Name Key Date _____ Period _____

Algebra 2
11.4-11.5 Review

True/False (#1&2): *If false, underline a part of the statement, then change what you underlined to correct the statement.*

F 1. To calculate a *z*-score for a data value in a normal distribution, you only need to know σ & μ

F 2. All normal data values fall within ± three standard deviations from the mean.
99.7% of

Circle the correct answer (#3&4):

3. If you increase the size of your sample, then the margin of error will increase or decrease (circle).

4. If your sample has a larger standard deviation, then the interval will increase or decrease (circle).

Fill in the blank (#5& 6):

5. If a population standard deviation is 2.5, the margin of error for a sample of 100 data points at a 95% level of confidence is 0.5.

6. If the population mean for the data described in **question 5** is 4.5, the reasonable range of means is between 4 and 5.

7. The heart rate of a random sample of people is approximately normally distributed. The mean heart rate is 73 beats per minute (BPM) and the standard deviation is 6 BPM.

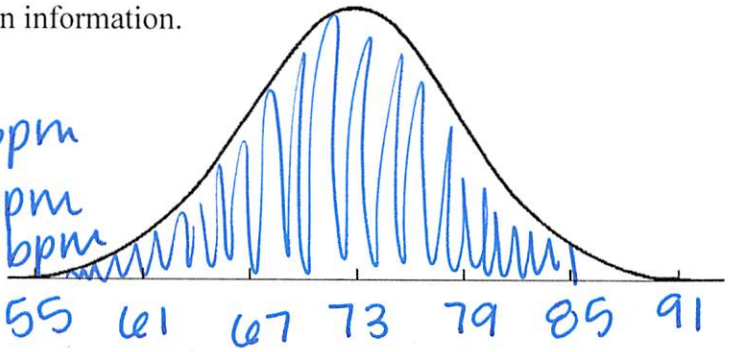
a. Fill out the normal curve below based on the given information.

b. Since the data is normally distributed:

68% of data values are between 67 and 79 bpm

95% of data values are between 61 and 85 bpm

99.7% of data values are between 55 and 91 bpm



c. According to Runner's World magazine, an elite marathon runner can have a resting heart rate as low as 38 BPM. What is the z-score for someone who has this resting heart rate?

$$z = \frac{38 - 73}{6} = -5.833$$

d. Stress and illness can affect your resting heart rate. Suppose you had a cold during finals week, and your resting heart rate was 85 BPM. What was your percentile ranking at that time?

50% + 34% + 13.5% = 97.5%

∴ 97.5th percentile

e. Shade on the normal curve the percentile rank of your answer from **part d**.

f. If 3,000 people were sampled, how many have a resting heart rate between 61 and 79 BPM?

13.5% + 34% + 34% = 81.5%

3000 (.815) = 2,445 people

8. Ryan is 5'6" and weighs 185 lbs. Ryan wants to know if he is in a higher percentile for height or weight. He researches the average height and weight for American males, and finds the average adult male is 5'9.5" tall with a standard deviation of 2", and the average adult male weighs 195.5 lbs with a standard deviation of 7.5 lbs. Assuming the data is normally distributed, which has a higher percentile, Ryan's height or weight? Show work to explain your answer.

5'6" = 66 inches 5'9.5" = 69.5 inches

Height: $\frac{66-69.5}{2} = -1.75$

weight: $\frac{185-195.5}{7.5} = -1.4$

∴ His weight has a higher percentile

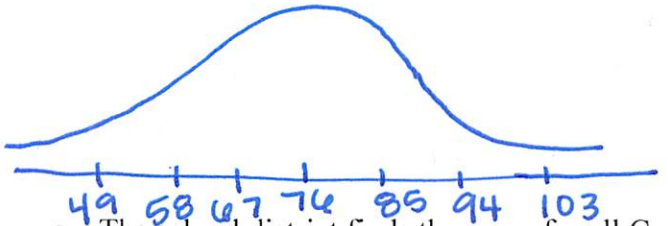
9. On a particular standardized assessment in Geometry, Mrs. Karpenko noticed the data was normally distributed. Her sixty-four students' had a mean score was 76%, and the standard deviation was 9%.

a. If a student's *z*-score was -1.44, what was their score on the assessment? (Round to the nearest percent.)

$-1.44 = \frac{\bar{x}-76}{9}$ $9(-1.44)+76 = \bar{x}$

$\bar{x} = 63.04$ ∴ 63%.

b. 99.7% of Mrs. Karpenko's students scored between what two values?



49% and 103%.

c. The school district finds the mean for all Geometry students in the district on the same standardized assessment was 78% with a standard deviation of 6%. Mrs. Karpenko wants to be sure her sample mean falls within the range of reasonable means at a 95% confidence level. Find the range of reasonable means and decide if Mrs. Karpenko's data is within that range.

$MOE = \pm\frac{2(6)}{\sqrt{64}} = \pm 2.25$

∴ Range of reasonable means: 78 ± 2.25%.

d. Mr. Blaskie boasts during lunch that his 64 students' mean score was a 90%. Would you believe him? Use your work from **part c** to support your answer.

NO, because his mean score is well outside of the range of reasonable means.