

Answer on Question #77002 – Math – Statistics and Probability

Question

Find the mean and the standard deviation of the set of numbers 5, 8, 8, 9, 14, 18, 100.

Solution

So, the mean is

$$\mu = \frac{1}{7}(5+8+8+9+14+18+100) = \frac{162}{7} \approx 23.14286.$$

Then

$$\begin{aligned} \frac{1}{7} \sum_{i=1}^7 x_i^2 - \mu^2 &= \frac{1}{7}(5^2 + 8^2 + 8^2 + 9^2 + 14^2 + 18^2 + 100^2) - (23.14286)^2 = \\ &= \frac{1}{7}(25 + 64 + 64 + 81 + 196 + 324 + 10000) - (23.14286)^2 = \\ &\approx \frac{10754}{7} - 535.59197 \approx 1536.28571 - 535.59197 = 1000.69374. \end{aligned}$$

Therefore,

the Sample Standard Deviation $s = \sqrt{\frac{7}{6} \left(\frac{1}{7} \sum_{i=1}^7 x_i^2 - \mu^2 \right)} = \sqrt{\frac{7}{6} \cdot 1000.69374} \approx 34.16835,$

the Population Standard Deviation $\sigma = \sqrt{\frac{1}{7} \sum_{i=1}^7 x_i^2 - \mu^2} = \sqrt{1000.69374} \approx 31.63375.$

Answer:

$$\mu = 23.14286,$$

$$s = 34.16835,$$

$$\sigma = 31.63375.$$