

Section 3.1
PART V!!

Linear Correlation

Auto Weapons x	Murder Rate y	z_x	z_y	$z_x \cdot z_y$
11.6	13.1	1.8153	1.3742	2.4946
8.3	10.6	0.9327	0.6802	0.6344
3.6	10.1	-0.3243	0.5414	-0.1756
0.6	4.4	-1.1266	-1.0411	1.1729
6.9	11.5	0.5583	0.9300	0.5192
2.5	6.6	-0.6185	-0.4303	0.2661
2.4	3.6	-0.6452	-1.2632	0.8150
2.6	5.3	-0.5917	-0.7912	0.4682
38.5	65.2	0	0	6.1949

$$\bar{x} = \frac{\sum x}{n} = \frac{38.5}{8} = 4.8125, \quad \bar{y} = \frac{\sum y}{n} = \frac{65.2}{8} = 8.15 \quad n=8$$

$$s_x = \sqrt{\frac{\sum x^2 - \frac{1}{n}(\sum x)^2}{n-1}} = \sqrt{\frac{283.15 - \frac{1}{8} \cdot 38.5^2}{7}} = 3.7392$$

$$s_y = \sqrt{\frac{\sum y^2 - \frac{1}{n}(\sum y)^2}{n-1}} = \sqrt{\frac{622.20 - \frac{1}{8} \cdot 65.2^2}{7}} = 3.6020$$

$$z_x = \frac{x - \bar{x}}{s_x}, \quad z_y = \frac{y - \bar{y}}{s_y}$$

Compute r

$$r = \frac{\sum z_x \cdot z_y}{n-1} = \frac{6.1949}{7} = 0.8850$$

Positive Correlation