6. [14 points] The force F due to gravity on a body at height h above the surface of the earth is given by

$$F(h) = \frac{mgR^2}{(R+h)^2}$$

where m is the mass of the body, g is the acceleration due to gravity at sea level ($g < 0$), and R is the radius of the earth.

a. [3 points] Compute $F'(h)$.

b. [3 points] Compute $F''(h)$.

c. [5 points] Find the best linear approximation to F at $h = 0$.

d. [3 points] Does your approximation from part (c) give an overestimate or an underestimate of F? Why?