

Assignment_7.21476

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.

Solution Statement 1:

Let X_i represent each observation in the sample

Mean is given by $\bar{X} = \frac{1}{5} \sum X_i = \frac{1}{5} (1550 + 1700 + 900 + 850 + 1000 + 950) = \1158.33

Variance is given by

$$s^2 = \frac{1}{5-1} \sum (X_i - \bar{X})^2 = \frac{1}{5} ((1550 - 1158.33)^2 + \dots + (950 - 1158.33)^2) = \$112\,847.22$$

Hence the standard deviation is given by:

$$s = \sqrt{s^2} = \sqrt{112\,847.22} = \$335.93$$

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

Solution Statement 2:

Mean is given by:

$$\bar{X} = \frac{1}{6} \sum X_i = \frac{1}{6} (3 + 21 + 98 + 203 + 17 + 9) = 58.5 \text{ ft}$$

Variance is given by:

$$s^2 = \frac{1}{6-1} \sum (X_i - \bar{X})^2 = \frac{1}{5} ((3 - 58.5)^2 + (21 - 58.5)^2 + (98 - 58.5)^2 + (203 - 58.5)^2 + (17 - 58.5)^2 + (9 - 58.5)^2) = 6\,219.95 \text{ square feet}$$

Problem Statement 3:

In a class of 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 Statement 3:

Let X be the random variable that represents the number of subjects failed by a student from a given class

The probability distribution is given by

x	0	1	2	3
$P(X = x)$	$\frac{4}{5}$	$\frac{1}{10}$	$\frac{7}{100}$	$\frac{3}{100}$