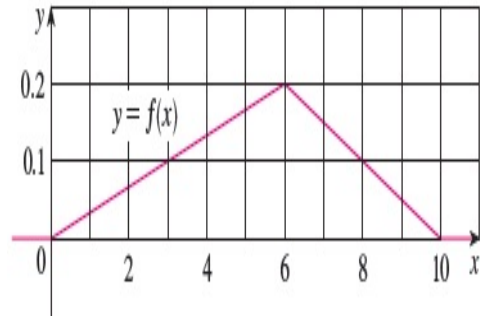


DIRECTIONS To receive full credit, you must provide complete legible solutions to the following problems in the space provided. Transfer all your answers to the space provided on the test paper.

1. Consider the following function whose graph is shown.

a. Explain why the function whose graph is shown above is a probability density function.



b. Use the graph to find the following probabilities.
 $p(x < 3)$

Ans _____

c. Use the graph to find the following probabilities
 $p(3 \leq x \leq 6)$

Ans _____

2. According to the National Health Survey, the heights of adult males in the United States are normally distributed with mean 69.0 inches and standard deviation 2.8 inches.

a. What is the probability that an adult male chosen at random is between 67 and 71 inches tall? Use graph of the PDF and shade the area used to find the probability.

Ans _____

b. What percentage of the adult male population is more than 6 feet tall? Use graph of the PDF and shade the area used to find the probability.

Ans _____

3. Let $f(x) = k(5x - x^2)$ if $0 \leq x \leq 5$ and $f(x) = 0$, if $x < 0$ or $x > 5$.

a. For what value of k is f a probability density function? Ans _____

b. For that value of k , find $P(X > 1)$ Ans _____

c. Find the mean. Ans _____

4. The manager of a fast-food restaurant determines that the average time that her customers wait for service is 1.5 minutes. The distribution of waiting: $f(x) = \frac{1}{\mu} e^{(-1/\mu)x}$, $x \geq 0$

a. Find the probability that a customer has to wait more than 5 minutes. Ans _____

b. Find the probability that a customer is served within the first minute. (Round your answer to three decimal places.) Ans _____

c. The manager wants to advertise that anybody who isn't served within a certain number of minutes gets a free hamburger. But she doesn't want to give away free hamburgers to more than 1% of her customers. What number of minutes should the advertisement use? Ans _____