

# COEP Technological University

Department of Mathematics

(MA- 21001) Probability and Statistics for Engineers

T.Y. B. Tech. Semester V

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## 1 Tutorial: Week 7

1. Define: Exponential distribution.
2. The length of time for one individual to be served at a cafeteria is a random variable having an exponential distribution with a mean of 4 minutes. What is the probability that a person is served in less than 3 minutes on at least 4 of next 6 days? (Ans: 0.3437)
3. State central limit theorem and apply it to solve following example: Suppose number of customers entering Dee's Grocery each day over 5 year period is a random variable with  $\mu = 100$ ,  $\sigma = 10$ . Then the average number of customers computed over randomly selected 30-day period can be modeled as a normal random variable with mean=100 and  $\sigma = 10/\sqrt{(30)}$ . What is the probability that average number of customers entering Dee's grocery daily over a 30-day period is between 95 and 105? (Ans:0.9946)
4. Consider the following statements and choose the correct option.
  - (i) A distribution is said to be symmetric if its distribution curve can be folded along a vertical axis so that the two sides coincide.
  - (ii) A distribution is said to be symmetric if its distribution curve can be folded along a horizontal axis so that the two sides coincide.
  - (iii) A distribution that lacks symmetry with respect to vertical axis is said to be 'Skewed'.
  - (iv) Normal Distribution is a skewed distribution.
  - (a) All statements are True.
  - (b) All statements are False.
  - (c) Only (i) and (iii) is True.
  - (d) Only (i) is true.

ans c

5. Consider the following statements and choose the correct option.
  - (i) A distribution is said to be symmetric if its distribution curve can be folded along a vertical axis so that the two sides coincide.
  - (ii) A distribution is said to be symmetric if its distribution curve can be folded along a horizontal axis so that the two sides coincide.

(iii) A distribution that lacks symmetry with respect to vertical axis is said to be 'Skewed'.

(iv) Normal Distribution is a symmetric distribution.

(a) All statements are True.

(b) All statements are False.

(c) Only (ii) is false.

(d) Only (i) is true.

ans c

6. Consider the following statements and choose the correct option.

(i) A distribution is said to be symmetric if its distribution curve can be folded along a vertical axis so that the two sides coincide.

(ii) A distribution is said to be symmetric if its distribution curve can be folded along a horizontal axis so that the two sides coincide.

(iii) A distribution that lacks symmetry with respect to vertical axis is said to be 'Skewed'.

(iv) Normal Distribution is skewed to left.

(a) All statements are True.

(b) All statements are False.

(c) (ii) and (iv) are false.

(d) Only (i) is true.

ans c

7. Consider the following statements and choose the correct option.

(i) A distribution is said to be symmetric if its distribution curve can be folded along a vertical axis so that the two sides coincide.

(ii) A distribution is said to be symmetric if its distribution curve can be folded along a horizontal axis so that the two sides coincide.

(iii) A distribution that lacks symmetry with respect to vertical axis is said to be 'Skewed'.

(iv) Normal Distribution is a skewed to right.

(a) All statements are True.

(b) All statements are False.

(c) Only (ii) is false.

(d) Only (ii) and (iv) are False.

ans d

8. Consider the following statements and choose the correct option.

(i) A distribution is said to be symmetric if its distribution curve can be folded along a vertical axis so that the two sides coincide.

(ii) A distribution is said to be symmetric if its distribution curve can be folded along a horizontal axis so that the two sides coincide.

(iii) A distribution that lacks symmetry with respect to vertical axis is said to be 'Skewed'.

(iv) Normal Distribution is not a skewed distribution.

(a) All statements are True.

(b) All statements are False.

(c) Only (ii) is false.

(d) Only (i) is true.

ans c

9. Consider following experiments and state whether they are Binomial experiments or not.

1. Flip a coin 10 times. Let  $X$  number of heads obtained.

2. A worn machine tool produces 1 percent defective parts. Let  $X$  be the number of defective parts in the next 25 parts produced.

3. Each sample of air has a 10 percent chance of containing a particular rare molecule. Let  $X$  be the number of air samples that contain the rare molecule in the next 18 samples analyzed.

4. Of all bits transmitted through a digital transmission channel, 10 percent are received in error. Let  $X$  be the number of bits in error in the next five bits transmitted.

5. A multiple choice test contains 10 questions, each with four choices, and you guess at each question. Let  $X$  be the number of questions answered correctly.

6. In the next 20 births at a hospital, let  $X$  be the number of female births.

7. Of all patients suffering a particular illness, 35 percent experience improvement from a particular medication. In the next 100 patients administered the medication, let  $X$  be the number of patients who experience improvement.

10. Each sample of water has a 10 percent chance of containing a particular organic pollutant. Assume that the samples are independent with regard to the presence of the pollutant. Find the probability that in the next 18 samples, exactly 2 contain the pollutant.

Ans 0.284