11. [8 points] Every morning, a student gets a cup of coffee from a local coffee shop and then sits down to work. Today the coffee was served at a temperature of 185°F. Let $C(t)$ be the temperature, in degrees Fahrenheit, of the cup of coffee t hours after it was poured today, and let $D(t) = C(t) - 70$.

Throughout this problem, show your work carefully and give all answers in exact form or accurate to at least three decimal places.

a. [1 point] Find $D(0)$.

Answer: $D(0) =$ _____

b. [2 points] $D(t)$ is an exponential function with a *continuous* hourly decay rate of 80%. Find a formula for $D(t)$ and then find a formula for $C(t)$

$D(t) =$ _____ $C(t) =$ _____

c. [1 point] By what percent does $D(t)$ decrease each hour?

Answer: _____

d. [2 points] By how many degrees did the temperature of the cup of coffee decrease within the first 30 minutes after it was poured?

Answer: _____

e. [2 points] Find and interpret, in the context of this problem, any horizontal asymptotes of the function $C(t)$.