

Name: _____

Date: _____

MA 226 Quiz 3 – B

Please show your work.

1. (5 pts) A cup of hot chocolate is initially $175^{\circ}F$ and is left in a room with an ambient temperature of $75^{\circ}F$. Suppose that at $t = 0$ it is cooling at a rate of $15^{\circ}F$ per minute.

a.) Assume the Newton's law of cooling applies: The rate of cooling is proportional to the difference between the current temperature and the ambient temperature. Write an initial value problem that models the temperature of the hot chocolate.

b.) Solve the initial value problem for the temperature $T(t)$.

c.) How long does it take the hot chocolate to cool to $115^{\circ}F$?

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2. (5 pts) Given the initial value problem:

$$\frac{dy}{dt} = t - y^2 \quad \text{with } y(0) = 1$$

Use Euler's Method with a step size of .25 to approximate the value of $y(t)$ when $t = .75$. Create a table and show your work. Use 6 decimal places of accuracy.