Instantaneous Speed, Rate of Change, & Slopes of Tangent Lines

1. A rock breaks loose from the top of a tall cliff. The position function for the rock is $f(t) = 16t^2$ feet. Find the speed of this falling rock at 3 seconds.

2. Evaluate the rate of change of the area of a circle when r = 7 feet.

3. At what point is the tangent to $f(x) = 3 - 4x - x^2$ horizontal? (HINT: What is the slope of a horizontal line?)

4. A line is tangent to a graph y = f(x) at the point (1, 4) and the tangent line passes through (3, 6). What is f'(1)?