

1. [11 points] Suppose $p(t)$ is the **probability density function** for a variable t .

$$p(t) = \begin{cases} 0 & t \leq 0 \\ at^2 & 0 < t \leq \frac{1}{2} \\ t & \frac{1}{2} < t \leq 1 \\ 0 & t > 1 \end{cases}$$

- a. [3 points] Find the value of a such that $p(t)$ is a probability density function.

Answer: $a =$ _____

- b. [3 points] Write an expression involving one or more integrals for the mean of the distribution. **Do not evaluate any integrals in your answer.** Your final answer should not include the letters p or P , but may include the letter a .

Answer: _____

- c. [5 points] Write a formula for the corresponding cumulative distribution function, $P(t)$. Your formula should not contain any integral signs, but may include the letter a .

$$\text{Answer: } P(t) = \begin{cases} \text{_____}, & t \leq 0 \\ \text{_____}, & 0 < t \leq \frac{1}{2}, \\ \text{_____}, & \frac{1}{2} < t \leq 1, \\ \text{_____}, & t > 1 \end{cases}$$