1. Newton's law of gravitation states that the gravitational force F between two bodies of mass m_1 and m_2 respectively is given by the equation

$$F(r) = G\frac{m_1 m_2}{r^2},$$

where r is the distance between the centers of mass of the bodies and G is the gravitational constant. Compute $\dfrac{dF}{dr}$, and explain the physical significance of its sign.

2. For each of the following functions, explain in words what the derivative is telling us.

(a) The temperature in degrees Fahrenheit is given by $F(C) = \dfrac{9}{5}C + 32$, where C is the temperature in degrees Celsius.

(b) The number $D(p)$ of donuts that I sell is a function of their price p.

(c) The time $R(T)$ that it takes to cook a 20 lb. turkey is a function of the oven temperature T.