Page 5, When \( m_1 \) or \( m_2 \) increases, \( F_g \) increases. When \( r \) increases, \( F_g \) decreases. \( F_g \) is proportional to \( 1/r^2 \). Attention: 1 over \( r \) square! Not 1 over \( r \)!

When \( r \) is doubled, \( F_g \) will reduce to 1/4 of the initial \( F_g \).

Page 8, Example 1: Circular orbit around earth. To let an object fly around the earth close to earth surface, you need to launch it with what velocity?

The total force it actually has along the radius direction = what’s needed (mv^2/r). \( F_{\text{net}} \) along radius = mg = mv^2/r. so \( v^2 = g \cdot r \), so \( v = \sqrt{gr} \)

Page 12, Example 3, How to find the period of a planet orbiting around the Sun? Assuming the orbit is a circle. Again, to keep circular orbit, in the radius direction the net Force on the planet (\( F_g \) from the sun) has to be equal to what’s needed (mv^2/r).

Mass of the sun = \( 1.99 \times 10^{30} \) kilograms

You don’t need to memorize any results above. You only need to learn how to set the equation that the total actual force pointing to the center \( \Sigma F_r = mv^2/r \). Use the correct \( r \), correct mass to find the correct \( v \) of the planet.

The time to finish a full circle will be \( T = 2\pi r / v \).