

3. [11 points] Yolko Ono purchases a serving of her favorite TV dinner, *Chuck's Caterpillar Chop and Gravy*, from Crowger's, her local supermarket chain. At home, she heats up the frozen dish in the microwave oven. Right out of the oven, the temperature of the meal is 185 °F. After 5 minutes, the meal cools to 140 °F. If left out on the counter, the meal will eventually cool to room temperature, 68 °F. **Please leave your answers in exact form for all parts of this problem.**

- a. [7 points] Let $M(t) = A + Be^{kt}$ be the temperature of the meal (in degrees Fahrenheit) t minutes after it leaves the oven. Using the information given, find the values of A , B , and k .

$$A = \underline{\hspace{10cm}}$$

$$B = \underline{\hspace{10cm}}$$

$$k = \underline{\hspace{10cm}}$$

- b. [4 points] Yolko has poured a cup of hot coffee into a thick mug. The temperature of the coffee (in degrees Fahrenheit) t minutes after she pours the coffee is given by the function $C(t) = 68 + 100e^{-0.05t}$. Yolko has a sensitive beak and wants to drink the coffee when it is at 131 °F. How long does she have to wait before she can drink it?

She will have to wait $\underline{\hspace{10cm}}$.