Chapter - 14
Statistics

Q: 1 In statistics, an outlier is a data point that differs significantly from other observations of a data set.
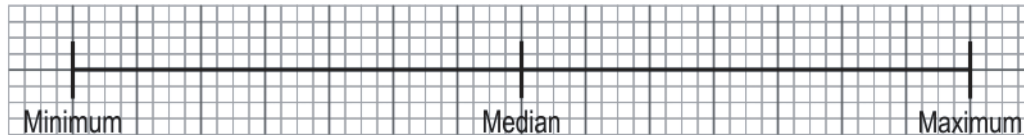
If an outlier is included in the following data set, which measure(s) of central tendency would change?
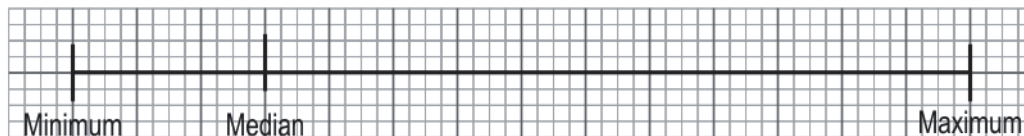
12, 15, 22, 44, 44, 48, 50, 51

1 only mean
2 only mean and median
3 all - mean, median, mode
4 (cannot be said without knowing the outlier.)

Q: 2 Shown below are number line representations of the medians of two different data sets.

i) Data set 1:

ii) Data set 2:

Minimum - Smallest data point
Maximum - Largest data point

Which of the two representations of median could be correct?

1 only i)
2 only ii)
3 both i) and ii)
4 (cannot say without knowing the elements of the data sets)

Q: 3 **A survey was conducted on 80 gamers on how many games did they play in a day. The data is given below.**

Number of games	Number of gamers
1 - 2	20
2 - 3	24
3 - 4	10
4 - 5	12
5 - 6	8
6 - 7	4
7 - 8	2

Which of the following is the modal class?

1 1 - 2   **2** 2 - 3   **3** 4 - 5   **4** 7 - 8

Q: 4 **A ketchup manufacturing company sells ketchup in three different bottle sizes. Now, it wants to sell only one size in the market. It has data on how the three sizes perform in the market.** [1]

Based on which measure of central tendency, should the company fix the size of the ketchup bottle? Justify your answer.

Q: 5 **The mean temperature of a certain city for 31 consecutive days was found to be 35.7°C. Further, the mean temperature of the first 8 days was 28.4°C. The mean temperature of the next 12 days was 36.4°C.** [3]

Find the mean temperature of the rest of the days. Show your work.

(Note: Round the numbers to one decimal point.)

Q: 6 **Bowling strike rate for a bowler is defined as the average number of balls bowled per wicket taken. A Bowler has taken 148 wickets so far with a strike rate of 27. In his next match, he bowls 48 balls and takes 2 wickets.** [3]

What is his new strike rate? Show your work.

Q: 7 **In a class test, the mean score of the class is 60. Half the students of the class scored 80 marks or above in the test.** [2]

Dipti said, "Each of the remaining half of the students would have definitely got 40 marks or below in the test for the mean to be 60 marks".

Prove or disprove Dipti's statement with a valid example.

Answer the questions based on the given information.

TRP stand for Television Rating Point. It is a tool that indicates the popularity of a television channel/program. It is used to judge which TV channel/program is viewed the most. A channel with higher TRP indicates that the channel is viewed by a large number of viewers.

Shown below is a data taken from 25000 televisions in a city. The table shows the details of 2 channels, their screen times and the number of viewers. Screen time refers to the duration for which the channel was viewed.

	Screen time (in hours)	0 – 2	2 – 4	4 – 6	6 – 8	8 – 10	10 – 12
Number of Viewers	Channel 1	5500	10000	6000	2000	1000	500
	Channel 2	9000	6000	6500	1500	1700	300

Q: 8 **On an average, how long does a viewer watch channel 1? Show your steps.** **[2]**

(Note: Round your answer to two decimal places.)

Q: 9 **Construct a less than type ogive for channel 2. Show your work.** **[3]**

Q: 10 **The frequency distribution of daily rainfall in a town during a certain period is shown below.** **[3]**

Rainfall (in mm)	Number of days
0 - 20	7
20 - 40	x
40 - 60	10
60 - 80	4

Unfortunately, due to manual errors, the information on the 20-40 mm range got deleted from the data.

If the mean daily rainfall for the period was 35 mm, find the number of days when the rainfall ranged between 20-40 mm. Show your work.

Q: 11 Shown below is an ogive for the average wages of 35 countries for the period 2017-2020. [1]

(Source of data: https://data.oecd.org/earnwage/average-wages.htm)

Raghav interpreted, "Since it is an increasing graph, a higher number of countries have an average wage of 60-70 thousand dollars than 30-40 thousand dollars in the given period."

Is Raghav right or wrong? Justify your answer.

(Note: Average wage of a country refers to the average wage of the working adult population of a country.)

Q: 12 Shown below is a table representing the percentage distribution of mental health disorders of Asian countries in 2019. [1]

Percentage of citizens with mental health disorders	Number of Asian countries
7.5 - 10	1
10 - 12.5	25
12.5 - 15	11
15 - 17.5	4
17.5 - 20	1

(Source of data: https://ourworldindata.org/mental-health.)

Can the median of the above data be greater than 12.5%? Give a valid reason.

Teacher should award marks if students have done the following:

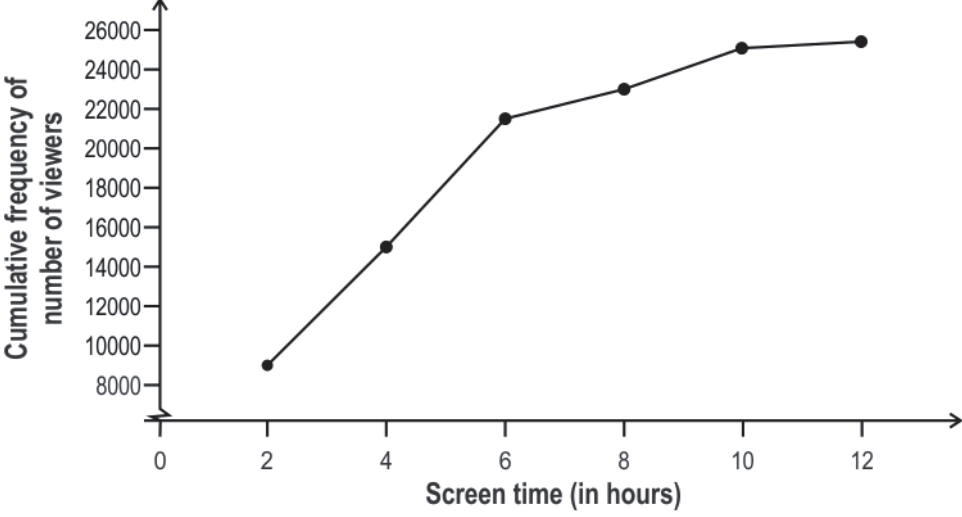| Q.No	Correct Answers
1	1
2	3
3	2

Q.No	Teacher should award marks if students have done the following:	Marks
4	Writes that the company should fix the size of the ketchup bottle based on the mode.	0.5
	Writes that the mode gives the information about the size that is sold most often.	0.5
5	Finds the number of days remaining as 31 - 8 - 12 = 11.	0.5
	Finds the sum of the temperatures of all the 31 days as 35.7°C × 31 = 1106.7°C.	0.5
	Finds the sum of the temperatures of first 8 days as 28.4°C × 8 = 227.2°C.	0.5
	Finds the sum of the temperatures of next 12 days as 36.4°C × 12 = 436.8°C.	0.5
	Finds the sum of the temperatures of last 11 days as 1106.7°C - 227.2°C - 436.8°C = 442.7°C.	0.5
	Finds the mean temperature of the last 11 days as $\frac{442.7}{11}$ = 40.2°C.	0.5
6	Finds the total number of balls bowled by the bowler so far as 148 × 27 = 3996.	1
	Finds the total number of balls bowled after the latest match as 3996 + 48 = 4044 and total number of wickets taken after the latest match as 148 + 2 = 150.	1
	Finds the new strike rate of the bowler as (total number of balls bowled)/(total number of wickets taken) = $\frac{4044}{150}$ = 26.96.	1
7	Writes that Dipti's claim is not correct.	0.5
	Writes a valid example by showing scores of some students where the mean is 60 marks, half of the students scored 80 marks or above, but the rest have scored both above and below 40 marks. For example, Consider there are 4 students in the class with scores, 80, 90, 20 and 50. The mean is 60 marks, half of them got 80 or above, but one score in the remaining half is above 40.	1.5

Q.No	Teacher should award marks if students have done the following:	Marks
8	Rewrites the data of channel 1 as:	1.5

Class Interval	f_i	x_i	$f_i x_i$
0 - 2	5500	1	5500
2 - 4	10000	3	30000
4 -6	6000	5	30000
6 - 8	2000	7	14000
8 - 10	1000	9	9000
10- 12	500	11	5500
	$n = 25000$		$\Sigma f_i x_i = 94000$

Writes that, on an average, a viewer watches channel 1 for $\frac{94000}{25000} = 3.76$ hours.		0.5
9	Writes the cumulative frequency of the data corresponding to channel 2 as:	1

Class Interval	f_i	Cumulative frequency
0 - 2	9000	9000
2 - 4	6000	15000
4 -6	6500	21500
6 - 8	1500	23000
8 - 10	1700	24700
10- 12	300	25000

Q.No	Teacher should award marks if students have done the following:	Marks
	The ogive may look as follows:	2

(Award full marks if the ogive is drawn directly without writing the table in the first step.)

Q.No		Marks
10	**Completes the frequency distribution table as:**	1.5

Rainfall (in mm)	Number of days / Frequency (f_i)	Class-mark (x_i)	($f_i x_i$)
0 - 20 mm	7	10	70
20 - 40 mm	x	30	30x
40 - 60 mm	10	50	500
60 - 80 mm	4	70	280
Total	21 + x		850 + 30x

Writes the equation for mean as:		0.5

$$\frac{850+30x}{21+x} = 35$$

Solves the equation in step 2 to find the value of x as 23.		1

Q.No	Teacher should award marks if students have done the following:	Marks
11	Writes that Raghav is wrong and justifies the answer. For example, 4 countries have an average wage of 60-70 thousand dollars and 7 countries have an average wage of 30-40 thousand dollars in the given period.	1
12	Writes that the median of the given data cannot be greater than 12.5% as 10 - 12.5 is the median class.	1

Q.No	Teacher should award marks if students have done the following:	Marks