Quiz 2

Total marks = 100   Answer all questions

In all the questions, show detailed derivations.
Write down your name and your SID

Qn 1

A player has a probability of winning a match of 0.4. After playing 10 matches, what is the probability that he wins 3 matches and the 3rd win occur on the 10th match?

(10 marks)

Qn 2

Suppose in a box with 10 balls, there are 2 red balls. Randomly draw without replacement n balls. What should the minimum n be if it is desired to have at least 50% chance of drawing both red balls?

(10 marks)

Qn 3

The values of two stocks A and B at 5 consecutive days are

Days	Stock A	Stock B
1	30	40
2	31	41
3	29	42
4	31	43
5	28	40

a) Compute the Pearson coefficient.

b) What is the relationship between the two stocks?

c) What implicit assumption have you made?   (10 marks)

Qn 4

Five measurements of an experimental outcome are made. The results are as follows:

5, 6, 8, 4, 5

a) Find the 90% confidence interval of the outcome.

b) What assumption(s) have you made?

c) If we wish to have a tighter confidence interval, what should be done?

(20 marks)

Qn 5

A newly developed drug is supposed to be able to reduce blood pressure. The systolic blood pressure data on 10 patients before and after taking the drug for one month are as follows:

Patient	before	after
1	120	120
2	130	120
3	135	120
4	140	145
5	155	145
6	140	125
7	165	160
8	115	120
9	130	120
10	140	120

It is desired to test whether the drug has any effect at all. Compute the p value using

a) sign test (using normal approximation)
b) signed rank test (using normal approximation)

(30 marks)

Qn 6

Repeat the last question using t test. Will you use paired or unpaired test? Determine whether the hypothesis will be rejected at level of significance 0.05.

What additional assumption(s) you must make to use this test?   (10 marks)

Qn 7

If we wish to test whether the drug in Qn 5 does reduce blood pressure, using sign test (**without** using normal approximation), will the hypothesis be rejected at level of significance 0.1?

(10 marks)

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