Exercise on Measure of Dispersion:

1. The following frequency distribution refers to the number of hours worked per month of 50 workers of a factory:

No. of hours worked per month	30-55	55-80	80-105	105-130	130-155	155-180	180-205
No. of workers	3	4	6	9	12	11	5

Calculate variance and standard deviation of the frequency distribution.

[Answer: 1740.82; 41.72]

2. The following data refer to the sales in thousand takas of 25 days of a departmental store:

Sales (in thousand Tk)	Number of days
10-20	3
20-30	6
30-40	11
50-60	3

Find mean and mean deviation of store. **[Answer: 64.78; 16.79]**

3. A collar manufacturer is considering the production of new collars to attract young men. Thus following statistics of neck circumference are available based on measurements of a typical group of students of a particular university:

Mid values (in inches):	13.0	13.5	14.0	14.5	15.0	15.5	16.0	16.5	17.0
Number of students:	2	16	36	60	76	37	18	3	2

Compute the standard deviation and use the criterion $\bar{x} \pm 3\sigma$, where σ is the standard deviation and $\bar{x}$ is the arithmatic mean to determine the largest and smallest size of the collar he should make in order to meet the needs of practically all the customers bearing in mind that collars are worn average half an inch longer than the neck size.

[Answer: 12.2 and 16.4 inches]

4. ANIK Electronics is considering employing one of two training programs. Two groups were trained for the same task. Group 1 was trained by program A, group 2 by program B. for the first group, the times required to train the employees had an average of 32.11 hours and a variance of 68.09. In the second group, the average was 19.75 and the variance was 71.14. Which training program has less relative variability in its performance?

5. The normal daily high temperatures (in degrees Fahrenheit) in January for 10 selected cities are as follows.

50, 37, 29, 54, 30, 61, 47, 38, 34, 61

The normal monthly precipitation (in inches) for these same 10 cities is listed below:

4.8, 2.6, 1.5, 1.8, 1.8, 3.3, 5.1, 1.1, 1.8, 2.5

Which variable represents greater relative variability?

[Answer: Monthly precipitation data; CV_2= 52.2%>CV_1=27.55]

6. The administrator of a Georgia hospital surveyed the number of days 200 randomly chosen patients stayed in the hospital following an operation. The data are:

Hospital Stay in days	Number of patients
1 – 3	18
4 – 6	90
7 – 9	44
10 – 12	21
13 – 15	9
16 – 18	9
19 – 21	4
22 – 24	5

Calculate the following:

i. Coefficient of variation (CV).

ii. Comments on the Skewness of the distribution using the Pearson's methods.

iii. Calculate the mean, median and Mode. And hence comment.

[Answer: 60.84%; Positively Skewed (0.53); 7.72, 5.82, 5.22]

7. The manager of ***Nando's Chicken*** has just received two dozen tomatoes form her supplier, but she is not ready to accept them. She knows from the invoice that the average weight is 7.5 ounces, but she insists that all be of uniform weight. She will accept them only if the average weight is 7.5 ounces and the standard deviation is less than 0.5 ounce. Here are the weights of the tomatoes.

6.3	7.2	7.3	8.1	7.8	6.8	7.5	7.8
7.2	7.5	8.1	8.2	8.0	7.4	7.6	7.7
7.6	7.4	7.5	8.4	7.4	7.6	6.2	7.4

What would be the manager's decision and why?

[Hints: Mean=7.5; Std. dev=0.53]

8. Student's ages in the regular daytime MBA program and the evening program of BRAC University are described by these two samples:

Regular MBA	23	29	27	22	24	21	25	27	24	26
Evening MBA	27	34	30	29	28	30	34	35	28	29

If homogeneity of the class is a positive factor in learning, use a measure of relative variability to suggest which of the two groups will be easier to teach?

[Hints: Mean=24.8, 30.4; Std. dev=2.49, 2.88; CV: 10.02%, 9.46%]

9. In two factories A and B engaged in the same industry, the average monthly wages and standard deviations are as follows:

Factory	Average monthly Wages (Tk.)	S.D. of Wages (Tk.)	No. of Wage Earners
A	4600	500	100
B	4900	400	80

Determine

i. Which factory A or B pays larger amount as monthly wages?

ii. Which factory shows greater variability in the distribution of wages?

iii. What is the mean wage of all workers in two factories taken together?

[Factory A; Factory A; 4733.33Tk.]

10. Average weight of new born babies is bell shaped with mean of 3325 grams and standard deviation of 571 grams. What percent of newborn babies weigh between 2183 and 4467 grams?

11. Electric bills for May are bell shaped with a mean of $119 and a standard deviation of $22. What percent of electric bills are less than $163?