

Chapter 4 Problems

Student	Height (X)	X ²	X - \bar{X}	(X - \bar{X}) ²	Weight (Y)	Y ²	Y - \bar{Y}	(Y - \bar{Y}) ²
1	149	22201	-16.53	273.35	54	2916	-7.13	50.88
2	153	23409	-12.53	157.08	52	2704	-9.13	83.42
3	167	27889	1.47	2.15	53	2809	-8.13	66.15
4	161	25921	-4.53	20.55	57	3249	-4.13	17.08
5	151	22801	-14.53	211.22	47	2209	-14.13	199.75
6	154	23716	-11.53	133.02	62	3844	0.87	0.75
7	177	31329	11.47	131.48	69	4761	7.87	61.88
8	162	26244	-3.53	12.48	60	3600	-1.13	1.28
9	172	29584	6.47	41.82	55	3025	-6.13	37.62
10	178	31684	12.47	155.42	73	5329	11.87	140.82
11	173	29929	7.47	55.75	78	6084	16.87	284.48
12	164	26896	-1.53	2.35	58	3364	-3.13	9.82
13	181	32761	15.47	239.22	73	5329	11.87	140.82
14	182	33124	16.47	271.15	68	4624	8.87	77.15
15	159	25281	-6.53	42.68	58	3364	-3.13	9.82
Sum	2483	412769	0.00	1749.73	917	57211	0.00	1151.73
Mean	165.53	27517.93	0.00	116.65	61.13	3814.07	0.00	76.78

$$a. \bar{X} = \frac{\sum X}{N} = \frac{2483}{15} = 165.53$$

$$\bar{Y} = \frac{\sum Y}{N} = \frac{917}{15} = 61.13$$

$$b. \sum (X - \bar{X}) = 0$$

$$\sum (Y - \bar{Y}) = 0$$

$$d. \sigma_x^2 = \frac{SS_x}{N-1} = \frac{1749.73}{14} = 124.98$$

$$\sigma_x = \sqrt{\sigma_x^2} = \sqrt{124.98} = 11.18$$

$$\sigma_y^2 = \frac{SS_y}{N-1} = \frac{1151.73}{14} = 82.27$$

$$\sigma_y = \sqrt{\sigma_y^2} = \sqrt{82.27} = 9.07$$

$$c. SS_x = \sum (X - \bar{X})^2 = 1749.73 \quad \text{or} \quad SS_x = \sum X^2 - \frac{(\sum X)^2}{N} = 412769 - \frac{(2483)^2}{15} = 1749.73$$

$$SS_y = \sum (Y - \bar{Y})^2 = 1151.73 \quad \text{or} \quad SS_y = \sum Y^2 - \frac{(\sum Y)^2}{N} = 57211 - \frac{(917)^2}{15} = 1151.73$$