Math Q4W2
Practice A

Directions: Given the following data, calculate the value of the indicated quantile.

A. The list shows the grades of 15 students in Mathematics arranged in ascending order.

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th
76	77	78	80	81	83	84	86	86	88	88	90	91	92	95

Determine the value of:

1. Q_1

$$\text{Position of } Q_k = \frac{k(n+1)}{4}$$

$$\text{Position of } Q_1 = \frac{1(15+1)}{4} = \frac{1(16)}{4} = \frac{16}{4} = 4$$

<u>The value of the 1st quartile is 80.</u>

2. D_5

$$\text{Position of } D_k = \frac{k(n+1)}{10}$$

$$\text{Position of } D_5 = \frac{5(15+1)}{10} = \frac{5(16)}{10} = \frac{80}{10} = 8$$

<u>The value of the 5th decile is 86.</u>

3. P_{75}

$$\text{Position of } P_k = \frac{k(n+1)}{100}$$

$$\text{Position of } P_{75} = \frac{75(15+1)}{100} = \frac{75(16)}{100} = \frac{1200}{100} = 12$$

The value of the 12th percentile is 90.

4. Interquartile range

$$IQR = Q_3 - Q_1 = 90 - 80 = 10$$

The value of the interquartile range is 10.

5. Percentile rank of the student with the mathematics grade of 88

$$PR = \frac{(B + 0.5\ E)(100)}{n} = \frac{[9 + 0.5(2)](100)}{15} = \frac{(9+1)(100)}{15}$$

$$PR = \frac{(10)(100)}{15} = \frac{1000}{15} \approx 66.667$$

The student with the mathematics grade of 88 is approximately in the 66.667th percentile.

B. The following are the amounts donated in pesos to help the 10 medical front liners:

Php 1500	Php 2000	Php 550	Php 1000	Php 5000
Php 500	Php 3200	Php 600	Php 3100	Php 4500

a. Make an array

1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
Php 500	Php 550	Php 600	Php 1000	Php 1500	Php 2000	Php 3100	Php 3200	Php 4500	Php 5000

b. Determine the value of:

1. P_{25}

$$Position\ of\ P_k = \frac{k(n+1)}{100}$$

$$Position\ of\ P_{25} = \frac{25(10+1)}{100} = \frac{25(11)}{100} = \frac{275}{100} = 2.75$$

$$value\ of\ P_{25} = L + d(H - L) = 550 + 0.75(600 - 550)$$

$$value\ of\ P_{25} = 550 + 0.75(50) = 550 + 37.5 = 587.5$$

The value of the 25th percentile is Php 587.5.

2. D_6

$$Position\ of\ D_k = \frac{k(n+1)}{10}$$

$$Position\ of\ D_6 = \frac{6(10+1)}{10} = \frac{6(11)}{10} = \frac{66}{10} = 6.6$$

$$value\ of\ D_6 = L + d(H - L) = 2000 + 0.6(3100 - 2000)$$

$$value\ of\ D_6 = 2000 + 0.6(1100) = 2000 + 660 = 2660$$

The value of the 6th decile is Php 2660.

3. Q_3

$$\text{Position of } Q_k = \frac{k(n+1)}{4}$$

$$\text{Position of } Q_3 = \frac{3(10+1)}{4} = \frac{3(11)}{4} = \frac{33}{4} = 8.25$$

$$\text{value of } Q_k = L + d(H - L) = 3200 + 0.25(4500 - 3200)$$

$$\text{value of } Q_k = 3200 + 0.25(1300) = 3200 + 325 = 3525$$

<u>The value of the 3th quartile is Php 3525.</u>

4. Interquartile range

$$IQR = Q_3 - Q_1 = 3525 - 587.5 = 2937.5$$

<u>The value of the interquartile range is Php 2937.5.</u>

5. Percentile rank of Php 1500

$$PR = \frac{(B + 0.5\ E)(100)}{n} = \frac{[4 + 0.5(1)](100)}{10} = \frac{(4 + 0.5)(100)}{10}$$

$$PR = \frac{(4.5)(100)}{10} = \frac{450}{10} = 45$$

<u>The data with the value of Php 1500 is in the 45th percentile.</u>

Directions: The table shows the number of boxes of alcohol sold in a month of 50 Supermarkets in Pampanga.

A. Complete the table.

No. of Boxes of Alcohol	f	LB	<cf
70 - 74	5	69.5	50
65 - 69	19	64.5	45
60 - 64	22	59.5	26
55 - 59	3	54.5	4
50 - 54	1	49.5	1

$$\underline{N = 50}$$

B. Calculate the value of:

1. Q_1

$$Position\ of\ Q_1\ class = \frac{kN}{4} = \frac{(1)(50)}{4} = \frac{50}{4} = 12.5$$

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

$$Q_1 = 59.5 + \left(\frac{12.5 - 4}{22}\right) 5 = 59.5 + \left(\frac{8.5}{22}\right) 5$$

$$Q_1 \approx 59.5 + 1.932 \approx 61.432$$

<u>The value of the 1st quartile is approximately 61.432.</u>

2. D_6

$$\text{Position of } D_6 \text{ class} = \frac{kN}{10} = \frac{(6)(50)}{10} = \frac{300}{10} = 30$$

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

$$D_6 = 64.5 + \left(\frac{30 - 26}{19}\right)5 = 64.5 + \left(\frac{4}{19}\right)5$$

$$D_6 \approx 64.5 + 1.053 \approx 65.553$$

<u>The value of the 6th decile is approximately 65.553.</u>

3. P_{95}

$$\text{Position of } P_{95} \text{ class} = \frac{kN}{100} = \frac{(95)(50)}{100} = \frac{4750}{100} = 47.5$$

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

$$P_{95} = 69.5 + \left(\frac{47.5 - 45}{5}\right)5 = 69.5 + \left(\frac{2.5}{5}\right)5$$

$$P_{95} = 69.5 + 2.5 = 72$$

<u>The value of the 95th percentile is 72.</u>

4. Percentile rank of 63

$$PR = \frac{100}{N} \left[\frac{(P-LB)f_p}{i} + cf_p \right]$$

$$PR = \frac{100}{50} \left[\frac{(63-59.5)22}{5} + 26 \right]$$

$$PR = \frac{100}{50} \left[\frac{(3.5)22}{5} + 26 \right]$$

$$PR = \frac{100}{50} \left[15.4 + 26 \right]$$

$$PR = \frac{100}{50} \left[41.4 \right] = 82.8$$

The data with the value of 63 is in the 82.8th percentile.