Seminar 22 (Suggested Solution)

1. False
2. True
3. True
4. False
5. d
6. d

7a. n = 8, $\sum x = 236.2$, $\sum y = 162.1$, $\sum xy = 4825.35$, $\sum x^2 = 6989.16$, $\sum y^2 = 3817.43$.
Hence, $\bar{x} = \sum x/n = 29.525$, $\bar{y} = \sum y/n = 20.2625$.

$$r = \frac{(\sum xy - n\bar{x}\bar{y})}{\sqrt{(\sum x^2 - n\bar{x}^2)(\sum y^2 - n\bar{y}^2)}}$$

$$r = \frac{[(4825.35) - (8)(29.525)(20.2625)]}{\sqrt{[6989.16 - (8)(29.525)^2][3817.43 - (8)(20.2625)^2]}}$$

$$= 0.4350$$

Interpretation of r : r = 0.4350 less than 0.7
there is a weak positive linear relationship between the two variables.

b. Coefficient of Determination = $r^2 = 0.4350^2 = 0.1892$

That means only 18.92% of data variation is explained by the regression equation.
So, the regression line does not fit the sample data.

8a.

Hours of part-time job working	Grade in Examination	Rank of x	Rank of y	d	d^2
8	60	5.5	4.5	1	1
5	65	3	6.5	-3.5	12.25
5	85	3	10	-7	49
13	45	8.5	1.5	7	49
10	50	7	3	4	16
5	70	3	8	-5	25
13	65	8.5	6.5	2	4
15	45	10	1.5	8.5	72.25
2	80	1	9	-8	64
8	60	5.5	4.5	1	1
				$\sum d^2$	293.5

$$r_s = 1 - \frac{6\sum d^2}{n(n^2 - 1)}$$

$$= 1 - \frac{6(293.5)}{10(10^2 - 1)} = -0.7788$$

b. There is a strong negative linear relationship between the variables.