5. [10 points] Scientists bore a hole deep into the earth and lower an instrument to record the temperature. As the instrument goes deeper, the temperature it records increases. Let $T = g(w)$ be the temperature, in degrees Celsius, the instrument records when it is w hectometers below the surface of the earth. (Recall that 1 hectometer is 100 meters.) Assume that the function g is invertible and that the functions g and g^{-1} are continuous and differentiable.

   a. [3 points] Using a complete sentence, give a practical interpretation of the equation $g^{-1}(68) = 49$ in the context of this problem. Be sure to include units.

   b. [4 points] Below is the first part of a sentence that will give a practical interpretation of the equation $g'(13) = 0.6$ in the context of this problem. Complete the sentence so that the practical interpretation can be understood by someone who knows no calculus. Be sure to include units in your answer.
   When the instrument is lowered from 1300 meters to 1320 meters below the surface of the earth, the temperature it records ...

   c. [3 points] Circle the <u>one</u> statement below that is best supported by the equation

   $$(g^{-1})'(56) = 0.4.$$

   i. The temperature recorded by the instrument is 56°C when it is about 0.4 hectometers below the surface of the earth.

   ii. The temperature recorded by the instrument increases from 56°C to 56.4°C when the instrument is lowered approximately one more hectometer.

   iii. When the instrument is lowered from 55.9 hectometers to 56 hectometers below the surface of the earth, it detects an increase in temperature of about 0.04 Celsius degrees.

   iv. The temperature recorded by the instrument increases from 56°C and 57°C when the instrument is lowered about $\frac{1}{0.4}$ $(= 2.5)$ hectometers further.

   v. As the temperature recorded by the instrument increases from 55.9°C to 56°C, the instrument is lowered about 4 meters further beneath the surface of the earth.

   vi. When the instrument is 56 hectometers below the surface of the earth, the recorded temperature is increasing at a rate of 0.04 Celsius degrees per meter.