square of a planet's orbital period (T^2) is proportional to the cube of the average distance (r^3) between the planet and the sun, or $T^2 \propto r^3$.
PERIOD AND SPEED OF AN OBJECT IN CIRCULAR ORBIT *The constant of universal gravitation (G) equals 6.673×10^{-11} N•m²/kg².*	$T = 2\pi\sqrt{\frac{r^3}{Gm}}$ $v_t = \sqrt{G\frac{m}{r}}$
TORQUE	$\tau = Fd\sin\theta$