

Activity Questions.

WEEK 3Topic
Dt:

Q1. Table shows the frequency of outcome of rolling a dice?

What is the value of x ?

Face NO	Frequency	RF
1	5	0.125
2	+	0.1
3	x	0.15
4	9	0.225
5	8	0.2
6	8	0.2



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$$\text{Relative frequency} = \frac{\text{Frequency}}{N}$$

$$0.125 + 0.1 + 0.15 + 0.225 + 0.2 + 0.2 = 1$$

$$\text{face } 1 \rightarrow \frac{5}{0.125} \rightarrow 40$$

$$\text{face } 3 \rightarrow \frac{x}{90} \rightarrow 0.15$$

$$x = \frac{0.15 \times 90}{100} \cdot 6 \approx$$



Q2.

C.I	F
1-20	5
20-40	10
40-60	6
60-80	8
80-100	6
	<u>35</u>

Q.

How much % of total time did she receive the cashback worth to ₹10 to ₹60?

Percentage. =

$$\left(\frac{6}{35} \right) \times 100 = [17.14] \stackrel{\text{u}}{=}$$

Q3. The number of wickets taken by bowler Jashant in trip school cricket

F → 1 2 5 6 4 (3) 4 2 1 6 4 (3) 1 (3) 2
 Total = [5] find the RF to 3 wickets?

$$RF = \frac{3}{16} = \boxed{0.2} \stackrel{\text{u}}{=} \\ DR \\ 20\% \checkmark$$

Q4. The markings of the given were newly launched Samsung mobile. How many ways gave a marking ≥ 3 or = 3?

Only count the fraction $\geq 3 \Rightarrow$

$$110 + 210 + 41 = [71] \stackrel{\text{u}}{=}$$

Q5. Histogram

Q C.I [55, 60)
 ↓ included \rightarrow not

$$\text{Class Mark} = \frac{55 + 60}{2} = [57.5] \stackrel{\text{u}}{=}$$

To which class does a student who got 65 marks belong?
 Q6. $\boxed{65-70}$ → because marks are $\Rightarrow 65$

3.2



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Q1. approx mean?

Midpoint	Weight
$60+70 = 65$	7
75	5
85	4
95	9

No. of categories
7
5
4
9
<u>20</u>

$$\begin{array}{l} \text{Total weight} \\ 65 \times 7 \rightarrow 455 \\ 75 \times 5 \rightarrow 375 \\ 85 \times 4 \rightarrow 340 \\ 95 \times 9 \rightarrow 850 \\ \hline 1550 \end{array}$$

$$\text{mean} \rightarrow \frac{1550}{20} = \boxed{77.5}$$

Q2. Mean of the following data 26?

19.3 20.1 23.4 23.5 21 29.8.

$$\text{Total} = 129.1 + x$$

$$\bar{x} = 26$$

$$\text{mean} = \frac{\Sigma x}{N}$$

$$26 = \frac{129.1 + x}{6} \Rightarrow 26 \times 6 = 129.1 + x$$

$$\Rightarrow 156 - 129.1 = x$$

$$\therefore x = 26.9$$

Q3. The no of wickets taken by bowler Jadhav in his school wicket matches

1 2 15 6 4 3 4 21 6 4 3

1 3 2

Q. What is Avg no of wickets taken by Jadhav?

$$\text{Total} = 47 \\ N = 15$$

$$\text{Avg} = \frac{\text{Total}}{N} = \frac{47}{15} = 3.13$$

Nearest int.

Q4. The ratings given by audience? What is Avg 3 ?

Fig 3.2.1

	Eff	$\sum f_i$	$\sum f_i x_i$	\bar{x}
1	98	98	98	
2	192	192	384	
3	125	125	375	
4	220	220	880	
5	65	65	325	
		<u>977</u>	<u>2927</u>	<u>2927</u>
				$\Rightarrow 3.02$



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Q5. Option 1 \rightarrow Mean is affected by outliers in the data
 \rightarrow mean is calculated by summing all points

Option 2 \rightarrow Mean value calculated from discrete data from a frequency

\rightarrow each point is subtracted except 1.

Q. Mean of continuous No. in table 3.2 ?

Midpoint	Class	F	$f_i m_i$
15	10-20	20	300
25	20-30	25	625
35	30-40	40	1400
45	40-50	35	1575
55	50-60	30	1650
65	60-70	25	1625
		175	2175

$$\frac{\sum f_i m_i}{\sum f_i}$$

$$\frac{2175}{175} \textcircled{41}$$

$$175$$



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$$\boxed{41} \text{ Ans}$$

3.3

Q1. Median of actual marks?

66 68 70 82 78 67 79 81
75 95

Median

$\Rightarrow 66, 67, 68, 70, \textcircled{75}, \textcircled{78}, 79, 81, 82, 85$.

Median

$$\frac{75+78}{2} = \frac{153}{2} = \boxed{76.5} \text{ Ans}$$

Q2. Mode change of mode?

No mode available in data

Q4. Median of certain data set is 21! Now each value in the data set is incremented by 4 and multiplied by 4. What is the median of final dataset?

Original Median of finaldata is 21 and transformed into by adding 16 to each element and multiply by 4.

Medium of final dataset = 4x21+16

Q5 Stem and leaf plot $\Rightarrow 84 + 16$
represent ages above $\Rightarrow \boxed{100}$ by
50 years for the person
living in colony? What is the median of ages?

fun	decay	put in the ascending order
5	1 2 4 5 7	
6	4 7 8 9	
7	1 3 5 6 7 8	
8	4 5 6 8 9	.51 52 54 55 57 6 + 67 68 69 71 73 75 76 77 78 84 85 86 88 89

Q6. Given that the median of the original data set x_1, x_2, \dots, x_n is 45?

Original date yet 2, 22, , . In = 45
Transformed

Original median = 45

$$\rightarrow 8 \times 45 + 1$$

$$\rightarrow 135 + 1$$

$$\rightarrow \boxed{136}$$

Q8. The mode of the marks obtained by students in a class is 65.

Mode of original dataset = 66

adding 4 to each student.

66+4, 66+4, 66+4 ... 66+n

70, 70, 70, ... n

Mode = $\boxed{70}$

Q9. Stem and leaf graph represent the temperatures?

Mode \rightarrow



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stem	leaf
6	1 2 4 5 7
7	4 1 8 9 9
8	1 1 5 6 7 8
	4 5 6 8 9

64, 69, 71

Q10. The mode of the data x_1, \dots, x_n is 95? What is the mode $2x_1 + 5, 2x_2 + 5, \dots, 2x_n + 5$?

Transformed data

$$2x_1 + 5, 2x_2 + 5, \dots, 2x_n + 5$$

If $x_i = 95$ \rightarrow original mode.

$$2x_i + 5 = 2(95) + 5$$

$$\approx \boxed{195}$$



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Q11. Fig 3.3.3.

Everyone knows that how to find mode

#(Highest occurrence of number)

$\boxed{3} \text{ } 2$

Activity 3.4

Q1. Calculate the sample variance (in kg²) for the above data?

Ans

$$\begin{aligned}
 x_1 &\rightarrow (x_1 - \bar{x})^2 \\
 62 &\rightarrow (62 - 71.99)^2 \rightarrow 99.53 \\
 85 &\rightarrow (85 - 71.99)^2 \rightarrow 170.6116 \\
 80 &\rightarrow 65.923 \\
 62.5 &\rightarrow 89.1016 \\
 82 &\rightarrow 102.0016 \\
 72.4 &\rightarrow 0.2116 \\
 68 &\rightarrow 15.6216 \\
 65 &\rightarrow 18.7236 \\
 78.5 &\rightarrow 2.422 \\
 69 &\rightarrow 8.6416 \\
 \bar{x} &\Rightarrow \frac{719.4}{10} \\
 x_1 &\rightarrow 71.99
 \end{aligned}$$

Sample variance

$$\Rightarrow \frac{\sum (x_i - \bar{x})^2}{N-1}$$

$$\Rightarrow \frac{602.6839}{9}$$

$$\Rightarrow \underline{\underline{66.6249 \text{ kg}^2}}$$



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Q2. The gymnasium owner find the weighting machine is defective! The machine show less than 3kg less weight than the actual weight!

$$\begin{aligned}
 \text{(Calculate new } \bar{x}) \Rightarrow & 65 + 88 + 83 + 65.5 + 85 + 75.4 + 71 + 68 + 76.5 \\
 & + 72 = 719.4 \Rightarrow \underline{\underline{71.99}}
 \end{aligned}$$

$$\underline{\underline{\sum (x_i - \bar{x})^2 = 602.6839}}$$

$$\Rightarrow \frac{602.6839}{9} = \underline{\underline{66.6249 \text{ kg}^2}} \quad \text{Same as above}$$

Note [Adding or subtracting a constant value to each data point in a sample does not affect of the sample variance].

Q5. Range of Data!

x_i	$(x_i - \bar{x})^2$	
5.4	0.044	
5.5	0.012	Range = Max Min
6	0.1521	
6.1	0.2101	$\rightarrow 6.1 - 5.1$
5.4	0.044	
5.7	0.0081	
5.9	0.0841	
6.1	0.2601	<u>1.0 feet</u>
5.3	0.0961	
5.7	0.0081	
$\frac{56.1}{10}$	<u>5.61</u>	
	<u>0.949</u>	

Q6 Sample variance.

$$\frac{0.949}{9} \Rightarrow \underline{\underline{0.1054 \text{ feet}^2}}$$

Q7 SD

$$S = \sqrt{S^2} \Rightarrow \sqrt{0.1054} \Rightarrow \underline{\underline{0.3247 \text{ feet}^2}}$$

Q8.

Adding 0.1 to each \rightarrow value

$$\frac{5.5 + 5.6 + 6.1 + 6.2 + 5.5 + 5.8 + 6.0 + 5.2 + 5.4 + 5.8}{10} \Rightarrow$$

$$\Rightarrow \frac{59.1}{10} \Rightarrow \underline{\underline{5.91}}$$

$$\frac{\sum (x_i - \bar{x})^2}{n-1} \Rightarrow \frac{0.949}{9} \Rightarrow 0.3 \cdot \underline{\underline{0.1054 \text{ feet}^2}}$$

$$SD = \sqrt{0.1054} = \underline{\underline{0.3247}}$$

[This que same as before no need worry that adding and subtracting in the sample ~~not~~ it's not effect on the sample, ans is same]

Q9.

Standard Deviation is affected by outliers

✓ \rightarrow The main reason is that data far from the mean. ~~Outlier \uparrow when variance \uparrow~~ \rightarrow spread of data \uparrow when var \uparrow .

Variance is affected by outliers

✓ \rightarrow outliers \uparrow when variance \uparrow



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Activity 8.5

Q1. Which of the following is Measure of dispersion?

IQR [Interquartile Range]

Percentile

Quartile formula

Median quartile

$Q_1 \rightarrow 1^{\text{st}}$ Quartile

Observation $\frac{1}{4} \rightarrow 25^{\text{th}}$ Percentile

Even $\left(\frac{n}{4}\right) \rightarrow 4^{\text{th}}$

odd $\left(\frac{n+1}{4}\right) \rightarrow 4^{\text{th}}$

Q2. Median &
50th percentile

$$= IQR = Q_3 - Q_1$$

Q2 Median
50th percentile

(1) $\frac{n}{2}^{\text{th}}$

$\left(\frac{n}{2}\right)^{\text{th}}$

$\left(\frac{n+1}{2}\right)^{\text{th}}$

Q3 upper
75th percentile

(2) $\frac{3n}{4}^{\text{th}}$ percentiles

$\left(\frac{3n}{4}\right)^{\text{th}}$

$\left(\frac{3(n+1)}{4}\right)^{\text{th}}$

Q3

stem	leaf
1	1 3
2	2 5 6
3	3 8
4	2 5 7 9

50th percentile

$$11 \text{ observation} \times \frac{11+1}{2} = \frac{12}{2}$$

$\boxed{33}$ cm

(odd) $\rightarrow 6^{\text{th}}$ observation

Q4.

Percentile formula

$$\left[\frac{\text{Rank} \times \text{Total No. of Observation}}{100} \right]$$

(15) (25)

85 23 57 37 92 81 89

Arrange in
ascending
order

$$8^{\text{th}} \text{ percentile} \Rightarrow \frac{9}{100} \times 9 = 0.81 \rightarrow 1^{\text{st}}$$

15 cm

$$Q_1 \rightarrow \frac{1}{4} \times 9 = \frac{2.25}{100} \rightarrow 2.25 \rightarrow \text{Close to } \frac{2^{\text{nd}}}{100} \rightarrow 25 \text{ cm}$$

$$Q_3 \rightarrow \frac{3}{4} \times 9 = \frac{6.75}{100} \rightarrow 6.75 \rightarrow \text{Close to } 7^{\text{th}}$$

$$IQR = Q_3 - Q_1$$

$$37 - 25 = \boxed{12} \text{ cm}$$



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Q8. First Quartile
(Q1) Total Observations \approx 14

~~14~~ ~~2~~ ~~3.5~~
~~4~~ ~~4th observation.~~

~~19~~ \rightarrow close to 20
3 Ans

Q2 \Rightarrow

Q10. Range of Data

$$\text{Max} - \text{Min} \rightarrow 70 - 5 = 65 \text{ dm}$$



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