Math Quarter 4 Week 4-5

Practice A

1.

| $1^{st}$ | $2^{nd}$ | $3^{rd}$ | $4^{th}$ | $5^{th}$ | $6^{th}$ | $7^{th}$ | $8^{th}$ | $9^{th}$ | $10^{th}$ | $11^{th}$ | $12^{th}$ | $13^{th}$ | $14^{th}$ | $15^{th}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 62 | 62 | 63 | 64 | 65 | 65 | 65 | 66 | 66 | 67 | 70 | 70 | 72 | 72 | 76 |

2. $Position\ of\ P_{25} = \frac{25(15+1)}{100}$

3. $Position\ of\ P_{25} = \frac{400}{100} = 4$

4. $Position\ of\ P_{25} = 64$

5. The value of the $25^{th}$ percentile is 64.

6. 25% of the students got a score less than or equal to 64.

7. 75% of the students got a score greater than 64.

8. $Position\ of\ Md = \frac{1(15+1)}{2}$

9. $Position\ of\ Md = \frac{16}{2} = 8$

10. $Position\ of\ Md = 66$

11. The value of the median is 66.

12. 50% of the students got a score less than or equal to 66.

13. 50% of the students got a score greater than 66.

14. $Position\ of\ Q_3 = \frac{3(15+1)}{4}$

15. $Position\ of\ Q_3 = \frac{48}{4} = 12$

16. $Position\ of\ Md = 70$

17. The value of the median is 70.

18. 75% of the students got a score less than or equal to 70.

19. 25% of the students got a score greater than 70.

20. The score of Martha is 70. (because it's equivalent to the median)

21. 10 students have a score lower than Martha's.

22. 5 students have a score equal to or higher than Martha's.

23. B = 4, E = 3, n = 15

24. $PR = \frac{[4 + 0.5(3)](100)}{15}$

25. $PR \approx 37$

Practice B

A.

| Monthly Electric Consumption (in kWh) | f | LB | <cf |
|---|---|---|---|
| 451 – 500 | 2 | 450.5 | 85 |
| 401 – 450 | 5 | 400.5 | 83 |
| 351 – 400 | 9 | 350.5 | 78 |
| 301 – 350 | 8 | 300.5 | 69 |
| 251 – 300 | 15 | 250.5 | 61 |
| 201 – 250 | 12 | 200.5 | 46 |
| 151 – 200 | 10 | 150.5 | 34 |
| 101 – 150 | 6 | 100.5 | 24 |
| 51 – 100 | 8 | 50.5 | 18 |
| 1 – 50 | 10 | 0.5 | 10 |

B. Answer the following:

1. Find the value of 25th percentile, 5th decile and 3rd quartile. For each quantile, determine the following, then interpret.

a. Position of the quantile (P25, D5, Q3 )

$P_{25}$:

$$Position\ of\ P_{25} = \frac{25(85)}{100} = \frac{2125}{100} = 21.25$$

$D_5$:

$$Position\ of\ D_5 = \frac{5(85)}{10} = \frac{425}{10} = 42.5$$

$Q_3$:

$$Position\ of\ Q_3 = \frac{3(85)}{4} = \frac{255}{4} = 63.75$$

b. Given: LB, k, N, cfb, f, i

$P_{25}$:

LB = 100.5, k = 25, N = 85, cfb = 18, f = 6, i = 50

$D_5$:

LB = 200.5, k = 5, N = 85, cfb = 34, f = 12, i = 50

$Q_3$:

LB = 300.5, k = 3, N = 85, cfb = 61, f = 8, i = 50

c. Formula to be used

$P_{25}$:

$$P_k = LB_{P_k} + \left( \frac{\frac{kN}{100} - cfb}{f_{P_k}} \right) i$$

$D_5$:

$$D_k = LB_{D_k} + \left( \frac{\frac{kN}{10} - cfb}{f_{D_k}} \right) i$$

$Q_3$:

$$Q_k = LB_{Q_k} + \left( \frac{\frac{kN}{4} - cfb}{f_{Q_k}} \right) i$$

d. Solution

$P_{25}$:

$$P_k = LB_{P_k} + \left( \frac{\frac{kN}{100} - cfb}{f_{P_k}} \right) i = 100.5 + \left( \frac{21.25 - 18}{6} \right) 50 \approx 100.5 + 27.08 \approx 127.58$$

$D_5$:

$$D_k = LB_{D_k} + \left( \frac{\frac{kN}{10} - cfb}{f_{D_k}} \right) i = 200.5 + \left( \frac{42.5 - 34}{12} \right) 50 \approx 200.5 + 35.42 \approx 235.92$$

$Q_3$:

$$Q_k = LB_{Q_k} + \left( \frac{\frac{kN}{4} - cfb}{f_{Q_k}} \right) i = 300.5 + \left( \frac{63.75 - 61}{8} \right) 50 \approx 300.5 + 17.19 \approx 317.69$$

e. Conclusion

$P_{25}$:

The value of the 25$^{th}$ percentile is 127.58.

$D_5$:

The value of the $5^{th}$ decile is 235.92.

$Q_3$:

The value of the $3^{th}$ quartile is 317.69.

f. Interpretation

$P_{25}$:

25% of households in Barangay Matiwasay have an average monthly electric consumption of less than or equal to 127.58 kWh.
75% households in Barangay Matiwasay have an average monthly electric consumption of greater than 127.58 kWh

$D_5$:

50% of households in Barangay Matiwasay have an average monthly electric consumption of less than or equal to 235.92 kWh
50% of households in Barangay Matiwasay have an average monthly electric consumption of greater than 235.92 kWh

$Q_3$:

75% of households in Barangay Matiwasay have an average monthly electric consumption of less than or equal to 317.69 kWh
25% of households in Barangay Matiwasay have an average monthly electric consumption of greater than 317.69 kWh

2. To be at the lower quartile, how many kWh of electricity should a household consume?

The amount of electricity that a household should consume in order to be in the lower quartile is 127.58 kWh. (because the lower quartile is equivalent to the twenty-fifth percentile)

3. To be at the median, how many kWh of electricity should a household consume?

The amount of electricity that a household should consume in order to be in the median is 235.92 kWh. (because the median is equivalent to the fifth decile)

4. What is the percentile rank of the household with an average monthly electric consumption of 320 kWh in a month?

Given: N = 85, P = 320, LB = 300.5, f = 8, i = 50, cfb = 61

$$PR = \frac{100}{N}\left[\frac{(P - LB)f_p}{i} + cfb\right] = \frac{100}{85}\left[\frac{(320 - 300.5)8}{50} + 61\right] =$$
$$\frac{100}{85}\left[\frac{(19.5)8}{50} + 61\right] = \frac{100}{85}\left[\frac{156}{50} + 61\right] = \frac{100}{85}\left[3.12 + 61\right] =$$
$$\frac{100}{85}\left[64.12\right] \approx 75$$

The percentile rank of the household with an average monthly electric consumption of 320kWh is 75th.