Assignment PSDA

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Question 1

a) ratio scale
b) ordinal scale
c) Interval scale
d) nominal scale
e) ordinal scale
f) ratio scale
g) ratio scale
h) interval scale
i) ratio scale
j) ratio scale

Question 2

a) i) The freshmen class at Lincoln High School
ii) 100 students of freshmen class

b) i) nominal
ii) ratio
iii) ratio

c) 280, 340, 440, 490, 520, 540, 560, 560, 580, 580, 600, 610, 630, 650, 660, 680, 710, 730, 740, 740

$$\text{median} = \frac{580 + 600}{2} = 590$$

ii)
Q_1 $\frac{25}{100} \times 20 = 5$ $\frac{520 + 540}{2} = 530$

Q_2 $\frac{50}{100} \times 20 = 10$ $\frac{580 + 600}{2} = 590$

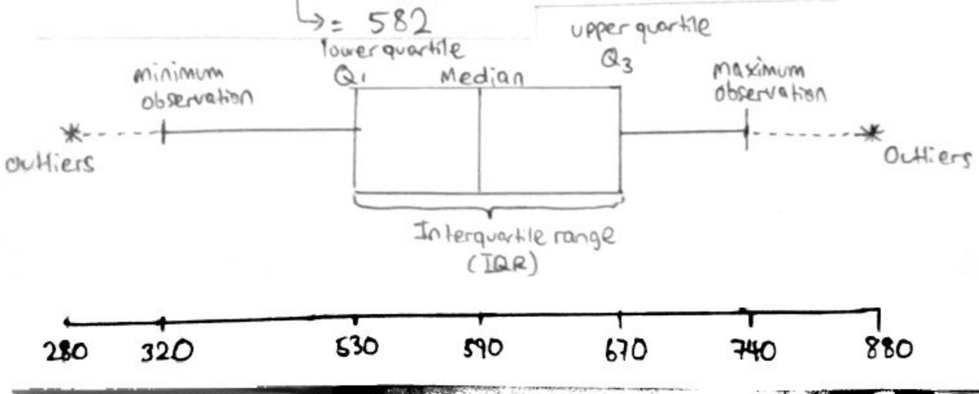
Q_3 $\frac{75}{100} \times 20 = 15$ $\frac{660 + 680}{2} = 670$

Inter-quartile range: $Q_3 - Q_1$
$= 670 - 530$
IQR $= 140$

i) lower limit:
$530 - 1.5 \times 140 = 320$

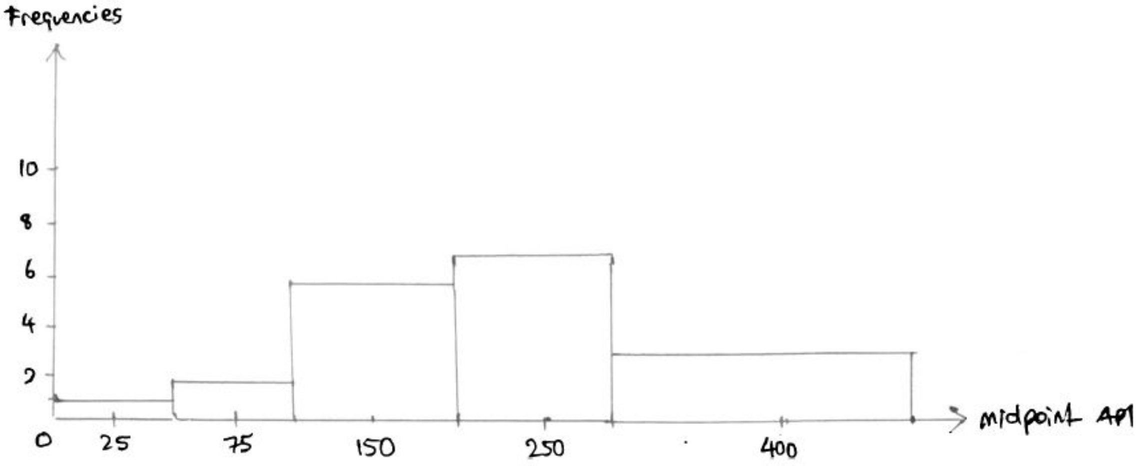
upper limit:
$670 + 1.5 \times 140 = 880$

$$\text{mean} = \frac{11640}{20} = 582$$



Question 3

a)



b) $\frac{6}{19} + \frac{7}{19} + \frac{3}{19} = \frac{16}{19}$ (total relative frequencies API ≥ 100) $\rightarrow \frac{16}{19} = 0.84$ (2 decimal places)

$$\frac{16}{19} \times 100 = 84.21\%$$

c) Yes, ~~mean is the most suitable statistical measure to show the danger of air pollutant situation. For example, average number of cases will show how many cases of air pollutant occur in general way~~.

c) Yes, it is because an extreme value (outliers) will make the mean value change drastically. The different of total value than the previous one will produce the different of mean value when divide with total number of class.

stion 4

35 36 88 92 92 98 112 134 215 237 336

a) mean = $\dfrac{35+36+88+92+92+98+112+134+215+237+336}{}$

$= \dfrac{1475}{11}$

$= 134.09$

mode = 92

median = 98

Standard deviation = 92.0885

x	$\bar{x}$	$(x-\bar{x})^2$
35	134.09	9818.8281
36	134.09	9621.6481
88	134.09	2124.2881
92	134.09	1771.5681
92	134.09	1771.5681
98	134.09	1302.488
112	134.09	487.9681
134	134.09	8.1×10^{-3}
215	134.09	6546.43
237	134.09	10590.47
336	134.09	40767.64

std dev $= \sqrt{\dfrac{\Sigma(x-\bar{x})^2}{n-1}}$

$= \dfrac{84802.9047}{11-1}$

$= \sqrt{8480.29047}$

$= 92.0885$

(Standard deviation)

b)

$x = \dfrac{\text{no. value less 215}}{\text{no. total}} \times 100$

$x = \dfrac{8}{11} \times 100$

$x = 72.73\%$

c) Mean is the most suitable statistical measure to show the danger of dengue fever. For exemple, the average number of ~~degree~~ dengue cases will show how many cases of dengue fever occur in a general way.

Question 5

a) 8 10 10 11 11 11 12 13 13 14 14 14

$$\text{mean} = \frac{8+10+10+11+11+11+12+13+13+14+14+14}{12}$$

mean = 11.75

$$\text{median} = \frac{11+12}{2}$$

median = 11.5

Mode : 11 and 14

range of data set : 14 − 8
= 6

b) The mean values were slightly greater than the median values. Therefore the distribution is skewed to the right described as positively skewed.

c) Standard deviation

$$\sqrt{\frac{(x-\bar{x})^2}{n-1}}$$

x	$\bar{x}$	$(x-\bar{x})^2$
8	11.75	14.0625
10	11.75	3.0625
10	11.75	3.0625
11	11.75	0.5625
11	11.75	0.5625
11	11.75	0.5625
12	11.75	0.0625
13	11.75	1.5625
13	11.75	1.5625
14	11.75	5.0625
14	11.75	5.0625
14	11.75	5.0625
		40.25

$$= \frac{40.25}{11}$$

$$= \sqrt{3.6591}$$

= 1.9129 (Standard deviation)

d) Q1 $\frac{25}{100} \times 12 = 3 = 10.5$

Q2 $\frac{50}{100} \times 12 = 6 = 11.5$

Q3 $= \frac{75}{100} \times 12 = 9 \rightarrow 13.5$

IQR = 3

upper limit $13.5 + 1.5 \times 3 = 18$

lower limit $10.5 - 1.5 \times 3 = 6$

Data 7 is not an outliers. It still within the range of data observed. With the lower limit being 6 and the upper limit is being 18.

$\frac{10+11}{2} = 10.5$

$\frac{11+12}{2} = 11.5$

$\frac{13+14}{2} = 13.5$

IQR = 13.5 − 10.5
= 3

Question 6

(sample)

Skeweness

$$\frac{\sum (x-\bar{x})^3}{(N-1)s^3}$$

standard deviation.

$$\sqrt{\frac{\sum (x-\bar{x})^2}{n-1}}$$

a) 14, 12, 21, 28, 30

mean = $\frac{14+12+21+28+30}{5}$

= 21

X	$\bar{X}$	$(x-\bar{x})^3$	$(x-\bar{x})^2$
14	21	-343	49
12	21	-729	81
21	21	0	0
28	21	343	49
30	21	729	81
		0	260

standard deviation = $\sqrt{\frac{260}{5-1}}$

$= \sqrt{65}$

skeweness

$= \frac{0^3}{(5-1)^3(\sqrt{65})}$

$= 0$

Skeweness value = 0

b) The sample data is neither positively skewed nor negatively skewed because the skewness value equal to zero. When the skewness value equal to zero, it is a normal distribution.