

PALESTINE POLYTECHNIC UNIVERSITY

Faculty of Applied Sciences

Introduction to Applied Statistics

First Exam (40 points)

Thursday 15/10/2020

60 Minutes

Instructor: Dr. Monjed H. Samuh

Name:

Key

Student ID:

Q1]... [4 points] Determine whether the data are qualitative or quantitative.:

1. Weights of adult women.

Quant. (+1)

2. Temperature (Measured in Fahrenheit or Celcius).

Quant. (+1)

3. Patient condition (Good, Fair, Serious, Critical).

Qual. (+1)

4. Heart rate of runners in a marathon.

Quant. (+1)

Q2]... [6 points] Find the class boundaries and widths for each of the following classes:

1. 58 - 62.

	boundaries	width	
→	57.5 - 62.5	5	(+2)

2. 16.3 - 18.5. →

16.25 - 18.55	2.3	(+2)
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3. 16.35 - 18.46. →

16.345 - 18.465	2.12	(+2)
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Q3]... [20 points] The following data give the LDL cholesterol level in a sample of ten heart patients.

132 139 162 147 133 160 145 150 148 153.

1. (8 points) Calculate the coefficient of variation.

$$\begin{aligned}
 CV &= \frac{S}{\bar{X}} \times 100\% ; (+) \\
 &= \frac{10.16}{146.9} \times 100\% \\
 &= \underline{\underline{6.92\%}} (+)
 \end{aligned}
 \left.
 \begin{aligned}
 S^2 &= \frac{\sum X_i^2 - \frac{(\sum X_i)^2}{n}}{n-1} (+) \\
 &= \frac{216725 - \frac{(1469)^2}{10}}{9} = \frac{929}{9} \doteq 103.22 (+) \\
 \Rightarrow S &= \sqrt{103} = 10.16 (+) \\
 \bar{X} &= \frac{\sum X_i}{10} = \frac{1469}{10} = 146.9 (+)
 \end{aligned}
 \right\}$$

2. (2 points) Find the z-score of 145.

$$Z = \frac{145 - 146.9}{10.16} \doteq -0.19$$

(+)
(+)

132, 133, 139, 145, 147, 148, 150, 153, 160, 162.

3. (3 points) Find and interpret D_8 . $D_8 = P_{80} = ?$

$$\text{index} = \frac{nk}{100} = \frac{(10)(80)}{100} = 8 \quad (+1)$$

$$P_{80} = \frac{8^{\text{th}} + 9^{\text{th}}}{2} = \frac{153 + 160}{2} = 156.5 \quad (+1)$$

That is, 80% of heart patients have cholesterol level below 156.5. $(+1)$

4. (2 points) Find the percentile rank of 145.

$$\frac{\# \text{ of obs's} < 145 + 0.5}{n} \cdot 100\% \quad (+1)$$

$$= \frac{3 + 0.5}{10} \cdot 100\% = 35\% \quad (+1)$$

5. (5 points) Identify potential outliers, if any.

$$Q_2 = 147.5, \quad Q_1 = 139, \quad Q_3 = 153 \quad (+1)$$

$$IQR = Q_3 - Q_1 = 153 - 139 = 14 \quad (+1)$$

$$1.5 IQR = (1.5)(14) = 21 \quad (+1)$$

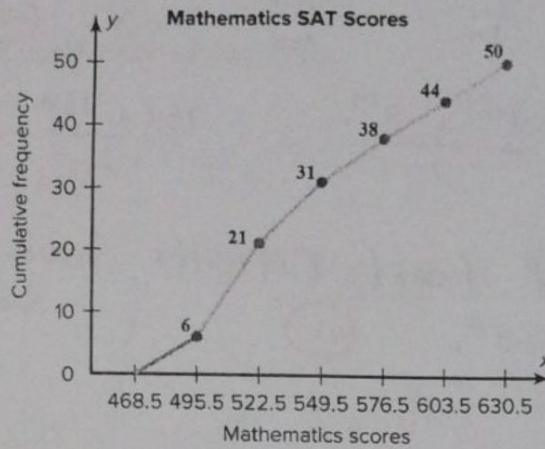
$$Q_1 - 1.5 IQR = 139 - 21 = 118 \quad (+1)$$

$$Q_3 + 1.5 IQR = 153 + 21 = 174 \quad (+1)$$

Any obs. outside the interval (118, 174) is an outlier;

\Rightarrow There is no outliers. $\rightarrow (+1)$

Q4)... [10 points] The following graph shows the distribution of mathematics SAT scores of students at public universities.



1. (2 points) What is the name of this graph?

Ogive. (+2)

2. (4 points) Construct the relative frequency table.

boundaries	freq	relative freq.
468.5 - 495.5	6	0.12
495.5 - 522.5	15 (+1)	0.30 (+2)
522.5 - 549.5	10	0.20
549.5 - 576.5	7	0.14
576.5 - 603.5	6	0.12
603.5 - 630.5	6	0.12
	(50)	(1)

3. (2 points) What is the percentage of students scoring above 522.5?

0.58 ≈ 58%. (+2)

4. (2 points) What is the number of students scoring between 495.5 and 603.5?

38. (+2)

GOOD LUCK