**1(ex. 1.5+1.11).**

Twenty adult males between the ages of 30 and 40 participated in a study to evaluate the effect of a specific health regimen involving diet and exercise on blood cholesterol.

Ten were randomly selected to be a **control group**, and the other ten were assigned to take part in the regimen as the **treatment group** for a period of 6 months.

The following data show the **reduction in cholesterol** (in mg/dL) experienced by the 20 subjects during the study period:

- **Control group:** 7, 3, −4, 14, 2, 5, 22, −7, 9, 5
- **Treatment group:** −6, 5, 9, 4, 4, 12, 37, 5, 3, 3

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## Questions

**(a)** Draw a **dot plot** of the data for both groups on the same graph.

**(b)** Compute the **mean**, **median**, **mode** and **10% trimmed mean** for both groups.

**(c)** Explain why the **difference in means** suggests one conclusion about the effect of the regimen, while the **difference in medians or trimmed means** suggests a different conclusion.

**(d)** Calculate the **sample variance** as well as the **standard deviation** in tensile strength for both samples.

**2. (ex. 1.3+1.9)**

A certain **polymer** is used for evacuation systems in aircraft. It is important that the polymer be **resistant to the aging process**.

Twenty specimens of the polymer were used in an experiment. Ten were randomly assigned to be exposed to an **accelerated aging process** that involved exposure to high temperatures for 10 days.

Measurements of **tensile strength** (in psi) were recorded for all specimens, as shown below:

- **No aging:** 227, 222, 218, 217, 225, 218, 216, 229, 228, 221
- **Aging:** 219, 214, 215, 211, 209, 218, 203, 204, 201, 205

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## Questions

**(a)** Draw a **dot plot** of the data.

**(b)** From your plot, does it appear as if the aging process has had an effect on the tensile strength of this polymer? Explain.

**(c)** Calculate the **sample mean tensile strength** for both samples.

**(d)** Calculate the **median** for both samples. Discuss the **similarity or lack of similarity** between the mean and median of each group.

**(e)** Calculate the **sample variance** as well as the **standard deviation** in tensile strength for both samples.

**(f)** Does there appear to be any evidence that **aging affects the variability** in tensile strength?

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Would you like me to **solve all parts (a)–(d)** next (with full calculations and explanations)?

3.(ex. 1.25)

**The following dataset** gives the percentages of the families that are in the upper income level for the same individual schools.

**Data:**
72.2, 31.9, 26.5, 29.1, 27.3, 8.6, 22.3, 26.5,
20.4, 12.8, 25.1, 19.2, 24.1, 58.2, 68.1, 89.2,
55.1, 9.4, 14.5, 13.9, 20.7, 17.9, 8.5, 55.4,
38.1, 54.2, 21.5, 26.2, 59.1, 43.3

**Questions:**
(a) Calculate the sample mean.
(b) Calculate the sample median.
(c) Construct a relative frequency histogram of the data.
(d) Compute the 10% trimmed mean. Compare with the results in (a) and (b), and comment.

4.(Sheet)

Following data were obtained on the age and blood glucose concentration (BGC) collected from 6 independent individuals.

| Age | 43 | 21 | 25 | 42 | 57 | 59 |
|---|---|---|---|---|---|---|
| BGC | 99 | 65 | 79 | 75 | 87 | 81 |

Identify the dependent and independent variables. Fit a simple linear regression model. Interpret the results. Also,

(a) Predict the value of BGC when the age of an individual is 45 years.

(b) Compare the BGC between individuals of ages
(i) 35 years and 30 years
(ii) 40 years and 48 years

5. 12 customer satisfaction scales are given below:

14,27,17,19,32,42, 49,23,80,54,59,71

(a) Find the 5-number summery.

(b) Find $P_{20}$ and $P_{90.}$

6. (a) What do you mean by Outlier, Skewness and Kurtosis of a dataset?

(b) Write down the classification with conditions of Skewness and Kurtosis.

(c) For a distribution Karl Pearson's coefficient of skewness is 0.64, standard deviation is 13 and mean is 59.2. Find mode and median.

(d) The first four moments about mean of a distribution are 0, 2.5, 0.7, 18.75. Find coefficient of skewness and kurtosis.