

Math 207 Quiz #5
May 4, 2010

Name: _____

Show all work and answers on a separate sheet with a box around your final answer. You should use a calculator on this quiz.

1. (6 pts.) A baked potato is fully cooked when its internal temperature is 99°C .^{*} Suppose you place a potato in a 200°C oven. After 20 minutes, you check the internal temperature of the potato and find that it is 60°C . When will the potato be fully cooked if the potato was initially at room temperature (20°C)?

(Define any variables you use to solve and approximate your answer to 4 decimal places.)

2. A 1 kg mass with a mini-parachute is dropped off of the observation deck of the Space Needle, which is 160 meters high. Assume there is no wind or other forces acting on the object and that the force due to air resistance is proportional to the velocity of the object with a proportionality constant of 20 N-sec/m.

(a) (2 pts.) When does the object hit the ground? (You will have to make some assumptions to solve this using algebra.)

(b) (2 pts.) Find the limiting velocity of the object. (Include units)

Free-Fall Motion: $x(t) = \frac{mg}{b}t - \frac{m}{b}(v_0 - \frac{mg}{b})e^{-bt/m} + \frac{m}{b}(v_0 - \frac{mg}{b})$ Gravity: 9.81 m/s^2

^{*}According to the Wikipedia page on baked potatoes