MATH 1115 - Fundamental Mathematics for the General Sciences I

ASSIGNMENT 6 (GROUP 1) [1]

* To be submitted by 3 p.m. on Wednesday, 31st. November, 2016 in the Department of Mathematics and Statistics (BOX labelled MATH 1115 GI as appropriate). Late assignments will be deducted 50% of achieved mark. Assignments submitted more than 24 hours late will be awarded a mark of zero.

* On your script, please include in the following order: Course code and Group number, Assignment number, Name, ID number and Instructor's name (Ms. L Addison). For example, Math 1115 GI, Assignment #2, Jane Doe, 81009672, Ms. L. Addison.

* Please ensure that you submit your script in the appropriate box in the department, labelled FOR YOUR GROUP of Math 1115.

* Attempt ALL questions, showing ALL working where applicable.

* Note that a selection of the questions will be marked, not necessarily all.

Question 1:

1. The two variables x and y have a linear relationship. The following table shows values of each:

x	2.1	3.2	4.2	5.2	6.0
y	2.4	3.6	4.8	5.5	7.2

a) Calulcate the following using the information above and enter in the spaces provided:

$\sum x$	$\sum x^2$	$\sum y$	$\sum y^2$	$\sum xy$

b) Find the line of the best fit in the form $y = a_0 + a_1 x$ where:

$$a_1 = \frac{n\sum x_i y_i - \sum x_i \sum y_i}{n\sum x_i^2 - (\sum x_i)^2} \text{ and } a_0 = \bar{y} - a_1 \bar{x} \text{ where } \bar{x} = \frac{\sum x_i}{n} \text{ and } \bar{y} = \frac{\sum y_i}{n}$$

Use the space provided to calculate the values of a_1 and a_0, then clearly state the equation of the line of best fit using the formulae provided.

c)   State the appropriate equation and answer NEXT to the questions below.

Estimate the value of i) y *when* $x = 1.5$

ii) x *when* $y = 2.5$

d)   Calculate the value of the correlation coefficient, r, STATING CLEARLY the equation you used to find r.

Correlation coefficient, r = ... (to 3.d.p.)

e) Determine the standard deviations for the x-values and y–values respectively, STATING CLEARLY the equation/s you used to find them.

i) Standard deviation of x-values = ... (2 d.p.)

ii) Standard deviation of y-values = ... (2 d.p.)

Question 2:

It is claimed that a new medicine has a success rate of 55%. Fifteen patients are selected at random and
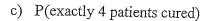
treated with it. What is the probability that:

a) at least 3 patients are cured?

b) at most 12 patients are cured?

c) exactly 4 patients are cured?

[Hint: Let X be the random variable denoting the number of patients cured by medicine, where

$X \sim Bin(n,p)$ and n=15, p = 0.55].

a) P(at least 3 patients cured)

b) P(at most 12 patients cured)

c) P(exactly 4 patients cured)

Question 3:

The weights of males in a University are said to follow a normal distribution with mean 60 kg and standard deviation 5kg. Let W be the weight in kg of any given male.

We can say that $W \sim N(60, 5^2)$.

Use the portion of the Normal tables provided below to assist you in answering the following questions.

Standard Normal Values for $Z \sim N(0, 1)$
$P(Z < 0) = 0.5$
$P(Z < 1) = 0.8413$
$P(Z < 1.5) = 0.9332$
$P(Z < 2.0) = 0.9772$

Find the probability that a male chosen at random is:

a) Less than 67.5 kg in weight. [i.e. Find P(W<67.5)]

b) Between 65 kg and 70 kg in weight. [i.e. Find P(65<W<70)]

THE END ☺