

## 2. Problem Statement

### Problem Statement 1:

You survey households in your area to find the average rent they are paying. Find the standard deviation from the following data:  
\$1550, \$1700, \$900, \$850, \$1000, \$950.

$$\text{Mean} = \frac{\sum x_i}{n} = \frac{1550 + 1700 + 900 + 850 + 1000 + 950}{6} = 1158.33$$

$$\text{Standard deviation} = \sqrt{\frac{1}{n} \sum_{i=1}^n (x_i - \mu)^2} = \sqrt{\frac{(1550 - 1158.33)^2 + (1700 - 1158.33)^2 + (900 - 1158.33)^2 + (850 - 1158.33)^2 + (1000 - 1158.33)^2 + (950 - 1158.33)^2}{6}}$$

$$= 335.92$$

### Problem Statement 2:

Find the variance for the following set of data representing trees in California (heights in feet):

3, 21, 98, 203, 17, 9

Ans) 78.86

Step 1 = Add up the numbers

$$3 + 21 + 98 + 203 + 17 + 9 = 351$$

Step 2) Square

$$351 \times 351 = 123201$$

$$\text{divide by 6 items} = \frac{123201}{6} = 20533.5$$

Step 3) Square the number individually

$$3 \times 3 + 21 \times 21 + 98 \times 98 + 203 \times 203 + 17 \times 17 + 9 \times 9$$

Add squares

$$9 + 441 + 9604 + 41209 + 289 + 81 = 51633$$

Step 4 = subtract Step 2 from Step 3

$$51633 - 20533.5 = 31,099.5$$

$$\text{Step 5} = 6 - 1 = 5$$

$$\text{Step 6} = 31,099.5 / 5 = 6219.9$$

$$\text{Step 7} = \sqrt{6219.9} = 78.86$$

### Problem Statement 3:

In a class on 100 students, 80 students passed in all subjects, 10 failed in one subject, 7 failed in two subjects and 3 failed in three subjects. Find the probability distribution of the variable for number of subjects a student from the given class has failed in.

The probability of failing in 0 subjects,  $P(X=0) = 0.8$

" " " " 1 subjects,  $P(X=1) = 0.1$

" " " " 2 subjects,  $P(X=2) = 0.07$

" " " " 3 subjects,  $P(X=3) = 0.03$

Probability Distribution

X	0	1	2	3
P(X)	0.8	0.1	0.07	0.03