

Solution Key for Sample Problem

Meal Plan 1: {0, 4, 4, 5, 7, 10}

$$\bar{x} = \frac{\Sigma x_i}{n} = \frac{0 + 4 + 4 + 5 + 7 + 10}{6} = \frac{30}{6} = 5$$

Interpret: On average, students on Meal Plan 1 eat at Servo 5 times per week.

x_i	Deviation $(x_i - \bar{x})$	Squared Deviation $(x_i - \bar{x})^2$
0	$0 - 5 = -5$	$-5^2 = 25$
4	$4 - 5 = -1$	$-1^2 = 1$
4	$4 - 5 = -1$	$-1^2 = 1$
5	$5 - 5 = 0$	$0^2 = 0$
7	$7 - 5 = 2$	$2^2 = 4$
10	$10 - 5 = 5$	$5^2 = 25$

Sum of squared deviations, $\Sigma(x_i - \bar{x})^2 = 25 + 1 + 1 + 0 + 4 + 25 = 56$

Variance, $\frac{\Sigma(x_i - \bar{x})^2}{n-1} = 56 / (6-1) = 11.2$

Standard deviation, $\sqrt{\frac{\Sigma(x_i - \bar{x})^2}{n-1}} = \sqrt{11.2} = 3.35$

Interpret: The number of times students on Meal Plan 1 eat at Servo differs from the overall average of 5 by an average of 3.35 meals.

Meal Plan 2: {0, 0, 1, 9, 10, 10}

$$\bar{x} = \frac{\Sigma x_i}{n} = \frac{0 + 0 + 1 + 9 + 10 + 10}{6} = \frac{30}{6} = 5$$

Interpret: On average, students on Meal Plan 2 eat at Servo 5 times per week.

x_i	Deviation $(x_i - \bar{x})$	Squared Deviation $(x_i - \bar{x})^2$
0	$0 - 5 = -5$	$-5^2 = 25$
0	$0 - 5 = -5$	$-5^2 = 25$
1	$1 - 5 = -4$	$-4^2 = 16$
9	$9 - 5 = 4$	$4^2 = 16$
10	$10 - 5 = 5$	$5^2 = 25$
10	$10 - 5 = 5$	$5^2 = 25$

Sum of squared deviations, $\Sigma(x_i - \bar{x})^2 = 25 + 25 + 16 + 16 + 25 + 25 = 132$

Variance, $\frac{\Sigma(x_i - \bar{x})^2}{n-1} = 132 / (6-1) = 26.4$

Standard deviation, $\sqrt{\frac{\Sigma(x_i - \bar{x})^2}{n-1}} = \sqrt{26.4} = 5.14$

Interpret: On average, the number of times students on Meal Plan 2 eat at Servo differs from the overall mean of 5 by 5.14 meals.

Quick sanity check – be sure to always make sure your solutions seem reasonable. Do our two standard deviations make sense? Notice that you got a larger s for the second group, as expected (the scores in the second group were more spread out).