G12-MDM-Term2-A1

November 7, 2019

- 1 The Dragon Academy
- 2 G12 Mathematics of Data Management
- 2.1 Term 2
- 2.2 Assignment 1
- 3 Problems

4 A: Knowledge and Application

From the following sheet, do problems 2.a) Just the scatter plot 2.b) and 2.c) 3.a,b,c and d) From b, ignore the question on the line of best fit -we'll see that next week

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5 B: Thinking and Inquiry

Answer the additional questions

- 1. The y values of the following table have been obtained directly from those of x through the relation y = 2x 1.
 - 1. If *x* would increase by 3 units, how much should we expect *y* to change? Say as well wether *y* would increase or decrease.
 - 2. Determine the covariance of *x* and *y*
 - 3. Determine the correlation coefficient between *x* and *y*

x	у
0	-1
1	1
2	3
3	5
4	7

- 2. The y values of the following table have been obtained directly from those of x through the relation y = -2x 1.
 - 1. If *x* would increase by 3 units, how much should we expect *y* to change? Say as well wether *y* would increase or decrease.
 - 2. Determine the covariance of *x* and *y*
 - 3. Determine the correlation coefficient between *x* and *y*

x	У
0	-1
1	-3
2	-5
3	-7
4	-9

3. Determine the covariance and the correlation coefficient for the data of the following table where each data point has been measured twice. Note: This table continues in the following page.

x	У
0	-1
0	-1
1	1
2	3
3	5

x	у
4	7
1	-3
2	-5
3	-7
4	-9

- 4. Consider the general case when $y = a \cdot x + b$. By substituting this relationship into the formulae for the corresponding statistics
 - 1. If *x* would increase by 3 units, how much should we expect *y* to change? Say as well wether *y* would increase or decrease.
 - 2. Determine the expression of the covariance cov(x, y) in terms of the variable x.
 - 3. Determine the expression of pearson's correlation coefficient r_{xy} in terms of the variable x.
- 5. From the previous questions choose which of the following statements is not true:
 - 1. If we get a (pearson's) correlation coefficient equal to 1 then the *y* follows a linear relation in terms of the *x*
 - 2. If both variables exactly follow a linear relation, then the correlation coefficient (in absolute value) is 1.
 - 3. If the correlation coefficient is zero, then both variables are independent
 - 4. If both variables are independent, then there is no correlation between them and pearson's correlation coefficient will be zero.