Regression and correlation

Questions:
a) Can Correlation coefficient be more than 1?
b) Can Correlation coefficient be less than 1?
c) Can correlation coefficient be close to zero? If yes what does that mean?
d) If the slope of the regression line is negative, then what it suggests about the nature of relationship between two variables?
e) In regression and correlation, what are the different names that we can label x and y variables?

A.

	$x =$ Hours Study/week	$y =$ Test Score	x^2	y^2	$x\,y$
1	7	68			
2	11	86			
3	16	98			
4	12	88			
5	8	79			
6	6	69			
	$\sum x = 60$	$\sum y = 488$	$\sum x^2 = 670$	$\sum y^2 = 40370$	$\sum x\,y = 5092$

1. Use the data and plot the data as a scattered diagram and **comment** on the pattern of the points.

2. Compute the correlation coefficient and **comment** on its value _____

3. Compute the slope and y-intercept and write the equation of regression line.

4. Explain the slope based on the regression equation and the in relation of x and y variables.

5. Compute average and standard deviation for both x and y variables.

6. If one student studies 10 hours a week, use **Reg. Equ.** to estimate her test score.
7. If one student has test score of 90, use **Reg. Equ.** to estimate number of hours he spends studying per week.

B

X = Experience(yrs)	14	3	5	6	4	9	18	5	16
Y = Monthly Salary $(000)	42	24	33	31	29	39	47	30	43

1. Use the data and plot the data as a scattered diagram and **comment** on the pattern of the points.

2. Compute the correlation coefficient and **comment** on its value_____

3. Compute the slope and y-intercept and write the equation of regression line._____

4. Explain the slope based on the regression equation and the in relation of x and y variables.

5. Compute average and standard deviation for both x and y variables._____

6. If some one's experience is 10 years old, use **Reg. Equ.** to estimate his salary. _____

7. If some one's salary is $38, 000, use **Reg. Equ.** to estimate her experience. _____

C.

| X= Midterm	75	68	82	91	84	77	72	88	90	66	70	81	59
Y= Final	77	72	80	89	89	80	72	88	92	70	72	83	66

1. Use the data and plot the data as a scattered diagram and **comment** on the pattern of the points.

2. Compute the correlation coefficient and **comment** on its value_____

3. Compute the slope and y-intercept and write the equation of regression line._____

4. Explain the slope based on the regression equation and the in relation of x and y variables.

5. Compute average and standard deviation for both x and y variables._____

6. If some one gets 74 on the midterm estimate his final score._____

7. If some one gets 74 on the final estimate her midterm score._____

D.

X = Number of times absent	2	3	5	2	6	0	4	3	9	5	0	4	8
Y = Average test scores	92	88	80	85	71	85	74	77	65	70	89	76	67

1. Use the data and plot the data as a scattered diagram and **comment** on the pattern of the points.

2. Compute the correlation coefficient and **comment** on its value_____

3. Compute the slope and y-intercept and write the equation of regression line._____

4. Explain the slope based on the regression equation and the in relation of x and y variables.

5. Compute average and standard deviation for both x and y variables._____

6. If some one has been absent 7 times, then estimate his average test score._____

7. If some one's average test score is 90, then estimate the number of absentees she might have_____
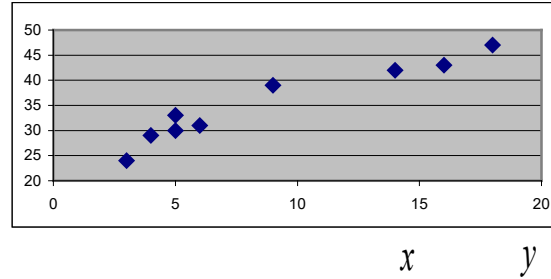
Problem   A
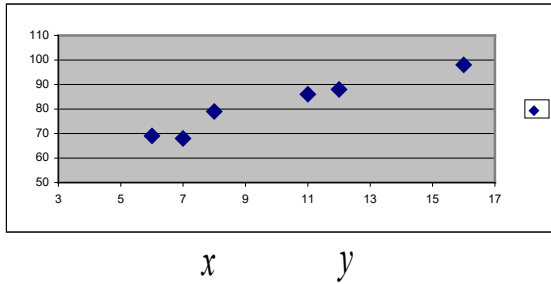
	x	y
Mean	10	81.33
St Dev.	3.74	11.66
Correl Coeff	$r = 0.972$	
Slope	3.03	
Y-itc	51.05	

Y = 3.03 X + 51.05
X = 10   , $y' = ? = 81.35$
Y = 90 , $x' = ? = 9.79$

Problem   B

	x	y
Mean	8.889	35.333
St Dev.	5.667	7.697
Correl Coeff	$r = 0.961$	
Slope	1.305	
Y-itc	23.730	

Y = 1.305 X + 23.73
X = 10   , $y' = ? = 36.78$
Y = 38   , $x' = ? = 10.93$

Problem   C

Midterm vs Final
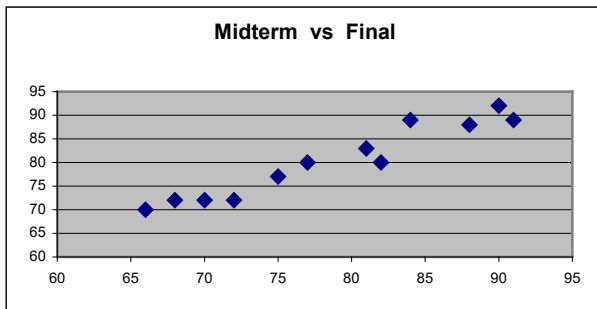
Mean	77.154	79.231
St Dev.	9.915	8.506
Correl Coeff	$r = 0.971$	
Slope	0.833	
Y-itc	14.971	

Y = 0.833 X +14.971
X = 74   , $y' = ? = 76.61$
Y = 74 , $x' = ? = 70.86$

Problem   D

Absent vs Score
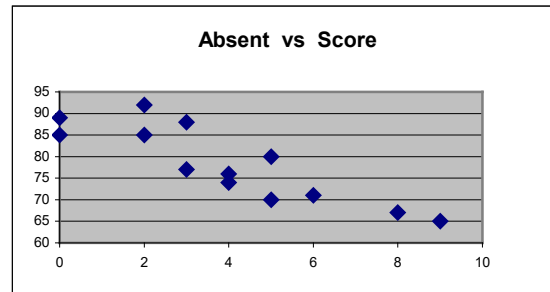
Mean	3.923	78.385
St Dev.	2.722	8.856
Correl Coeff	$r = -0.870$	
Slope	-2.830	
Y-itc	89.485	

Y = -2.83 X + 89.485
X = 7   , $y' = ? = 69.68$
Y = 90 , $x' = ? = -0.18$