STATISTICS 1&2

- **Task 1 - 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.

- **Solution 1 –**
- **Let's assume the above dataset is a sample data**
- Step 1 – Calculation of Mean – (x1+x2+x3+x4+x5+x6)/(n)
  (1550+1700+900+850+1000+950) / 6 = **1158.33**
- Step 2 – Calculation of Variance –

Data X_i	$X_i - \overline{X}$	$\left(X_i - \overline{X}\right)^2$
1550	392	153403
1700	542	293403
900	-258	66736
850	-308	95069
1000	-158	25069
950	-208	43403
$\overline{X} = \frac{\sum_{i=1}^{n} X_i}{n} = 1158.33$		$\sum_{i=1}^{n}\left(X_i - \overline{X}\right)^2 = \mathbf{677083.3}$
Variance =		$S^2 = \frac{\sum_{i=1}^{n}\left(X_i - \overline{X}\right)^2}{(n-1)} = \mathbf{677083.3} / (6-1) = \mathbf{135416.7}$

- Step 3 – Calculation of Standard Deviation –

$$S = \sqrt{\frac{\sum_{i=1}^{n}\left(X_i - \overline{X}\right)^2}{(n-1)}} = \sqrt{\mathbf{677083.3} / (6-1)} = \sqrt{\mathbf{135416.7}} = 367.99$$

Hence, the Standard Deviation is **367.99**

STATISTICS 1&2

- **Task 1 - 2:**

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

3, 21, 98, 203, 17, 9

- **Solution 2 -**
- Step 1 – Calculation of Mean – (x1+x2+x3+x4+x5+x6)/n
  (3+21+98+203+17+9) / 6 = **58.5**
- Step 2 – Calculation of Variance –

Data X_i	$X_i - \overline{X}$	$\left(X_i - \overline{X}\right)^2$
3	-55.5	3080.25
21	-37.5	1406.25
98	39.5	1560.25
203	144.5	20880.25
17	-41.5	1722.25
9	-49.5	2450.25
$\overline{X} = \frac{\sum_{i=1}^{n} X_i}{n} = 58.5$		$\sum_{i=1}^{n}\left(X_i - \overline{X}\right)^2 = 31099.5$
Variance =		$S^2 = \frac{\sum_{i=1}^{n}\left(X_i - \overline{X}\right)^2}{(n-1)} = 31099.5/(6-1) = 6219.9$

STATISTICS 1&2

- **Task 1 - 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.

- **Solution 3 –**
- The probability of failing in 0 subjects, P(X=0) =80/100 =0.8
  The probability of failing in 1 subjects, P(X=1) =10/100 = 0.1
  The probability of failing in 2 subjects, P(X=2) =7/100 = 0.07
  The probability of failing in 3 subjects, P(X=3) = 3/100 = 0.03
  The probability distribution can be shown as:

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