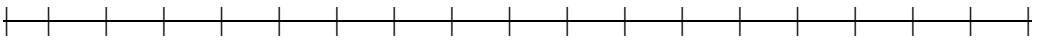
# Exercises

## Chapter 2 Describing Data with Numerical Measures

1) The heights of 5 basketball players selected randomly from a college are 73, 76, 72, 70, 74. Find the average and median heights.

2) Find the sample mean and median rate paid at a library if the hourly rates are
30 35 30 30 40 100 baht.
Also draw a dotplot. Are the rates symmetric or skewed? What do you notice about the mean and the median rates?



3) Find the mode in Exercises 1 and 2.

4) A small set of data produces a stem-and-leaf plot shown below:

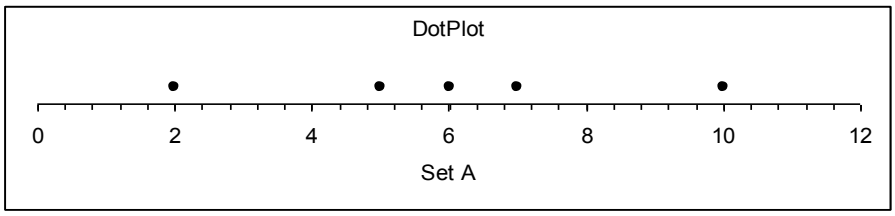
| Stems | Leaves |
|---|---|
| 0 | 0 1 1 5 6 7 8 |
| 1 | 1 1 2 3 |
| 2 | 6 8 |
| 3 | |
| 4 | 5 |

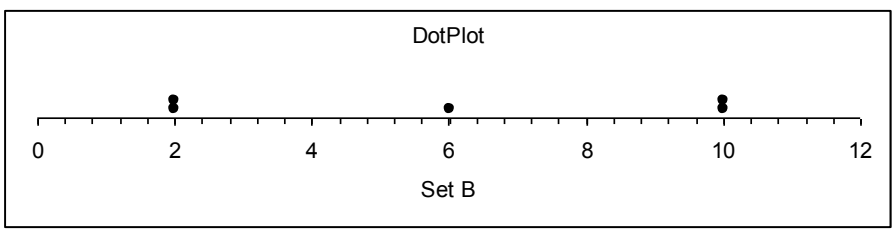
4.1) Find the median
4.2) Find the range.

5) Consider these 2 data sets.

| | | | | | |
|---|---|---|---|---|---|
| Set A : | 2 | 5 | 6 | 7 | 10 |
| Set B : | 2 | 2 | 6 | 10 | 10 |

5.1) Draw a dotplot for each data set.



5.2) Are Sets A and B symmetric or skewed? If they are skewed, what direction of skewness are they?

5.3) Which set has more dispersion from the center?

6) Find the range of each of data sets A and B of Exercise 5. Please make a comment on whether or not range is a good measure of variability?

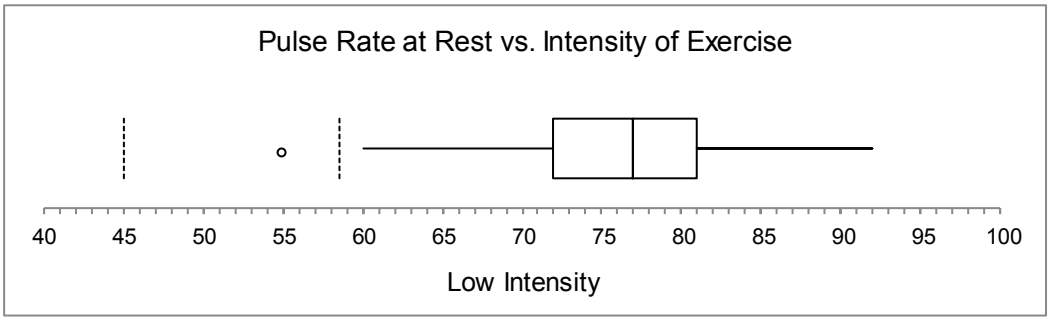
7) From Exercise 5 let both data sets be samples. Find the sample variance of each data set.

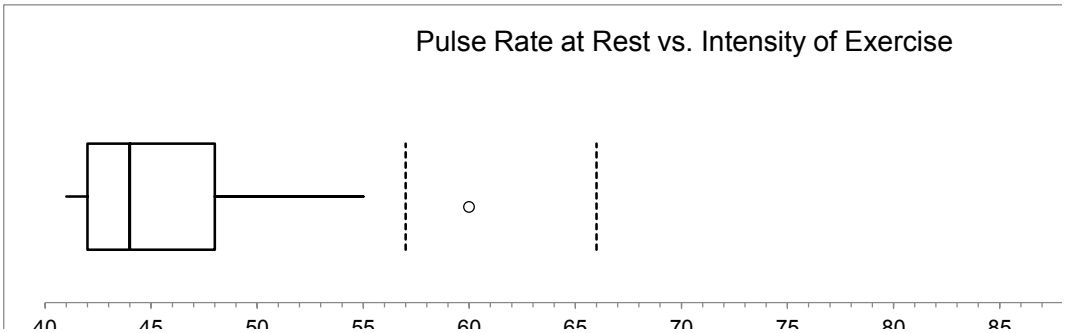
8) A set of data consisting of 200 measurements has a mean of 80 and a standard deviation of 4. Find a measurement which is 2.4 standard deviations below the mean.

9) Three hundred workers were assigned to assemble a device. The average time is 15 minutes and the standard deviation is 1.5 minute. If the z-score of a worker is -2.3, then how long did he take to assemble the device?

10) A sample of 50 students has an average height of 164 cm. with standard deviation of 4 cm. Two students are 159 and 187 cm. tall. Compute their *z*-scores. Interpret the results.

11) There may exist a relationship between intensity of exercise and the pulse rate measured when body is at rest. The following diagrams are summarized based of 2 groups of people who exercise for 2 years with either low and high intensity. Describe the differences/similarity of your findings.



12) A sample of 20 students taken a STAT course arranged in ascending order is

45 68 68 69 71 77 80 80 80 82
82 86 89 89 90 93 93 96 97 99

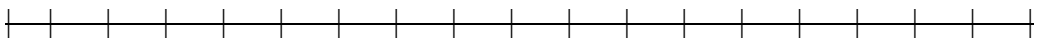
Given $\bar{x}$ = 81.70 and $s$ = 13.01.

12.1) Find 25th, 50th, 75th and 90th percentiles.

12.2) Find the interquartile range.

12.3) Construct a boxplot. Is there any outlier?

12.4) Use the z-score method to justify whether the least score (45) is an outlier or not. Do you get the same result as in Question 12.3?



## ANSWERS:
## Chapter 2 Describing Data with Numerical Measures

1) average = 73, median = 73
2) median = 44.17 baht, median = 32.5
3) Exercise 1 : There is no mode.
   Exercise 2 : mode = 30

4.1) median = (8+11)/2 = 9.5
4.2) range = 34-0 =34

5) Set B has a larger dispersion.
6) range = 8 for both sets A and B.
7) Set A: $S^2 = 8.5$
   Set B: $S^2 = 16$

8) 70.4

9) 11.55 minutes

10) $z = \frac{159 - 1641}{4} = -1.25$. The height 159 cm. is 1.25 standard deviations below the average.

$z = \frac{187 - 1641}{4} = 5.75$. The height 187 cm. is 5.75 standard deviations above the average.

12.1) $25^{th}$ percentile = 72.5 $50^{th}$ percentile = 82
$75^{th}$ percentile = 92.25 $90^{th}$ percentile = 96.9

12.2) IQR = 19.75

12.3) upper fence = 92.25+1.5(19.75) = 121.875
lower fence = 72.5-1.5(19.75) = 42.875