1. A discrete numerical data set with N = 100 numbers has the following   relative frequency table.

Relative frequency	0.2	0.2	0.1	0.3	m
Data Points	-1	0	1	3	4

     i.   What is the relative frequency 'm' of 4?
    ii.   What is the frequency of 0?
   iii.   What is the median of the data set?
   iv.   What is the first Quartile?

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2. The mean and standard deviation of a series of 10 data points (x1, x2, x3, x4, x5, x6, x7, x8, x9, x10) are 20 and $\sqrt{16}$.

Find;

     i.   the sum $\sum(x)$ of 10 data points,

    ii.   the sum of squares $\sum(x^2)$ the 10 data points

3. Out of 100 people surveyed in a study, 20 are cancer patients in which there are 10 males. What is the probability that if the person surveyed is a cancer patient then he is a male?

4. An experiment takes a random amount of time W, measured in seconds, to complete.

    The probability density function of W is f(w) = αw +1/2   (0 < w < 1)
    where α is a constant.

     i.   Calculate the value of α.
    ii.   Find the cumulative distribution function of W.
   iii.   Calculate the probability that the experiment takes between 0.5 and 0.9 seconds to complete.

    iv.   Calculate the mean and variance of W.

5. In a box of 200 light bulbs, 20 are found to be defective. What is the probability that the number of defectives exceeds 10?

6. A Suppose that we have a random sample of UK adults who are 25 or older of size n = 40 from a Normal distribution whose mean (μ) height has an unknown value but the variance, σ^2 = 25.0. From these data it has been calculated that the sample mean, is 29.63.
   Show that there is no significant evidence at the 5% level to reject $H_0 : \mu = 30.0$ in favour of the alternative $H_1 : \mu < 30.0$.

7. You are an Assistant Manager, and want to promote as the Manager at your company. But that depends on who is being Managing Director (MD) at next time.
   a. With MD Peter, the probability of promoting as Manager is 0.5
   b. With MD John, the probability of promoting as Manager is 0.3
   Peter can be next MD with a probability of 0.6.

   What is the probability that you will promote as a Manager at next time?

8. a) State the general factors involved in determining sample size.

   b) A study is to be performed to determine a certain parameter in a community. From a previous study a standard deviation of 46 was obtained. If a sample error of up to 4 is to be accepted. How many subjects should be included in the sample of study at 95% level of confidence?

9. The Agriculture department of Sri Lanka conducts as eight-week experiment. In each week, it records the temperature (X) and the yield of a certain new crop (Y). The data are summarized as follows.

$\sum_i^n xi = 52$ $\sum_i^n (xi)^2 = 380$ $\sum_i^n xi * yi = 1335$ $\sum_i^n yi = 225$
$\sum_{k=0}^n (yi)^2 = 7007$ n = 8

   i.   Calculate the Pearson's product moment correlation coefficient.
   ii.   Test whether the correlation is significant at 1% level of significance.

10. A vehicle dealer has 10 vehicles for sale. She decides to investigate the link between the age of vehicles (in years) and the diesel usage per kilometer (in liters). The data collected, the scatterplot and the R & SPSS outputs are given below.

Age	2	2.5	3	4	4.5	4.5	5	3	6	6.5

Diesel Usage	22	34	33	37	40	45	49	30	58	58

Scatterplot of Mileage vs. Age
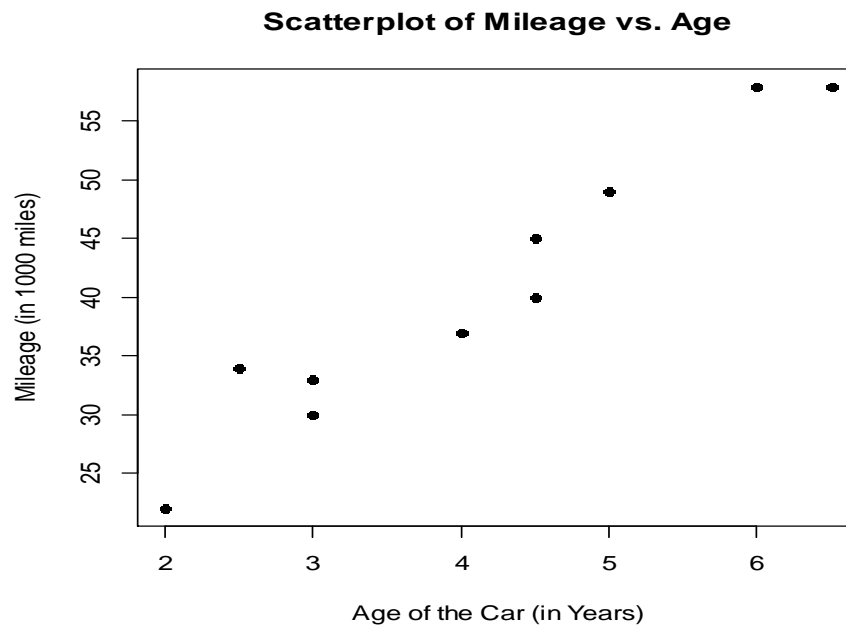
R Output:

Coefficients:	
(Intercept)	Age
8.892	7.734

Analysis of Variance Table						
Response: Age						
	Df	Sum Sq	Mean Sq	F Value	Pr(>F)	
Diesel Usage	1	1190.21	**D**	**G**	4.05e-06	***
Residuals	**A**	78.19	**E**			
Total	**B**	**C**	**F**			
Signif. Codes:	0 '***'	0.001 '**'	0.01 '*'	0.05 '.'	0.1 ' '	1

i.   What can be concluded using the scatterplot?

ii.   Find values marked A, B, C, D, E, F and G in the ANOVA table (Show workings).

State the estimated regression equation in the form of $\hat{Y} = \hat{\alpha} + \hat{\beta}X$ and state how much more will a vehicle be driven in a 12-month period.