4. [8 points] The amount of time it takes a spider to build a web is t hours. The **cumulative distribution function** for t is given by:

$$J(t) = \begin{cases} 0, & \text{for } t \leq \frac{1}{2} \\ \frac{16}{9}\left(-\frac{1}{3}t^3 + \frac{5}{4}t^2 - t + \frac{11}{48}\right), & \text{for } \frac{1}{2} < t < 2 \\ 1, & \text{for } 2 \leq t \end{cases}$$

a. [2 points] What appears to be the shortest amount of time it could take the spider to build a web? Include units.

Answer: _____

b. [2 points] What is the probability that it will take the spider more than 1 hour to build a web?

Answer: _____

c. [4 points] Write an expression for the mean amount of time it takes the spider to build a web. Your answer may involve one or more integrals, but should not involve the letter J.

Answer: _____