CE 4101 Application of Engineering Fundamentals
2011-0120
Probability and Statistics

Student Name (Printed) : _____

1. In probability theory, what is the term that describes the set of all possible outcomes of an experiment?

   (A) a set of random variables

   (B) a fuzzy set

   (C) a cumulative distribution

   (D) a sample space

2. If two random variables are independently distributed, what is their relationship?

   (A) They are not identically distributed.

   (B) They are uncorrelated.

   (C) They are mutually exclusive.

   (D) Either (A) or (B).

3. Five fair coins are flipped once. What is the probability that at least two of the coins will show heads?

   (A) 0.19

   (B) 0.80

   (C) 0.81

   (D) 1.50

4. Which of the functions depicted in Figure 1 **cannot** be a probability density function?

(A)

(C)

(B)

(D)
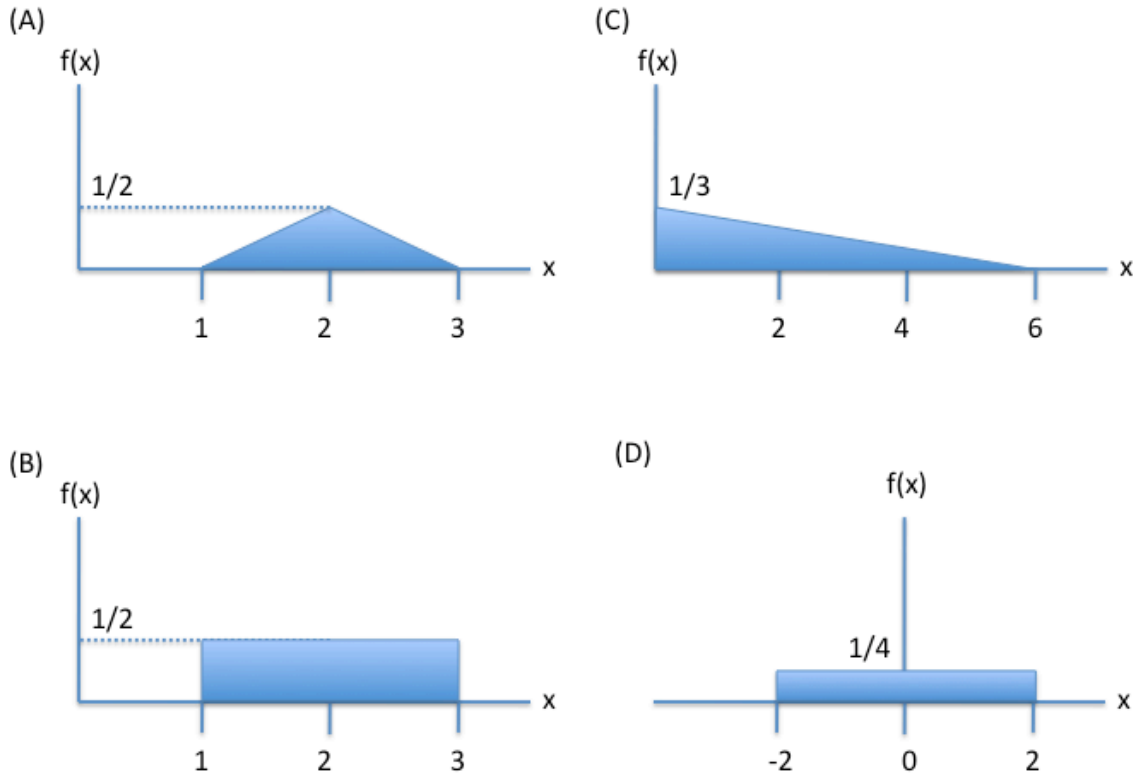

Figure 1: Probability density function $f(x)$

5. What is the sample standard deviation of the data set $\{2.0, 7.0, 9.0, 12, 34\}$?

   (A) 11

   (B) 12

   (C) 13

   (D) 17

6. An item's cost distribution is given in the table below

cost($)	probability
1	0.07
2	0.23
3	0.46
4	0.17
5	0.04
6	0.03

What is the approximate expected cost?

(A) $2.5

(B) $2.9

(C) $3.0

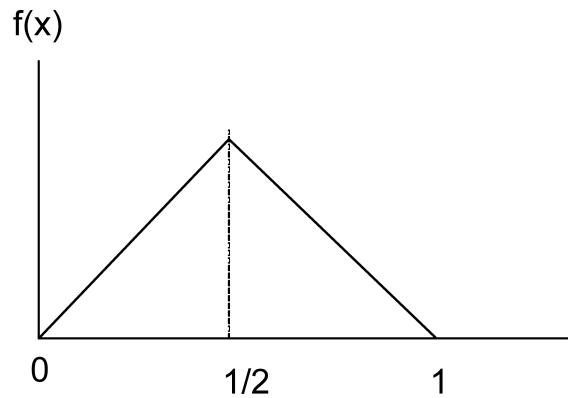(D) $3.1

f(x)

0   1/2   1

Figure 2: Probability density function $f(x)$

7. For the probability density function in Figure 2 what is the probability of the random variable x being less than $\frac{1}{3}$?

(A) 0.11

(B) 0.22

(C) 0.25

(D) 0.33

8. If the variable X has a Poisson distribution with parameter λ, what is the expected value of X?

   (A) λ^2

   (B) $\lambda(1 - \lambda)$

   (C) λ^{-1}

   (D) λ

9. A bag contains four black balls and six yellow balls. What is the probability of getting one balck ball and one white ball in two consecutive draws from the bag without replacement?

   (A) 0.040

   (B) 0.24

   (C) 0.27

   (D) 0.53

10. The probability that both stages of a two-stage turbo-pump will function correctly is 0.95. The reliability of the first stage is 0.98. What is the reliability of the second stage?

    (A) 0.95

    (B) 0.96

    (C) 0.97

    (D) 0.98