1. Arithmetic mean of the following distribution is 60.5. Compute the **upper limit (A) of the last class**.

Class Frequencies

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20 and less than 30 100

30 and less than 40 140

40 and less than 54 125

54 and less than 70 200

70 and less than 100 180

100 and less than **A** 55

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800

1. The following table gives the monthly income distributions of the employees of two firms (A and B).

**A B**

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Income Number of Income Number of

(millions of L.T.) employees (millions of L.T.) employees

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160 and less than 200 10 200 and less than 240 5

200 and less than 240 15 240 and less than 280 17

240 and less than 280 20 280 and less than 320 23

280 and less than 320 18 320 and less than 360 25

320 and less than 360 15 360 and less than 400 15

360 and less than 400 12 400 and less than 420 10

400 and less than 440 10 420 and less than 460 5

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100 100

a) In which of these two firms the incomes are greater?

b) In which of these two firms dispersion of the incomes is greater?

1. Annual average rates of return (%) of two different stocks, for a period of seven years, are shown in the table:

STOCK A STOCK B

4 % 6.5 %

* 1. 4.4

1. 3.8

- 12.7 6.9

- 22.5 8.0

* 1. 5.8
  2. 5.1

Compare these two stocks from (a) rate of return and (b) risk, points of view.

1. In a random sample of 50 cars, gasoline consumption of these cars (mile per gallon of gasoline) were observed and the following results were obtained.

Mile per gallon Number of cars

14 and less than 16 4

16 and less than 18 6

18 and less than 20 13

20 and less than 22 20

22 and less than 24 7

a) Draw the histogram of the distribution and the show the mod value on it.

b) What is the average mile realised using a gallon of gasoline?

c) What can you say about the skewness of this distribution?

1. A lot of 25 television sets contains five defectives. If a customer buys five television sets for the meeting rooms of his company and they are randomly drawn from the lot of 25, what is the probability that
2. all five are defective?
3. at least four of them is non-defective?
4. Two of them are defective?
5. An investigation of the life cycle of a particular type of automobile tire disclosed that there was a 0.9772 probability that a tire would be used 45,000 kilometers or longer and a 0.8413 probability that it would be used 50,000 kilometers or longer. Assume that the life length of the tires is a normally distributed random variable.
6. What is the standard deviation of the life cycle of this type of tire?
7. What is the mean life of this type of tire?
8. What is the probability that a tire of this type last between 50,000 and 65,000 kilometers?
9. The number of customers that arrive to a cash of a supermarket per minute is known to follow a Poisson distribution with a mean rate of 4 customers per minute. What is the probability that
10. 4 customers arrive to the cash in a given one minute-period?
11. at least 2 customers arrive in a given one minute-period?
12. 8 customers arrive in a given thirty-second period?
13. 4 customers arrive in a given two-minute period?
14. A machine produces a certain product. X denotes the random variable that represents the length of the product (in millimeters). Suppose that X follow a normal distribution with mean μ = 54 millimeters and standard deviation σ = 0,2. A product is qualified as defective if x ≤ 53,6 or x ≥ 54,3.
    1. What is the probability that a randomly chosen product is defective?
    2. For controlling that the machine works properly, the tolerance limits, (μ – a) and (μ + a) are taken into account. These limits are defined as follow:

P (μ – a ≤ μ ≤ μ + a) = 0,95.

Calculate the tolerance limits.

1. A very large shipment of parts contains 10% defectives. Two parts are chosen randomly from the shipment and checked. Let the random variable X denote the number of defectives found. Find the probability function of this random variable.
2. A shipment of 20 parts contains 2 defectives. 2 parts are chosen at random from the shipment and checked. Let the random variable Y denote the number of defectives found. Find the probability function of this random variable. Explain why your answer is different from that of part (**9**).
3. A corporation produces packages of paper clips. The number of clips per package varies, as indicated in the accompanying table.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Number of clips | 47 | 48 | 49 | 50 | 51 | 52 | 53 |
| Proportion of packages | 0.04 | 0.13 | 0.21 | 0.29 | 0.20 | 0.10 | 0.03 |

1. Draw the probability function.
2. Calculate and draw the cumulative probability function.
3. What is the probability that a randomly chosen package will contain between 49 and 51 clips (inclusive)?
4. 2 packages are chosen at random. What is the probability that at least one of them contains at least fifty clips?
5. Find the mean and standart deviation of the number of paper clips per package.
6. The cost (in cents) of producing a package of clips is 16+2X, where X is the number of clips in the package. The revenue from selling the package, however many clips it contains, is $1.50. If profit is defined as the difference between revenue and cost, find the mean and standart deviation of profit per package.
7. A factory manager is considering whether to replace a temperamental machine. A review of past records indicates the following probability distribution for the number of breakdowns of this machine in a week.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Number of breakdowns | 0 | 1 | 2 | 3 | 4 |
| Probability | 0.10 | 0.26 | 0.42 | 0.16 | 0.06 |

1. Find the mean and standart deviation of the number of weekly breakdowns.
2. It is estimated that each breakdown costs the company $1500 in lost output. Find the mean and standart deviation of the weekly cost to the company from breakdown of this machine.