At the surface of the earth, the acceleration due to gravity is 9.8 m/sec^2, or 32 ft/sec^2. In general, the acceleration is inversely proportional to the square of the distance to the center of the earth.

1. A cantaloupe is dropped from a 400-ft tower. When does it hit the ground and how fast is it going at the time of impact? What would the acceleration due to gravity have to be to make it reach the ground in half the time?

2. A cantaloupe that is dropped from a window hits the ground in ten seconds. How high (in feet) is the window?

3. On the moon the acceleration due to gravity is 5 ft/sec^2. An astronaut jumps into the air with an initial upward velocity of 10 ft/sec. How high does she go? How long is the astronaut off the ground?

4. What is the acceleration due to gravity 100 meters from the ground? At 100,000 meters? (The radius of the earth is 6.4×10^6 meters.)