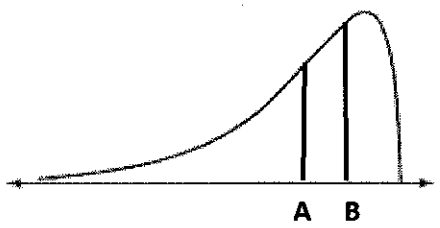
Statistical Reasoning
Unit 3 Review

Name: _____

Unit 2 Review

1. Using the curve below, which segment represents the median? Mean?

skewed left
A-mean
B-median



2. Using your calculator, find the mean, standard deviation, and five number summary of the following:

12 16 3 6 13 19 21 7 8 8 10 2 15

$\bar{x} = 10.77$ $Sx = 5.88$

min = 2 $Q_1 = 6.5$ $Q_2 = 10$ $Q_3 = 15.5$ max = 21

Percentiles and Z-Score

3. What is the definition for percentile?

% of observations less than or equal to

4. What does a z-score tell you?

How many standard deviations away from the mean

5. What is the formula for z-score?

$$z = \frac{x - \bar{x}}{Sx}$$

6. What is the meaning of a z-score of -1?

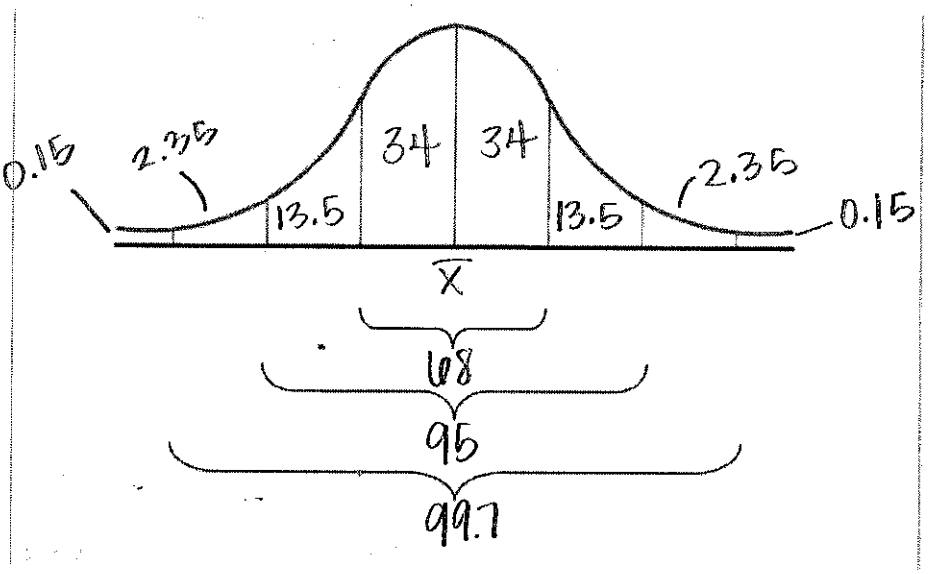
The data is 1 standard deviation

7. The scores for the last quiz are 40, 41, 42, 43, 45, 47, 49, 50, 51, 54, 57, 59, 60, 61, 63, 67, 69, 70, 71. Calculate the percentile for the score of 51.

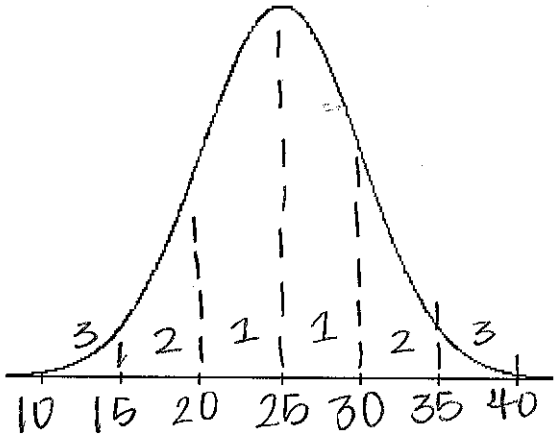
$\frac{9}{19} = 0.47$ 47th percentile

Empirical Rule (68-95-99.7 Rule)

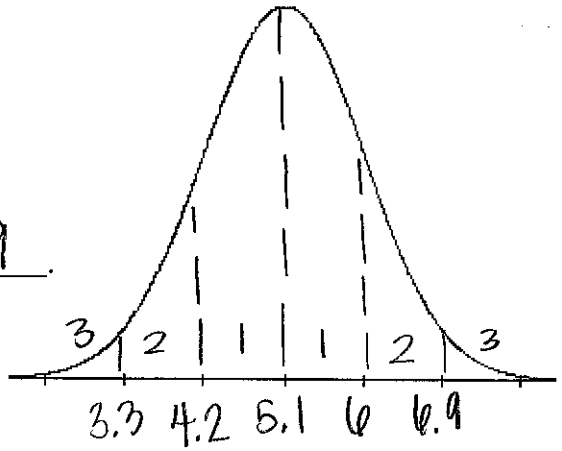
8. Fill in the following normal curve using the percentages from the empirical rule.



9. A Normal distribution has a mean of 25 and a standard deviation of 5. Find the area under the curve for the following intervals:
   a. Between 20 and 30
      68%
   b. 20 to the right
      84%
   c. Below 30
      84%



10. A set of data has a normal distribution with a mean of 5.1 and a standard deviation of 0.9. Find the percent of data within each interval.
    a. Between 4.2 and 6.0
       68%
    b. Greater than 6.9
       2.5%
    c. 95% of the data lies between 3.3 and 6.9.
    d. Less than 4.2
       16%
    e. Less than 3.3 and greater than 6.9.
       5%



Normal Standard Table

11. Use the standard normal table and the value of z to find the percentile.

a. z = -1.78

0.0375 | 3.75%

b. z = 2.62

0.9956 | 99.56%

c. z = 0.34

0.6331 | 63.31%

12. A normal distribution has a mean of 112.8 and a standard deviation of 9.3. Use the standard normal table to find the area covered by the following intervals:

a. $x \leq 104.3$

$Z = \frac{104.3 - 112.8}{9.3} = -0.91$ 0.1814 | 18.14%

b. ~~X247916~~ X283.16

$Z = \frac{83.16 - 112.8}{9.3} = -3.13$ 0.0009 $1 - 0.0009 = 0.9991$ | 99.91%

c. x is between 106.2 and 127.1

$Z = \frac{106.2 - 112.8}{9.3} = -0.71$ 0.2389 $Z = \frac{127.1 - 112.8}{9.3} = 1.54$ 0.9382 0.6993 | 69.93%

13. Scores on the SAT follow a normal distribution with mean 452 and standard deviation 18. Michael's z-score is 1.34. What is his actual SAT score?

$1.34 = \frac{X - 452}{18}$ $24.12 = X - 452$

$X = 476.12$

14. The height of the students in Mrs. Brattebo's class has a mean of 66 inches and a standard deviation of 1.3 inches. Assuming these heights follow a normal distribution find the following:

a. What percentage of students have a height less than 63 inches?

$Z = \frac{63 - 66}{1.3} = -2.31$ 0.0104 | 1.04%

b. What percentage of students have a height greater than 69 inches?

$Z = \frac{69 - 66}{1.3} = 2.31$ 0.9896 $1 - 0.9896 = 0.0104$ | 1.04%

c. What percentage of students have a height between 62 and 67 inches?

$Z = \frac{62 - 66}{1.3} = -3.08$ 0.0010 $Z = \frac{67 - 66}{1.3} = 0.77$ 0.7794 $0.7794 - 0.0010$ 0.7784 | 77.84%

d. Find the 40th percentile of the height distribution for Mrs. Brattebo's class.

$Z = -0.25$ $-0.25 = \frac{X - 66}{1.3}$ $-0.325 = X - 66$

65.68in = X