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WeBWorK assignment Assignment-02 is due on 10/07/2012 at 09:00pm PDT.

1. (6 pts) The continuous random variable X has cumulative distribution function given by

$$F(x) = \begin{cases} 0 & \text{for } x < 0 \\ x - \frac{1}{4}x^2 & \text{for } 0 \leq x \leq 2 \\ 1 & \text{for } x > 2 \end{cases}$$

Part(a) Find the median of X , correct to 2 decimal places. ____

Part(b) Find the value of q such that $P(X < q) = \frac{1}{4}$. Give your answer as a decimal correct to 3 decimal places. ____

Part(c) Find $E(\sqrt{X})$, correct to 2 decimal places. ____

Part(d) Find $P(X > \frac{1}{2})$. Give your answer as a decimal, correct to 2 decimal places. ____

Part(e) Find the value of c correct to one decimal place given that $E(X + c) = 4E(Xc)$. ____

Part(f) Find $\text{Var}(X)$, correct to 2 decimal places. ____

Answer(s) submitted:

- 0.5858
- 0.2679
- 0.75
- 0.5625
- 0.4
- 0.22222

(correct)

Correct Answers:

- 0.59
- 0.268
- 0.75
- 0.56
- 0.4
- 0.22

2. (1 pt)

The time T required to repair a machine is an exponentially distributed random variable with mean 4 (hours). What is the probability that a repair takes at least $12\frac{1}{2}$ hours given that its duration exceeds 12 hours?

Select the correct answer:

- A. e^{-4}
- B. $1 - \frac{1}{4}e^{-\frac{1}{8}}$
- C. $1 - e^{-\frac{1}{8}}$
- D. $e^{-\frac{1}{8}}$
- E. $1 - e^{-4}$

Answer(s) submitted:

- E

(incorrect)

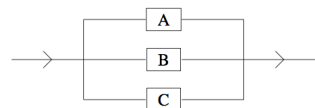
Correct Answers:

- D

3. (1 pt) Electronic components of a certain type have a length of life X , measured in hours with probability density given by

$$f(x) = \begin{cases} \frac{1}{150}e^{-\frac{x}{150}} & x > 0 \\ 0 & \text{otherwise} \end{cases}$$

Suppose that three such components operate independently and in parallel in a certain system as shown in the diagram below. Which statement best describes the distribution of Y , the length of life of the entire system?



Which statement best describes the distribution of Y , the length of life of the entire system?

- A. $Y = \max(X_1, X_2, X_3)$, Y has an exponential distribution with mean of 450.
- B. $Y = \min(X_1, X_2, X_3)$, Y has an exponential distribution with a mean of 450.
- C. $Y = \max(X_1, X_2, X_3)$, Y has an exponential distribution with a mean of 50.
- D. $Y = \min(X_1, X_2, X_3)$, Y has an exponential distribution with a mean of 50.
- E. $Y = \max(X_1, X_2, X_3)$, Y is not an exponential random variable.

Answer(s) submitted:

- A

(incorrect)

Correct Answers:

- E

4. (1 pt) X is uniformly distributed over the interval $[-1, 1]$.

Which of the following is the probability density function of $Y = e^X$?

- A.

$$f_Y(y) = \begin{cases} \frac{e}{1-e^2} & \frac{1}{e} \leq y \leq e \\ 0 & \text{otherwise.} \end{cases}$$

- B.

$$f_Y(y) = \begin{cases} \frac{1}{2} \ln y + \frac{1}{2} & \frac{1}{e} \leq y \leq e \\ 0 & \text{otherwise.} \end{cases}$$

- C.

$$f_Y(y) = \begin{cases} \frac{1}{2y} & \frac{1}{e} \leq y \leq e \\ 0 & \text{otherwise.} \end{cases}$$

- D.

$$f_Y(y) = \begin{cases} \frac{2e^2}{e^4-1}y & \frac{1}{e} \leq y \leq e \\ 0 & \text{otherwise.} \end{cases}$$

- E.

$$f_Y(y) = \begin{cases} 0.0729e^y & \frac{1}{e} \leq y \leq e \\ 0 & \text{otherwise.} \end{cases}$$

Answer(s) submitted:

- B

(incorrect)

Correct Answers:

- C

The length of a coil of copper wire is a random variable with mean 150 m and standard deviation 6 m .

If we choose five coils of wire at random, what is the variance of the total length of the wire in the coils?

- A. $30m^2$
- B. $900m^2$
- C. $0.8m^2$
- D. $180m^2$
- E. $150m^2$

Answer(s) submitted:

- A

(correct)

Correct Answers:

- D