ANSWER 5 OUT OF 7 QUESTIONS (20 MARKS EACH)

Question 1

a) For each of the following statements, state whether Descriptive or Inferential statistics is used:

(i)   Eating too much salty food will lead to kidney problem
(ii)   Nine out of ten nurses are women
(iii)   The average salary of new graduates is S$3000 per month
(iv)   Allergy therapy makes bees go away

(4 marks)

Indicate whether the following variables are nominal, ordinal, interval or ratio level of measurement:

(v)   The amount of time taken in minutes
(vi)   The type of products produced by a company
(vii)   The grades of students for Accounting module
(viii)   The average temperature of a city

(4 marks)

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b) Twelve batteries were tested to see how many hours they would last. The frequency distribution is shown in the table below.

Find each of the following
i) Mean
ii) Modal Class
iii) Variance
iv) Standard Deviation

(12 marks)

Hours	Frequency			
1 – 3	1			
4 – 6	4			
7 – 9	5			
10 – 12	1			
13 – 15	1			

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Question 2

a) A patient complained that the cost of a doctor's visit was too high. She randomly surveyed 20 other patients and found that the mean amount of money they spent on each visit was $44.80. The standard deviation of the sample was $3.53. Assume the variable is normally distributed.

    i) Find the point estimate of the population mean.

    ii) Find the 95% confidence interval of the population mean.

   iii) Explain the interval obtained in part (ii).

(8 Marks)

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b)   The following set of raw data shows the weights of a group of 40 students in a
     class, measured correct to the nearest kilograms.

53	55	58	42	52	58	51	56	43	56
45	60	50	59	62	48	59	47	69	52
40	51	64	65	45	54	68	63	55	63
52	49	58	56	51	59	41	40	56	48

i)   Recommend a suitable class width to construct a grouped frequency
      distribution with 6 classes. Show your workings.
ii)   Construct a grouped frequency distribution starting from '40 to 44', '45
      to 49', ….
iii) Draw a histogram and frequency polygon.

(12 marks)

Class limits	Class boundaries	Mid-points	Frequency

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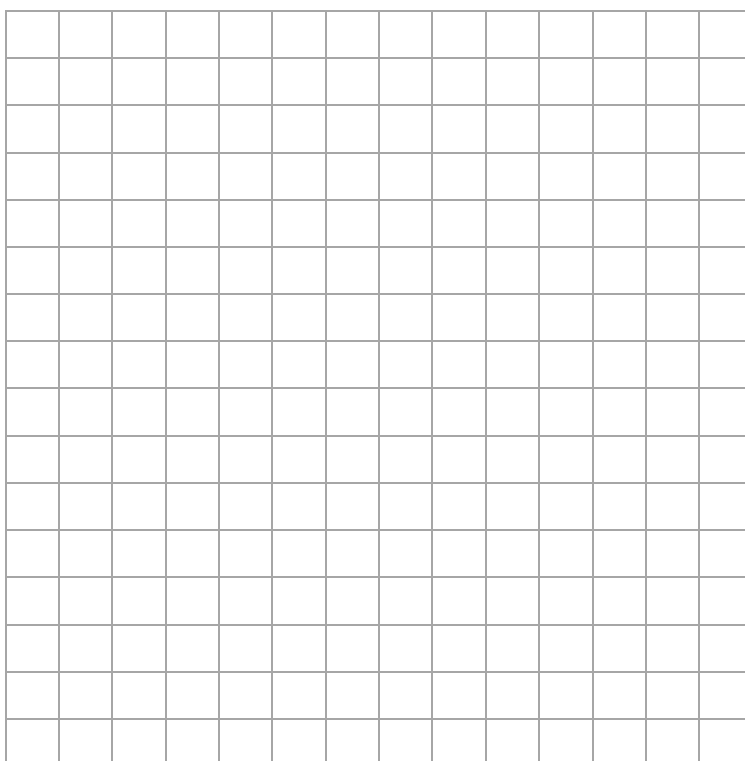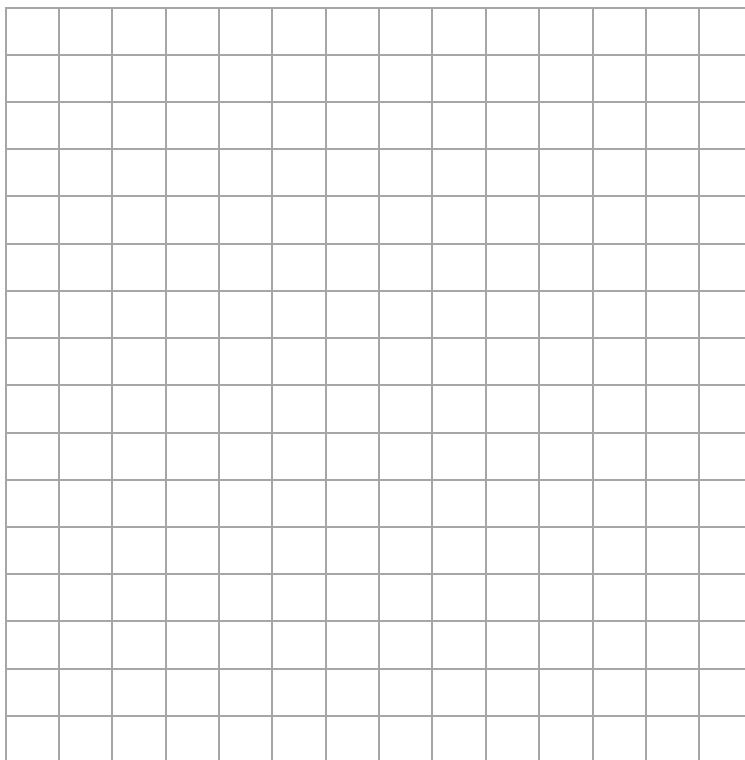
Question 3

a)   Find the mean, median, mode and range of the data given below:

8   2   5   8   5   13   5   1   2   4

(8 marks)

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b)   At a used book sale, 110 books are adult books and 170 books are children's books. Of the adult books, 70 are nonfiction while 70 of the children books are nonfiction. If a book is selected at random, find the probability that it is

    i) Fiction

    ii) Nonfiction book, given that it is a children's book

    iii) A children and nonfiction book

    iv) An adult book or a nonfiction book

    v) Are the events 'Children' and 'Non-fiction' mutually exclusive?

	Fiction	Non-Fiction	Total
Adult books			
Children books			
Total			

(12 marks)

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Question 4

a) In a survey, 25% of people are found to be volunteers for charity work. If 10
   people are selected randomly, find the probability that:
      i)   None of them are volunteers   (2 marks)
      ii)   Exactly 4 people are volunteers   (2 marks)
      iii)   At most 2 people are volunteers   (6 marks)
           (Give your answers to **four** decimal places)

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b) i) A sample of the reading scores of 35 students has a mean of 82. The standard deviation of the population is 15. Find the 95% confidence interval of the mean scores.

(5 marks)

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ii) The average monthly mobile phone bill of sample 20 persons was $42.55. The sample standard deviation was $8.05. Assuming that the monthly mobile phone bill is normally distributed, find the 95% confidence interval of the true population mean.

(5 marks)

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Question 5

a) The average annual salary for preschool teachers is $35,441. Assume that the salary is normally distributed with σ = $5100.

    i) What is the probability that a randomly selected teacher has an annual salary that is greater than $45,000?

    ii) If there are 500 preschool teachers in the region, how many of them will have an annual salary that is greater than $45,000?

    iii) For a sample of 75 teachers, what is the probability that the sample mean salary is greater than $38000?

(10 marks)

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b) Men spend an average of 29 minutes per day on weekends and holidays exercising and playing sports. A random sample of 25 men resulted in a mean of 35 minutes exercising with a standard deviation of 6.9 minutes. At the $\alpha = 0.05$ level of significance, is there sufficient evidence that the results differ from national means.

(10 marks)

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Question 6

a) On a daily run of an express bus, the average number of passengers is 48. The standard deviation is 3. Assume the variable is normally distributed. Find the probability that the bus will have

    (i)   Between 38 and 41 passengers   (5 marks)

    (ii)   Fewer than 42 passengers   (3 marks)

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b) An educator wants to see how the number of absences for a student in her class affects the student's final grade. The data obtained from a sample are shown below:

No. Of absences, x	10	12	2	0	8	5
Final grade, y	70	65	96	94	75	82

(i)   Compute the correlation coefficient and comment on the relationship between the number of absences and final grade   (7 marks)

(ii)   Determine the equation of the regression line.   (5 marks)

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Question 7

a) (i)   Two variables X & Y are negatively correlated. Explain the effect of the increase in variable X on variable Y.

   (ii)   Explain the relationship between two variables when the correlation coefficient values are +0.92; -0.11

   (iii)   Calculate the coefficient of determination when the correlation coefficient is -0.11.

<div align="right">(8 marks)</div>

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b) An instructor wishes to see if the way people obtain information is independent of their educational background. A survey of 400 high school and college graduates yielded this information. At $\alpha = 0.05$, test the claim that the way people obtain information is independent of their educational background.

	Television	Newspapers	Other sources
High school	159	90	51
College	27	42	31

(12 marks)

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