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Course: Statistics and Probability

Course code: STA 102

Section: 04

Assignment-2

1| a] Hotel room rates are from 20 cities; ~~So. N=20~~

$$\text{mean}, \bar{x} = \frac{(163+177+166+126+123+120+144+\ldots\ldots+145+207)}{20}$$

$$= \$159.05$$

The estimated average hotel room rate of US cities is $159.05.

b] All hotel room rates in ascending order:

120, 123, 125, 126, 134, 139, 144, 145, 146, 160, 162

162, 163, 166, 167, 167, 173, 177, 192, 207, 245

$$\text{Median is} = \left(\frac{20+1}{2}\right)^{th} \text{position} = 10.5^{th} \text{position}$$

Hence,

$$\text{Median} = \frac{160+162}{2} = \$161.00$$

50% hotel room rates of US cities are less than $161.00 and the rest is above it.

c] Here, Mode is 167.

d] Hotel room rates in ascending order:

120, 123, 125, 126, 134, 139, 144, 145, 146, 160, 162, 163

166, 167, 167, 173, 177, 192, 207, 245

Now, $Q_1 = P_{25} = \frac{n+1}{100} \times 25 = \frac{20+1}{100} \times 25 = 5.25^{th}$ position

Hence,

$$Q_1 = P_{25} = 139 + 0.25 \times (139 - 134) = \$135.25$$

So, 25% Hotel room rates of the ~~region 20~~ cities of the US. are less than $135.25

e] Here,

$$Q_3 = P_{75} = \frac{n+1}{100} \times 75 = \frac{20+1}{100} \times 75 = 15.75^{th}$$

Hence,

$$Q_3 = P_{75} = 167 + 0.75 \times (173 - 167) = \$171.50$$

So, 75% hotel room rates of the ~~major 20~~ cities of the U.S are less than $171.50 and the nest 25% above it.

2] Here,

50 nurse's aides, each receives $8 per hour,

50 practical nurses, each receives $15 per hour,

100 registered nurses, each receives $24 per hour.

$\therefore$ mean hourly wage, $\bar{x} = \frac{(50\times 8)+(50\times 15)+(100\times 24)}{50+50+100}$

$= \$17.75$

The weighted mean hourly wage of each nursing staff is $17.75.

3] Let, $x_1 = 9.4\% = \frac{109.4}{100} = 1.094$

$x_2 = 13.8\% = \frac{113.8}{100} = 1.138$

$x_3 = 11.7\% = \frac{111.7}{100} = 1.117$

$x_4 = 11.9\% = \frac{111.9}{100} = 1.119$

$x_5 = 14.7\% = \frac{114.7}{100} = 1.147$

Geometric mean $= (1.094\times 1.138\times 1.117\times 1.119\times 1.147)^{\frac{1}{5}} - 1$

$= 0.1228 = 12.28\%$

On an average, the sales of MG Corporation has increased 12.28% in the last 5 years.

4] Cell phone subscribers in 2000, were x_0 = 720,000

" " " " 2015 were, x_n = 752,000,000

Years, $n = 15$

$\therefore$ Geometric mean $= \left(\frac{x_n}{x_0}\right)^{\frac{1}{n}} - 1 = \left(\frac{752\,000\,000}{720\,000}\right)^{\frac{1}{15}} - 1$

$= 0.5895 = 58.95\%$

The number of cell phone subscribers has increased by an average of 58.95% per year.

5] a] i]

Arithmetic mean, $\bar{x} = \frac{16+10+49+\ldots+13+17}{12}$

$= 16.75$ days

On an average, each patient had to stay 16.75 days

at the hospital.

ii] Data in ascending order:

6, 8, 10, 11, 13, 15, 15, 16, 17, 19, 22, 49

Median is $= \left(\frac{12+1}{2}\right)^{th}$ position $= 6.5^{th}$ position

Hence, Median $= \frac{15+15}{2} = 15$ days

50% diabetic patients of the hospital had to stay at most 15 days at there and the rest is above it.

iii] Here, the mode is 15. Most of the ~~pedie~~ diabetes-related patients had to stay at the hospital for 15 days.

b] The given data set contains numerical values and an extreme value (99). So among the measures above, using median should be best because it doesn't affected by any extreme values.

6| i] Data is already in ascending order in the question

$\therefore Q_1 = P_{25} = \left(\frac{n+1}{100} \times 25\right)$ th position $= 5.25^{th}$ position

Hence, $Q_1 = P_{25} = (115 + 0.25 \times (115 - 115))$

$= 115$ pounds

The weight of 25% individuals is less than 115 pounds and the nest 75% is above it.

Again, $Q_3 = P_{75} = \left(\frac{n+1}{100} \times 75\right)^{th}$ position $= 15.75^{th}$ position

Hence, $Q_3 = P_{75} = (152 + 0.75 \times (157 - 152))$

$= 155.75$ Pounds

The weight of 75% individuals is at most 155.75 pounds and the nest is above it.

ii] $P_{23} = \left(\frac{n+1}{100} \times 23\right)^{th}$ pos $= 9.83^{th}$ position

Hence, $P_{23} = 115 + 0.83 \times (115 - 115) = 115$ pounds

23% individuals has the weight at most 115 pounds

$$P_{65} = \left(\frac{n+1}{100} \times 65\right)^{th} \text{pos} = 13.65^{th} \text{ position}$$

Hence, $P_{65} = 147 + 0.65(150 - 147) = 148.95$ pounds

The weight of 65% individuals is less than 148.95 pounds and the rest is above it.