Statistics Assignment 7.2

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 $\bar{X} = \frac{1}{6}\sum X_i = \frac{1}{6}(1550 + 1700 + 900 + 850 + 1000 + 950) = \$\mathbf{1158.33}$

Variance is given by

$$s^2 = \frac{1}{6-1}\sum(X_i - \bar{X})^2 = \frac{1}{5}((1550 - 1158.33)^2 + \cdots + (950 - 1158.33)^2) = \$\mathbf{135\,416.70}$$

Hence the standard deviation is given by:

$$s = \sqrt{s^2} = \sqrt{112\,847.22} = \$\mathbf{367.99}$$

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:

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

Variance is given by:

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

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