Given the following measures on the Statistics scores for a group of 25 second year's students:

The smallest 3 values	The first quartile	The median	The third quartile	The largest 3 values
30, 33, 37	40	45	60	72, 80, 98

1) Draw the Box-Plot.
2) Find a measure of central tendency
3) Is the value "15" an outlier? Why?
4) Determine the direction of the skewness (without calculation).
5) Calculate the coefficient of skewness, and comment.
6) Is it a difficult exam? Why?

1) **Draw the Box-Plot.**

98

60 Q3

45 Q2   median

40 Q1

30   min
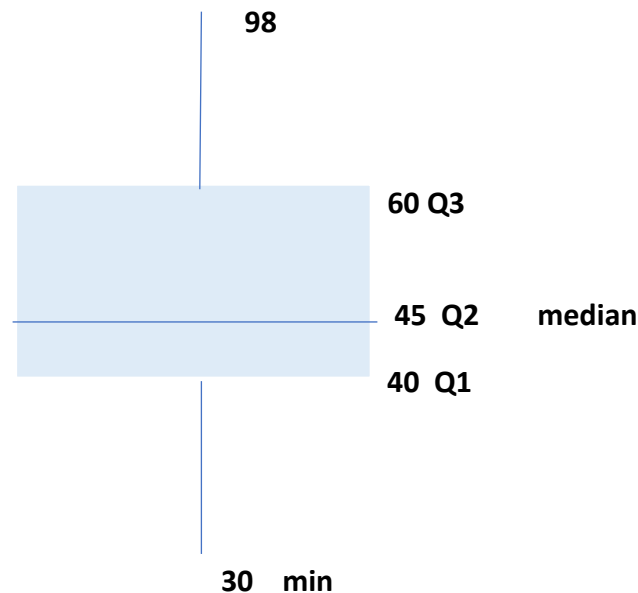
2) **Measure of Central.**

   Answer :-   The median is 45

3) Checking if "15" is an Outlier

Calculate IQR = Q3 - Q1 = 60-40= **20**

Calculate upper limit = Q3 + 1.5 * IQR = 60 + 1.5 * 20 = **90**

Calculate lower limit = Q1 – 1.5 * IQR = 40 – 1.5 * 20 = **10**

So 15 is not outlier because 15 > lower limit (10)

4) Direction of Skewness (Without Calculation)

the distribution **is right-skewed (positive)** because distance from centeral to max is larger

than distance from min to centeral .

5) Calculating Coefficient of Skewness

$$\beta = \frac{(Q_3 - Q_2) - (Q_2 - Q_1)}{(Q_3 - Q_1)}$$

= (60-45) – (45-40) / (60-40) = 0.5

This positive value confirms the right-skewness we observed .

6) is it a difficult exam ? why ?

Yes the exam is difficult .

Because 50 % of studends scored < or = 45 and 75 % of students scored < or = 60 .

(1) What name is given to a table that lists all the values that a discrete random variable X can assume and their corresponding probbilities?

(2) For the probability distribution of a discrete random variable, the probability of any single value of X is always
   a. In the range 0 to 1   b. 1.0   c. less than zero

(3) For the probability distribution of a discrete random variable, the sum of the probabilities is always ....

(4) The parameters of the binomial probability distribution are .... and ....

(5) The binomial distribution is skewed to the right if π 0. 5

(6) The parameter/ parameters of the Poisson probability distribution is/ are ....

(7) Find the mean and the standard deviation from the followin table

x	−4	0	1	2
$P(X = x)$	0.2	0.3	0.3	0.2

(8) A factory has eight machines. The probability is 0.04 that any machine will break down at any time. Find the probability that at any given time:
   a. All eight machines will be broken down
   b. Exactly two machines will be broken down
   c. None of the machines will be broken down

(10) A high school boys' basketball team averages 1.2 technical fouls per game. Find the probability that in agiven game this team will commit:
a. Exactly three technical fouls
b. At least two technical fouls
c. Find the mean and the standard deviation

1) Probability mass function (pmf).

2) In the range 0 to 1

3) 1

4) N and P where **n** is total number of trails and **P** is probability of success.

5) If π < 0. 5, the distribution is skewed to the right.

6) λ **(average number of occurrences)**

7) Mean of x = μx = E(X) = $\dfrac{\sum X.p(x)}{}$ =
(−4)(0.2)+(0)(0.3)+(1)(0.3)+(2)(0.2)=−0.8+0+0.3+0.4= −0.1

Calculate Variance :-

X	p(x)	x.p(x)	x2.p(x)
-4	0.2	-0.8	3.2
0	0.3	0	0
1	0.3	0.3	0.3
2	0.2	0.4	0.8
total	1	-0.1	4.3

Variance = 4.3 − 0.01= 4.29

Standard deviation= 2.07

8)

   a) $P(x=8) = (0.04)^8 = 6.55 * 10^{-12}$

   b) $P(X=2)= 28 * 0.04^2 * 0.96^6 = 0.035$

   c) $P(X=0) = 1 * 0.04^0 * 0.96^8 = 0.721$

10)

   a) $\lambda=1.2$ $P(X=3) = e^{-1.2} * (1.2)^3 / 3! = 0.0867$

   b) $P(X \geq 2)=1-P(X=0)-P(X=1)$

     $P(X=0)=e^{-1.2} = 0.3012$

     $P(X=1)=e^{-1.2} * (1.2)^1 = 0.3614$

     $P(X \geq 2)=1-0.3012-0.3614=0.3374$

   c) *Mean (μ) = $\lambda=1.2=1.2$*

     Standard Deviation (σ) = $\lambda^{1/2}=1.2^{1/2} =1.095$