

Subject: Assignment 1 (Probability and Statistical Data)

Date:

Question 1

(a) Interval

(b) Ordinal

(c) Interval

(d) Nominal

(e) Ordinal

(f) Ratio

(g) Ratio

(h) Interval

(i) Ratio

(j) Ratio

Question 2

(a) 100 students randomly selected

i) Freshmen class at Lincoln High School.

ii) 100 randomly selected students.

(b) i) Nominal

ii) Interval

iii) Ratio

(c) 20 High school student scores

$$Q_1 = 20/4 = 5^{\text{th}}$$

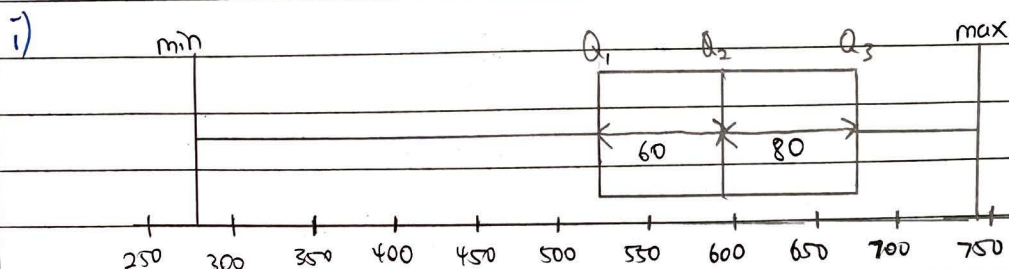
$$Q_1 \Rightarrow \frac{5^{\text{th}} + 6^{\text{th}}}{2} = \frac{520 + 540}{2} = 530$$

$$Q_2 = 20/2 = 10^{\text{th}}$$

$$Q_2 \Rightarrow \frac{10^{\text{th}} + 11^{\text{th}}}{2} = \frac{580 + 600}{2} = 590$$

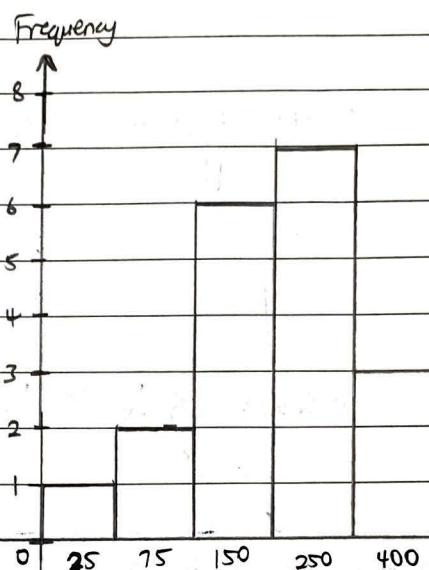
$$Q_3 = \frac{3}{4}(20) = 15^{\text{th}}$$

$$Q_3 \Rightarrow \frac{15^{\text{th}} + 16^{\text{th}}}{2} = \frac{660 + 680}{2} = 670$$



Question 3

(a)



(b)

Frequency	Relative frequency
1	$1 \div 19 = 0.05$
2	$2 \div 19 = 0.11$
6	$6 \div 19 = 0.32$
7	$7 \div 19 = 0.37$
3	$3 \div 19 = 0.16$

$$API \geq 100 \Rightarrow \frac{6+7+3}{19} \times 100\%$$

$$= 84.21\%$$

Total = 19

(c) The value will affect the mean value.

$$\text{Original mean} \Rightarrow \frac{25 + 150 + 900 + 1750 + 1200}{5}$$

$$= 805$$

∴ The additional reading will increase the overall value and also another value in the denominator, resulting in an overall change.

Question 4

$$(a) \text{ Mean} = \frac{92 + 98 + 112 + 88 + 134 + 36 + 35 + 92 + 215 + 336 + 237}{11}$$

$$= 134.10$$

$$\text{Mode} = 92$$

$$\text{Median} = \frac{35, 36, 88, 92, 92, 98, 112, 134, 215, 237, 336}{11} = 98$$

$$\text{Standard deviation, } \sigma = \sqrt{\frac{(-42.1)^2 + (-36.1)^2 + (-22.1)^2 + (-46.1)^2 + (-0.1)^2 + (-98.1)^2 + (-99.1)^2 + (-42.1)^2 + (80.9)^2 + (201.9)^2 + (102.9)^2}{11}}$$

$$= \sqrt{\frac{84802.91}{11}} \quad \sigma \Rightarrow 87.80$$

$$(b) Y[9] = 215, \quad P = ?, \quad N = 11$$

$$\frac{8}{11} \times 100 =$$

$$P = 72.72$$

$$P = 73^{\text{th}} \text{ percentile}$$

(c) Frequency polygon. Because it can show the accurate rise and fall of the dengue cases.

Question 5

$$(a) \text{ Mean} = \frac{14 + 14 + 10 + 12 + 11 + 13 + 11 + 11 + 14 + 10 + 13 + 8}{12}$$

$$= 11.75$$

$$\text{Mode} = 11 \text{ and } 14$$

$$\text{Median} = \frac{12}{2} = 6^{\text{th}}$$

$$= \frac{6^{\text{th}} + 7^{\text{th}}}{2} = \frac{13 + 11}{2} = 12$$

$$\text{Range} = 14 - 8$$

$$= 6$$

(b) The mean is lower than the median, the ~~the~~ graph of the data will be skewed to the left.

$$(c) \text{ Standard deviation, } \sigma \Rightarrow \sqrt{\frac{(2.25)^2 + (2.25)^2 + (-1.75)^2 + (0.25)^2 + (-0.75)^2 + (1.25)^2 + (-0.75)^2 + (-0.75)^2 + (2.25)^2 + (-1.75)^2 + (1.25)^2 + (-3.75)^2}{12}}$$

$$= \sqrt{\frac{32.72}{12}} \quad \sigma \Rightarrow 1.65$$

$$(d) Q_1 = 25/100 \times 12 = 3$$

$$= (3 + 4) / 2$$

$$= 3.5^{\text{th}} = 10.5$$

$$Q_3 = 75/100 \times 12 = 9$$

$$= (9 + 10) / 2$$

$$= 9.5^{\text{th}} = 13.5$$

$$\text{IQR} = Q_3 - Q_1$$

$$= 13.5 - 10.5$$

$$= 3$$

$$\text{Min} = Q_1 - 1.5(\text{IQR})$$

$$= 10.5 - 1.5(3)$$

$$= 6$$

$$\text{Max} = Q_3 + 1.5(\text{IQR})$$

$$= 13.5 + 1.5(3)$$

$$= 18$$

Question 6

$$(a) \text{ Mean} = \frac{14 + 12 + 21 + 28 + 30}{5}$$
$$= 21$$

$$\text{Median} \Rightarrow 12, 14, 21, 28, 30$$
$$= 21$$

$$\text{Standard deviation, } \sigma = \sqrt{\frac{(-7)^2 + (-9)^2 + (0)^2 + (7)^2 + (9)^2}{5}}$$
$$= \sqrt{\frac{260}{5}}$$

$$\sigma = 7.21$$

$$\text{Skewness} = \frac{\sum (x - \bar{x})^3}{(N-1)\sigma^3}$$

$$= \frac{0}{4(7.21)^3}$$

$$\text{Skewness} = 0$$

(b) Symmetrically skewed. The mean and median have the same value, and the skewness is zero.