Statistics test

1. ANOVA – Determine the Analysis of Variance for the below variables

Variable 1	**Variable** 2	**Variable** 3
27	63	52
43	43	60
64	52	37
62	58	40
44	54	23
54	50	39
57	65	55
49	53	52
31	43	43
69	49	39

2. Determine the ANOVA for below stocks

STOCK MARKET EXAMPLE

A stock analyst randomly selected 8 stocks from each of 3 industries, viz., Financial, Energy and Utilities. She compiled the 5-year rate of return for each stock.

The analyst wants to know if, at 0.05 Significance Level, there is a difference in the rate of return for any of the industries.

5-Year Rates of Return		
Financial	Energy	Utilities
10.76	12.72	11.88
15.05	13.91	5.86
17.01	6.43	13.46
5.07	11.19	9.9
19.5	18.79	3.95
8.16	20.73	3.44
10.38	9.6	7.11
6.75	17.4	15.7

3. Perform hypothesis test for 2 sample variances with F – distribution for below scenario

    a. A machine produces metal sheet with 20mm thickness. There is a variability in thickness due to machine, operators, manufacturing environment, raw material etc. The company wants to know the consistency of the two machines and randomly sample 10 sheets from machine 1 and 10 sheets from machine 2. Thickness measurements are taken. Assume sheet thickness is normally distributed in the population. The company wants to know if the variance from each samples have equal population variance or not. How do you test this?
    b. Frame your hypothesis and justify accept or reject the H0 or Ha for below table

Machine 1	Machine 2
20.2	22.1
20.9	21.3
22.3	20.1
22.8	22.5
21.5	20.2
23.0	20.3
22.4	20.4
21.4	21.1
21.2	20.8
21.3	20.4

4. Perform t- distribution (t student distribution) and provide the confidence Interval for below scenario
    a. The labelled speed of the car from 0 to 5 seconds is 100 mph. A sample of 10 car speeds are taken for the study
    b. A researcher wants to estimate the interval for the true mean of the batch of cars with 95% confidence. Assume the speeds are normally distributed
    c. Speeds are as follows (in mph)

100.5	101.3	99.5	98.6	104.0	103.1	100.5	99.8	98.6	102.4

5. Perform t test:
    a. A company wants to improve the sales of books. Past sales indicate that the mean sale was $105 per transaction. After the book underwent enhancement, the latest sales data indicate the mean sale of $125, with standard deviation of $14 from the sample of 25 books. Did the enhancement work? Test your hypothesis at 5% significant level.
    b. Create your hypothesis and prove if the book enhancement worked or not

6. Perform Z-test for the below application
    a. According to a recent survey, the daily one-way commute distance of U.S. worker averages 15 miles with standard deviation of 14 miles. An investigator wishes to determine whether the national average describes the mean commuting distance for all workers in New York area. Commuting distances are obtained for a random sample of 169 workers from this area, and the mean distance is found to be 16 miles.
    b. Test the hypothesis at the 0.10 significant level

Good luck 😊