Topic Test 11 Summary statistics

Section I — Multiple choice

1 What is the mode for these scores 7, 4, 4, 7, 5, 4, 3, 1, 6, 5, 3, 5 and 5?

A 4 B 4.5 C 5 D 6

2 Blake spends the following amounts each day: \$5.30, \$4.40, \$4.50, \$5.00, \$3.80, \$4.80. What is the median?

A \$4.10 B \$4.40 C \$4.65 D \$4.75

3 What is the median of the data in this table?

A 1 B 2

C 2.5 D 4

4 What is the mean of the data in this table?

A 1 B 2

C 2.5 D 4

Score	Frequency	fx
1	8	
2	5	
3	5	
4	3	
5	3	

5 What is the population standard deviation of 19, 6, 11, 15, 13, 14, 10 and 21?

A 4.5 B 4.8 C 8 D 13.6

6 What is the difference between the mode and the mean for these scores: 90, 50, 70, 80 and 50?

A 12 B 18 C 20 D 28

7 What is the frequency of the highest score?

A 1 B 3

C 5 D 10

8 What is the population standard deviation of the data in this table?

A 1.22 B 1.23

C 1.24 D 1.25

Score	Frequency
1	3
2	5
3	9
4	11
5	10

9 Which statement about the set of scores 1, 2, 3, 4, 5, 5, 8 is true?

A Mean and median are equal. B Mean and mode are equal.

C Median and mode are equal. D Mean, median and mode are unequal.

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Section II — Short answer

1 Assessment task results: 72, 93, 74, 95, 80, 83, 86, 68, 95, 84, 94, 95, 85, 82, 37, 75, 74, 90, 96 and 29.

a Find the mean, median and mode scores. (Answer correct to one decimal place.)

b Which is the better measure for the centre for the data? Explain your answer.

2 Calculate the value of the following measures correct to one decimal place.

a Mean b Median c Mode

Score	Frequency	fx
100	6	
101	9	
102	10	
103	6	

3 Find the sample standard deviation of each data set. (Answer correct to one decimal place.)

a 32, 23, 26, 35, 27, 24, 29 b 6.1, 6.3, 4.9, 5.6, 4.8, 6.2, 4.9

4 The following frequency table shows the results of a test out of 20.

a Complete the fx column.

b Find the mean of this data to the nearest whole number.

c What is the modal class?

Class	Class centre	Freq (f)	fx
40–46		5	
47–53		2	
54–60		7	
61–67		2	
68–74		3	

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Worked solutions

<table>
<tr><th>Section 1</th><th>Solution</th><th>Answer</th></tr>
<tr><td>1</td><td>Mode is the score with highest frequency.
Mode is 5</td><td>C</td></tr>
<tr><td>2</td><td>\$3.80, \$4.40, \$4.50, \$4.80, \$5.00, \$5.30
$\text{Median} = \frac{\$4.50 + \$4.80}{2}$
$= \$4.65$</td><td>C</td></tr>
<tr><td>3</td><td>There are 24 scores.

Median is the average of the 12th and 13th score.

Median is 2.

<table><tr><th>Score</th><th>Frequency</th><th>fx</th></tr><tr><td>1</td><td>8</td><td>8</td></tr><tr><td>2</td><td>5</td><td>10</td></tr><tr><td>3</td><td>5</td><td>15</td></tr><tr><td>4</td><td>3</td><td>12</td></tr><tr><td>5</td><td>3</td><td>15</td></tr><tr><td></td><td>24</td><td>60</td></tr></table></td><td>B</td></tr>
<tr><td>4</td><td>$\text{Mean} = \frac{\sum fx}{\sum f}$
$= \frac{60}{24}$
$= 2.5$</td><td>C</td></tr>
<tr><td>5</td><td>Population standard deviation is 4.525966748… or 4.5</td><td>A</td></tr>
<tr><td>6</td><td>Mode is 50
$\text{Mean} = \frac{\text{Sum of scores}}{\text{Number of scores}}$
$= \frac{90+50+70+80+50}{5} = 68$
Difference $= 68 - 50 = 18$</td><td>B</td></tr>
<tr><td>7</td><td>Highest score is 5.
Frequency of 5 is 10.</td><td>D</td></tr>
<tr><td>8</td><td>Population standard deviation is 1.22982331… or 1.23</td><td>B</td></tr>
<tr><td>9</td><td>$\text{Mean} = \frac{\text{Sum of scores}}{\text{Number of scores}} = \frac{1+2+3+4+5+5+8}{7} = 4$
Median = 4 (1, 2, 3, 4, 5, 5, 8)
Mode = 5 (score with the highest frequency)
Statement A is correct.</td><td>A</td></tr>
</table>

<table>
<tr><th>Section II</th><th>Solution</th></tr>
<tr><td>1a</td><td>29 37 68 72 74 74 75 80 82 83
84 85 86 90 93 94 95 95 95 96
Order the scores into increasing order.
Mean = 79.5
Median = 83.5
Mode = 95</td></tr>
<tr><td>b</td><td>Median is a better measure as it is not distorted by outliers</td></tr>
<tr><td>2a</td><td>
<table>
<tr><th>Score</th><th>Frequency</th><th>fx</th></tr>
<tr><td>100</td><td>6</td><td>600</td></tr>
<tr><td>101</td><td>9</td><td>909</td></tr>
<tr><td>102</td><td>10</td><td>1020</td></tr>
<tr><td>103</td><td>6</td><td>618</td></tr>
<tr><td></td><td>31</td><td>3147</td></tr>
</table>
$\text{Mean} = \dfrac{\sum fx}{\sum f}$
$= \dfrac{3147}{31} \approx 101.5$
</td></tr>
<tr><td>b</td><td>There are 31 scores. Median is the 16^{th} score.
Median is 102.</td></tr>
<tr><td>c</td><td>Mode is the score with the highest frequency.
Mode is 102</td></tr>
<tr><td>3a</td><td>Sample standard deviation is 4.320493799… or 4.3</td></tr>
<tr><td>b</td><td>Sample standard deviation is 0.670465367… or 0.7</td></tr>
<tr><td>4a</td><td>
<table>
<tr><th>Class</th><th>Class centre</th><th>Freq (f)</th><th>fx</th></tr>
<tr><td>40–46</td><td>43</td><td>5</td><td>215</td></tr>
<tr><td>47–53</td><td>50</td><td>2</td><td>100</td></tr>
<tr><td>54–60</td><td>57</td><td>7</td><td>399</td></tr>
<tr><td>61–67</td><td>64</td><td>2</td><td>128</td></tr>
<tr><td>68–74</td><td>71</td><td>3</td><td>213</td></tr>
<tr><td></td><td></td><td>19</td><td>1055</td></tr>
</table>
</td></tr>
<tr><td>b</td><td>$\text{Mean} = \dfrac{\sum fx}{\sum f} = \dfrac{1055}{19} \approx 55.5$</td></tr>
<tr><td>c</td><td>Modal class is 54–60</td></tr>
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