

ACD_MDS_V5_Session_15_Assignment_1_Main

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.

Mean:

$$\begin{aligned}\mu &= \frac{\sum x_i}{n}, \quad n=6 \\ &= \frac{1550 + 1700 + 900 + 850 + 1000 + 950}{6} \\ &= 1158.33\end{aligned}$$

Variance :-

$$\begin{aligned}\sigma^2 &= \sum (x_i - \mu)^2 \\ &= (1550 - 1158.33)^2 + (1700 - 1158.33)^2 + (900 - 1158.33)^2 + (850 - 1158.33)^2 + (1000 - 1158.33)^2 + (950 - 1158.33)^2 \\ &= 112847.2\end{aligned}$$

Standard deviation

$$\begin{aligned}\sigma &= \sqrt{\sigma^2} \\ &= \sqrt{112847.2} \\ &= 335.9274\end{aligned}$$

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

Mean :-

$$\begin{aligned}\mu &= \frac{\sum x_i}{n}, \quad n=6 \\ \mu &= \frac{(3+21+98+203+17+9)}{6} \\ &= 58.6\end{aligned}$$

Variance :-

$$\begin{aligned}\sigma^2 &= \sum (x_i - \mu)^2 \\ &= (3-58.6)^2 + (21-58.6)^2 + (98-58.6)^2 + (203-58.6)^2 + (17-58.6)^2 + (9-58.6)^2 \\ &= 5183.25\end{aligned}$$

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.

n = 100					
No. of failed subjects (x)	No. of students	P(x)	x · P(x)	$\mu = \sum (x \cdot P(x))$ = 0.33	
0	80	0.8	0		
1	10	0.1	0.1		
2	7	0.07	0.14		
3	3	0.03	0.09		