



## TEST 1 (ANSWER SCHEME)

Course: STATISTICS & PROBABILITY

Course Code: DUM2413

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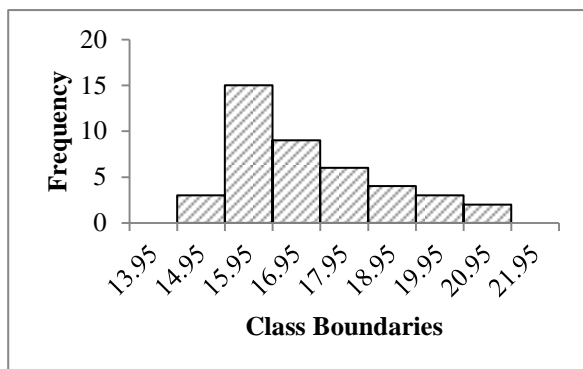
QUESTION 1	
Answer	Remarks
<p>(i)  <b>Population:</b>                      480 customers who purchased the cars for the past 12 months from the outlets.  <b>Type of population:</b>                      Tangible.</p> <p>(ii)  <b>Variable:</b>                      Level of satisfaction.  <b>Level of measurement:</b>                      Ordinal-level scale.</p> <p>(iii)  <b>Sampling Method:</b> stratified sampling technique.</p>	



QUESTION 2																																	
Answer	Remarks																																
<p>(i)</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 20px;"> <thead> <tr> <th style="text-align: center;">Class Limits</th> <th style="text-align: center;">Class Boundaries</th> <th style="text-align: center;">Midpoint</th> <th style="text-align: center;">Frequency</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">14.0-14.9</td> <td style="text-align: center;">13.95-14.95</td> <td style="text-align: center;">14.45</td> <td style="text-align: center;">3</td> </tr> <tr> <td style="text-align: center;">15.0-15.9</td> <td style="text-align: center;">14.95-15.95</td> <td style="text-align: center;">15.45</td> <td style="text-align: center;">15</td> </tr> <tr> <td style="text-align: center;">16.0-16.9</td> <td style="text-align: center;">15.95-16.95</td> <td style="text-align: center;">16.45</td> <td style="text-align: center;">9</td> </tr> <tr> <td style="text-align: center;">17.0-17.9</td> <td style="text-align: center;">16.95-17.95</td> <td style="text-align: center;">17.45</td> <td style="text-align: center;">6</td> </tr> <tr> <td style="text-align: center;">18.0-18.9</td> <td style="text-align: center;">17.95-18.95</td> <td style="text-align: center;">18.45</td> <td style="text-align: center;">4</td> </tr> <tr> <td style="text-align: center;">19.0-19.9</td> <td style="text-align: center;">18.95-19.95</td> <td style="text-align: center;">19.45</td> <td style="text-align: center;">3</td> </tr> <tr> <td style="text-align: center;">20.0-20.9</td> <td style="text-align: center;">19.95-20.95</td> <td style="text-align: center;">20.45</td> <td style="text-align: center;">2</td> </tr> </tbody> </table> <p>(ii)</p> <p>Mean, <math>\bar{x} = 16.6881</math></p> $\text{Median} = L_{\text{median}} + \left( \frac{\left(\frac{n}{2}\right) - f_L}{f} \right) * C$ $= 15.95 + \left( \frac{\left(\frac{42}{2}\right) - 18}{9} \right) * 1$ $= 16.2833$ $\text{Mode} = L_{\text{mode}} + \left( \frac{\lambda_1}{\lambda_1 + \lambda_2} \right) * C$ $= 14.95 + \left( \frac{12}{12 + 6} \right) * 1$ $= 15.6167$ <p>Since (Mode = 15.6167) &lt; (Median = 16.2833) &lt; (Mean = 16.6881), therefore the data of weights of chocolate bars is right-skewed distributed.</p>	Class Limits	Class Boundaries	Midpoint	Frequency	14.0-14.9	13.95-14.95	14.45	3	15.0-15.9	14.95-15.95	15.45	15	16.0-16.9	15.95-16.95	16.45	9	17.0-17.9	16.95-17.95	17.45	6	18.0-18.9	17.95-18.95	18.45	4	19.0-19.9	18.95-19.95	19.45	3	20.0-20.9	19.95-20.95	20.45	2	
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(iii)



Since the histogram also depicted that the data of weights of chocolate bars is right-skewed distributed, therefore the answer in (ii) can be supported.

**QUESTION 3**

**Answer**

**Remarks**

(i)

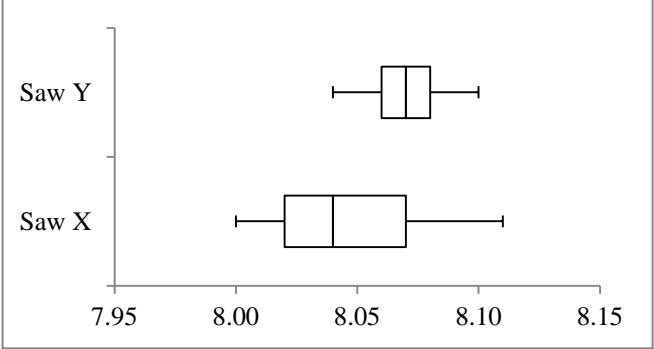
Saw	$X$	$Y$
$\bar{x}$	8.0489	8.0700
$s$	0.0372	0.0224

Since  $(s_X = 0.0396) > (s_Y = 0.0236)$ , the data of Saw  $X$  is more variable compares to Saw  $Y$ .

(ii)

Information	Saw $X$	Saw $Y$
Minimum (Min)	8.00	8.04
First Quartile ( $Q_1$ )	8.02	8.06
Median( $Q_2$ )	8.04	8.07
Third Quartile ( $Q_3$ )	8.07	8.08
Maximum (Max)	8.11	8.10
Outlier	No	No



Saw X	Saw Y
$Q_1 = x_{\frac{1(9)}{4}} = x_{2.25} = x_3 = 8.02$	$Q_1 = x_{\frac{1(9)}{4}} = x_{2.25} = x_3 = 8.06$
$Q_2 = x_{\frac{2(9)}{4}} = x_{4.5} = x_5 = 8.04$	$Q_2 = x_{\frac{2(9)}{4}} = x_{4.5} = x_5 = 8.07$
$Q_3 = x_{\frac{3(9)}{4}} = x_{6.75} = x_7 = 8.07$	$Q_3 = x_{\frac{3(9)}{4}} = x_{6.75} = x_7 = 8.08$
<p><b>Outlier:</b></p> <p><b>Lower Limit (LL)</b>  <math>x &lt; Q_1 - 1.5(Q_3 - Q_1)</math>  <math>x &lt; 8.02 - 1.5(8.07 - 8.02)</math>  <math>x &lt; 7.9450</math></p> <p><b>Upper Limit</b>  <math>x &gt; Q_3 + 1.5(Q_3 - Q_1)</math>  <math>x &gt; 8.07 + 1.5(8.07 - 8.02)</math>  <math>x &gt; 8.1450</math></p>	<p><b>Lower Limit (LL)</b>  <math>x &lt; Q_1 - 1.5(Q_3 - Q_1)</math>  <math>x &lt; 8.06 - 1.5(8.08 - 8.06)</math>  <math>x &lt; 8.0300</math></p> <p><b>Upper Limit</b>  <math>x &gt; Q_3 + 1.5(Q_3 - Q_1)</math>  <math>x &gt; 8.08 + 1.5(8.08 - 8.06)</math>  <math>x &gt; 8.1100</math></p>
<p>(iii)</p>  <p><b>Shape of distribution:</b>  <b>Saw X:</b> Right-skewed distribution; <b>Saw Y:</b> Symmetrical distribution</p> <p><b>Variation:</b>  Since <math>(IQR_X = 0.05) &gt; (IQR_Y = 0.02)</math>, therefore the data of Saw X is more variable compares to Saw Y.</p>	



QUESTION 4	
Answer	Remarks
<p>(i)  <math>s = 6.1803\text{km}</math></p> <p>(ii)  <math>1.9393 = 14.3000 - 6.1803k</math>  <math>6.1803k = 12.3607</math>  <math>k = 2</math></p> <p><math>1 - \frac{1}{k^2} = 1 - \frac{1}{2^2} = 0.75</math></p> <p>At least 75% of one-way distance home to college is between 1.9393 and 26.6607 km.</p>	

