2. [12 points] A population of creatures is placed on a small preservation space. Ten creatures are initially placed on the preservation. The time it takes for a population to reach C creatures is given by

$$T(C) = \int_{10}^{C} \frac{20dx}{x(400-x)},$$

where T is measured in years after the creatures were first placed on the preservation.

a. [6 points] Find a function for $T(C)$ by analytically solving the integral given above. Be sure to show all appropriate work.

b. [2 points] How long does it take for the creatures to reach a population of 50? State your answer in a complete sentence and include units in your answer.

c. [4 points] Determine if the integral $T(400) = \int_{10}^{400} \frac{20dx}{x(400-x)}$ converges or diverges. What does your conclusion mean in terms of the creatures on the preservation?