# SHANTILAL SHAH ENGINEERING COLLEGE, BHAVNAGAR

**B.E. Sem-IV (CIVIL ENGG.) Even Term-2018-19 Sub : Num. & Stat. Methods for Civil Engineering**

**Tutorial No.-4 Topic : Statistics**

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Ex-1 Calculate the Arithmetic Mean by the shortcut method for the following data:

| X | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| F | 2 | 8 | 43 | 133 | 207 | 260 | 213 | 120 | 54 | 9 | 1 |

Ex-2 For the following data, find mean.

| Class | 10-19 | 20-29 | 30-39 | 40-49 | 50-59 |
|---|---|---|---|---|---|
| Frequency | 1 | 1 | 15 | 10 | 20 |

Ex-3 Define the Geometric mean and Harmonic Mean with examples.

Ex-4 Find the median of 10, 15, 26, 30, 5, 11, 48, 44.

Ex-5 The following table gives the marks obtained by 50 students in statistics. Find the median.

| Marks | 10-14 | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 |
|---|---|---|---|---|---|---|---|---|
| No. of student | 4 | 6 | 10 | 5 | 7 | 3 | 9 | 6 |

Ex-6 Calculate mode for the following data.

| Marks | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 |
|---|---|---|---|---|---|---|---|
| No. of student | 5 | 15 | 20 | 20 | 32 | 14 | 14 |

Ex-7 Find standard deviation for the following data.

| x | 5 | 10 | 15 | 20 | 25 |
|---|---|---|---|---|---|
| f | 7 | 4 | 6 | 3 | 5 |

Ex-8 Using method of leat squares, find the best fitting straight line to the given data.

| x | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| y | 1 | 3 | 5 | 6 | 5 |

Ex-9 Find the correlation coefficient from the following data.

| X | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| Y | 6 | 8 | 11 | 9 | 12 | 10 | 14 |

Ex-10 The scores of 12 students in their mathematics (X) and statistics (Y) classes are

| Mathematics(X) | 2 | 3 | 4 | 4 | 5 | 6 | 6 | 7 | 7 | 8 | 10 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Statistics(Y) | 1 | 3 | 2 | 4 | 4 | 4 | 6 | 4 | 6 | 7 | 9 | 10 |

Find the regression line of Y on X.

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**Tutorial No.-5 Topic : Roots of Algebraic and transcendental Equations**

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Ex-1 Find a positive root of the equation $x - \cos x = 0$.

Ex-2 Find a real root of $e^x - 2\cos x = 0$ in the closed interval [0,2]

Ex-3 Find a real root of $x^3 - x - 1 = 0$ by bisection method correct to three decimal places.

Ex-4 Find the positive root of $x^3 - 4x - 9 = 0$ using the bisection method in four stages.

Ex-5 Find a real root of the equation $3x - \cos x - 1 = 0$ correct to three significant figures using N-R method.

Ex-6 Find the positive root of $x = \cos x$ using N-R method correct to 3 decimal places.

Ex-7 Use method of false-position to find a real root of $x^3 - 4x - 9 = 0$ correct to three decimal places.

Ex-8 Find an iterative formula to find $\sqrt{N}$ (where N is a positive number) and hence find (a) $\sqrt{5}$ , (b) $\sqrt{27}$.

Ex-9 Use the secant method to find a real root of the equation $f(x) = x^3 + 2x^2 - 3x - 1$ with the initial estimates of $x_0 = 2$, and $x_1 = 1$.

Ex-10 Use the secant method to estimate the root of $f(x) = e^{-x} - x$ . Start with initial estimates of $x_0 = 0$ and $x_1 = 1$.

Ex-11 Find the value of 1/19 using N-R method.

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**B.E. Sem-IV (CIVIL ENGG.) Even Term-2018-19 Sub : Num. & Stat. Methods for Civil Engineering**

**Tutorial No.-6 Topic : Probability**

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Ex-1 If P(A) = 1/3 , P(B) = 3/4 , and P(A ∪ $B$) = 11/12. Find P(A/B).

Ex-2 A problem of statistics is given to three student A, B, C whose chances of solving it are 1/3, 1/4 1/2 respectively . What is the probability that the problem will be solved ?

Ex-3 A discrete random variable X has the following probability distributions.

| X | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| f(X=x) | 0 | k | 0.2 | 2k | 0.3 | 2k |

(a) Find k,

(b) Compute P(X < 3), P(X ≥ 3), P(2 < X < 5 )

Ex-4 Define Poisson Distribution .

In a company, there are 250 workers. The probability of a workers remain absent on any one day is 0.02. Find the probability that on a day seven workers are absent.

Ex-5 Define Binomial Distribution.

A dice is thrown 6 times. If getting an odd number is a success, find the probability of

(a) five successes

(b) At least five successes

(c) At the most five successes.

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