Name: _____   Date: _____

The 5 Number Summary
Algebra 1

After understanding the central tendency of a data set, it is important to understand how the rest of the data set is **distributed**. We can do this by looking at numbers that divide the data set into quarters – known as the **quartiles.**

***Exercise #1***: Shown below are the scores 16 students received on a math quiz.

$$52, 60, 66, 66, 68, 72, 72, 73, 74, 75, 80, 82, 84, 91, 92, 98$$

(a) What is the median of this data set?

(b) Find the **range** of the data set (defined as the difference between the largest data value and the smallest data value).

(c) What is the median of the lower half of this data set (known as the **first quartile**, Q_1)?

(d) What is the median of the upper half of this data set (known as the **third quartile**, Q_3)?

Exercise #2: What would be an appropriate name, in terms of quartiles, for the median? Explain.

The first and third quartiles are sometimes known as the lower and upper quartiles, respectively. The quartiles, the median, and the lowest and highest values in a data set comprise what is known as the **five number summary** and can be graphically represented on a **box-and-whisker plot.**

***Exercise #3***: Using the same data set construct a box-and-whisker plot on the number line given below.
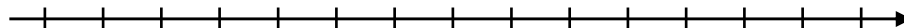
Exercise #4: The ages of the 15 employees of the Cool Curry House are given below.

$$16, 17, 17, 18, 19, 22, 25, 26, 29, 33, 33, 37, 40, 42, 44$$

(a) Determine the median and quartile values for this data set.

(b) Create a box-and-whiskers diagram below.

Exercise #5: Twenty of Mr. Greco's physics students recently took a quiz. The results of this quiz are shown in the following box-and-whiskers diagram. Assume that all scores are whole numbers.
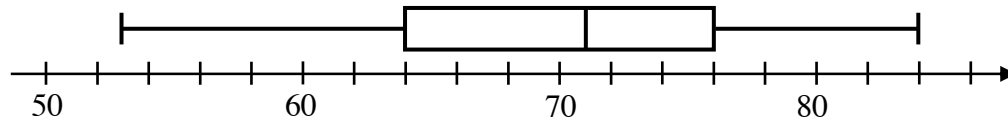

(a) What was the median score on Mr. Greco's math quiz?

(b) What was the range of the scores on Mr. Greco's math quiz?

(c) What score was greater than or equal to 75% of all other scores on this quiz?

(d) Mr. Greco regularly sets the passing grade on his quizzes to be the score of the lower quartile. What is the passing grade on this quiz?

Exercise #6: Which of the following box-and-whiskers diagram shows a data set with the greatest median?

(1)

(3)

(2)

(4)
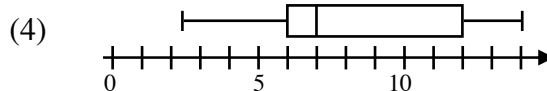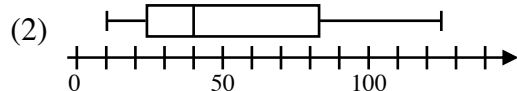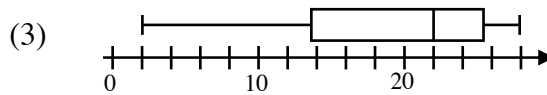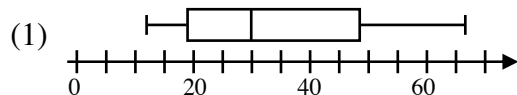
Name: _____   Date: _____

The 5 Number Summary
Algebra 1 Homework

Skills
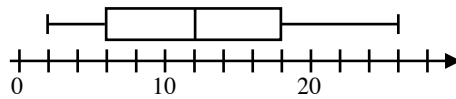
1. Which of the following data sets, given in ascending order, has the greatest range?

   (1) $\{3,4,7,10,18\}$ (3) $\{-2,5,8,11,26\}$

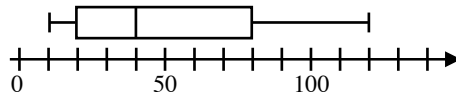   (2) $\{65,66,70,72\}$ (4) $\{-5,-2,4,7,10\}$

2. Given the box-and-whiskers diagram shown below, which of the following represents the third quartile value for this data set?

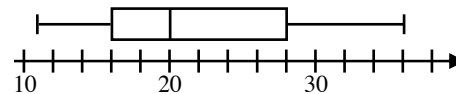   (1) 12   (3) 6

   (2) 18   (4) 19

3. Given the box-and-whiskers diagram shown below, which of the following represents the range of this data set?

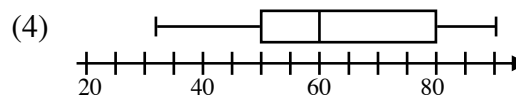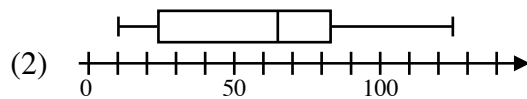   (1) 110   (3) 60

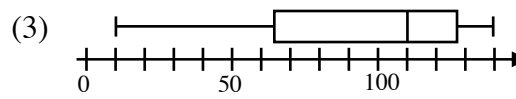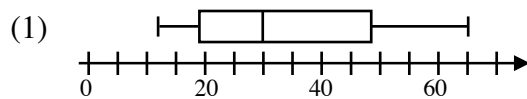   (2) 40   (4) 75

4. According to the following box-and-whiskers diagram, which of the following values represents the lower quartile of this data set?

   (1) 20   (3) 28

   (2) 13   (4) 16

5. Which of the following box-and-whiskers diagram represents a data set whose median value is equal to 65?

   (1)

   (3)

   (2)

   (4)

Applications

6. The ages of 12 fast-food workers are given in the data set below.

$$17, 18, 18, 19, 20, 21, 22, 23, 25, 25, 34, 47$$

(a) Calculate the five number summary. Label each of the five numbers with what they represents (i.e. min, max, lower quartile, etc.).

(b) Create a box-and-whiskers diagram of this data set below.
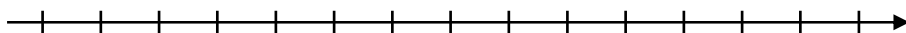
7. Mr. Daly gives a math test and records the grades of his 17 students as follows:
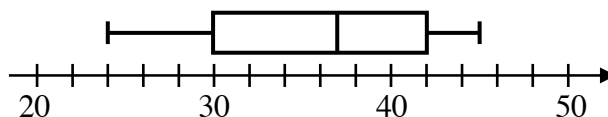
$$67, 72, 74, 74, 78, 80, 80, 82, 85, 85, 86, 87, 90, 92, 92, 95, 98$$

Create a box-and-whisker diagram of this data set below.

8. The speeds, in miles per hour, of 24 cars on a particular road are recorded and represented on the box-and-whiskers diagram shown below. Answer each of the following questions based on this diagram.

(a) What is the range of this data set?

(b) What is the maximum speed of the 24 drivers?

(c) How many drivers drove between 30 and 42 miles per hour?

(d) If the speed limit on this part of the road is 35 miles per hour, are more people speeding or are more people going below the speed limit? Justify.