



Final Exam

Statistics and Probability
Wednesday, December 4, 2024
Time: 120 minutes
Open book

Instructions

1. Do not use a laptop.
2. Calculators may be used.
3. Answers must be neatly handwritten. The writing must be easy for the lecturer to read.

Number 1: CPMK a1, a2, a3; weighting factor 50%

The concrete strength required in the contract document is 27 MPa. The results of the cylinder compressive test can be seen in the table below:

Test Date	Strength (MPa)	Test Date	Strength (MPa)
19/07/2024	25	31/07/2024	25
19/07/2024	18	31/07/2024	24
19/07/2024	24	31/07/2024	25
19/07/2024	23	31/07/2024	24
19/07/2024	26	09/08/2024	30
19/07/2024	26	09/08/2024	31
19/07/2024	17	09/08/2024	28
19/07/2024	28	09/08/2024	25
29/07/2024	26	09/08/2024	19
29/07/2024	28	09/08/2024	20
29/07/2024	28	09/08/2024	24
29/07/2024	29	10/08/2024	28
29/07/2024	28	10/08/2024	26
29/07/2024	27	10/08/2024	27
29/07/2024	30	10/08/2024	24
29/07/2024	29	10/08/2024	25

Based on the test data above,

- a. Calculate the average value and standard deviation of the compressive strength of the concrete sample! (10%).
- b. Using a 90% confidence level, calculate the upper and lower limits of the concrete compressive strength value! (20%).
- c. Using a 95% confidence level, does the concrete quality in the field meet the concrete quality specifications set out in the contract document? (20%).







Number 2: CPMK a1, a2, a3; weighting factor 50%

A study was conducted to analyze the relationship between dissolved sediment concentration (x) and settling time (y) in a sedimentation pond. The following data were obtained from 16 water samples:

Sample	Sediment concentration (mg/L)	Settling time (minute)
1	30	50
2	35	45
3	40	42
4	45	38
5	50	35
6	55	33
7	60	30
8	65	28
9	70	25
10	75	23
11	80	21
12	85	20
13	90	18
14	95	16
15	100	15
16	105	14

- a. Draw a scatter plot of the above data. (5%)
- b. Determine the linear regression equation using the least squares method. (15%)
- c. Draw a graph of the linear regression equation. (5%)
- d. Predict the settling time if the sediment concentration reaches 130 mg/L (10%)
- e. Calculate the correlation coefficient and interpret the results. (15%)

Examiner Lecturer			Kaprodi
The 1 st Examiner	The 2 nd Examiner	The 3 rd Examiner	
			
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