3. [12 points] Cleaver the beaver is building a large dam to protect against predators. After 4 hours of working, the dam he is building is 24 cm high. After 16 hours of working, the dam he is building is 180 cm high. Let $C(t)$ be the height of Cleaver’s beaver dam, in cm, after he has been working for $t$ hours. Assume that $C(t)$ is exponential.

a. [4 points] Find a formula for $C(t)$. You must find your answer algebraically. All numbers in your formula should be in exact form.

Answer: _______________________________

b. [1 point] Find the continuous hourly growth rate of the height of Cleaver’s dam. Round your answer to the nearest 0.01%.

Answer: _______________________________

Cleaver’s neighbors, Anne and Barry, are also each building a dam, and they start working at the same time. Let $A(t)$ be the height, in cm, of Anne’s dam $t$ hours after she starts working on it, and let $B(t)$ be the height, in cm, of Barry’s dam $t$ hours after he starts working on it.

c. [2 points] Write an equation that expresses the following sentence:

“After they have been working for $h$ hours, Anne’s dam is 35% taller than Barry’s dam.”

Note: Your equation may involve $A$, $B$, and $h$.

Answer: _______________________________

- Anne’s dam starts off 5 cm high, and she builds at a continuous hourly rate of 22%.
- Barry’s dam starts off 12 cm high, and he builds at a constant rate of 4 cm per hour.

d. [2 points] Use the information above to find formulas for $A(t)$ and $B(t)$.

Answers: $A(t) =$ ________________________ and $B(t) =$ ________________________

e. [3 points] When will Anne’s dam be 35% taller than Barry’s dam?

Round your answer to the nearest 0.01 hour. Clearly indicate how you found your solution. (Remember item 7 from the instructions on the front page.)

Answer: _______________________________