Normal Distribution Practice

Name _____Key_____

Directions: Read carefully. Grab your calculator. Please show your work.

1. The heights of women running in a marathon are *normally distributed* with a mean height of 66 inches. If 95% of the women are between 63 and 69 inches in height, what is the standard deviation for this data?

2, empirical rule

2. Josalyn scored 84 on the final examination in American History. Her score was exactly one standard deviation above the mean. If the scores are normally distributed with a standard deviation of 6, what was the mean score on the test?

$84 - 6 = \boxed{78}$

3. In a normal distribution, $\mu + 2\sigma = 60$ and $\mu - 2\sigma = 30$, where μ represents the mean and σ represents the standard deviation. What is the standard deviation?

$\mu = 45$

$\sigma_x = 7.5$

4. The amount of coffee creamer dispensed from a Coffee Vending Machine is normally distributed with a mean of 0.9 ounces and a standard deviation of 0.1 ounce. If the dispenser is used 500 times, *approximately* how many times will it be expected to dispense 1 or more ounces of coffee creamer?

$\text{norm cdf}(1, 1E99, .9, .1) = .1587(500)$

$\approx 79 \text{ times}$

5. Factory made chocolate chip cookies have a mean weight of 42 grams. The weight is normally distributed and for quality control, the standard deviation is 1.5 grams. Cookies that weigh more than 45 grams or less than 39 grams are rejected. How many cookies will be rejected in a 5,000 count batch of cookies?

$\text{normcdf}(-1E99, 39, 42, 1.5) = .02275(5000) = 113.75$

$\text{norm cdf}(45, 1E99, 42, 1.5) = .02275(5000) = 113.75$

$\boxed{\approx 227 \text{ cookies}}$

6. From 2003 to 2015, the winning scores for a golf tournament at the Wayland Country Club were 279, 277, 278, 282, 282, 272, 278, 276, 279, 278, 280, 285, and 279.

Using the standard deviation for this sample, S_x, find the percent of these winning scores that fall within one standard deviation of the mean.
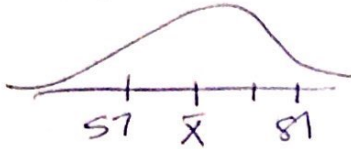
$\sigma_x = 3.158$

$\bar{x} = 278.846$

Lower $= 275.658$

upper $= 282.004$

$\frac{11}{14} = 79\%$

7. The scores on a pre-test for Calculus have a normal distribution. A score of 57 falls one standard deviation below the mean, and a score of 81 falls two standard deviations above the mean. Find the mean score for this pre-test.

$65 = \bar{x}$ $\sigma_x = 8$

57   $\bar{x}$ 81

8. The ages of first-year medical students are normally distributed with a mean of 23 years and a standard deviation of 1 year.

a) To the *nearest integer*, find the percentage of first-year medical students who are between the ages of 22 and 24, inclusive.   68% -   (1 standard dev)

b) To the *nearest integer*, find the percentage of first-year medical students who are 24 years old or older.

15.87%

9. A survey of college freshmen reveals that the mean number of cans of soda consumed per student per week to be 20 cans with a standard deviation of 3.5 cans. Assuming a normal distribution, find an interval indicating the total number of cans consumed per week for approximately 95% of the population. Justify your answer.   2 standard deviations

13   to   27

10. Residents of New York state that live near the east end of Lake Ontario receive large amounts of winter snowfall, referred to as "lake-effect" snow. Snowfall exceeding 6 inches in one day is not uncommon. In one city, daily snowfalls in this range were recorded for one winter (in inches):
8.6, 9.5, 14.1, 11.5, 7.0, 8.4, 9.0, 6.7, 21.5, 7.7, 6.8, 6.1, 8.5, 14.4, 6.1, 8.0, 9.2, 7.1, 10.3, 12.1, 8.3

a) Determine if this data is normally distributed. Explain.

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b) Find the mean and the standard deviation for this data to the *nearest hundredth*.

$\bar{x} = 9.57$ $S_x = 3.613$