6. [17 points] A scientist is studying the mass, in milligrams (mg), of several different bacterial colonies.

- Colony A’s mass is 17 mg at the start of the experiment, and it grows at a rate of 7\% per hour.
- Colony B’s mass in mg \( t \) hours after the experiment begins is given by \( B(t) = 3e^{0.11t} \).
- Colony C’s mass in mg \( t \) hours after the experiment begins is given by \( C(t) = 22(1.04)^t \).
- Two hours into the experiment, Colony D has a mass of 21 mg, but by four hours into the experiment, only 18 mg remains.

For each part of this problem, you must **show every step** of any algebraic work that is required.

a. [3 points] Find a formula for the function \( A(t) \), which gives the mass, in mg, of colony A \( t \) hours after the experiment begins.

\[
\text{Answer: } A(t) = \text{__________________________}
\]

b. [2 points] By what percent is colony B growing each hour? Give your answer in exact form or rounded to at least two decimal places.

\[
\text{Answer: } \text{__________________________}\%
\]

c. [3 points] How many hours will it take for colony B’s population to triple? 
*Give your answer in exact form, and circle your final answer.*

This problem continues onto the following page.
A scientist is studying the mass, in milligrams (mg), of several different bacterial colonies.

- Colony A’s mass is 17mg at the start of the experiment, and it grows at a rate of 7% per hour.
- Colony B’s mass in mg \( t \) hours after the experiment begins is given by \( B(t) = 3e^{0.11t} \).
- Colony C’s mass in mg \( t \) hours after the experiment begins is given by \( C(t) = 22(1.04)^t \).
- Two hours into the experiment, Colony D has a mass of 21 mg, but by four hours into the experiment, only 18 mg remains.

For each part of this problem, you must show every step of any algebraic work that is required.

d. [5 points] At what time \( t \) will the size of colonies B and C be the same? 
   Give your answer in exact form, and circle your final answer.

e. [4 points] Assuming colony D’s mass is decaying exponentially, what will its mass (in mg) be 12 hours after the start of the experiment? Give your answer in exact form.