

Math123 Homework Section 15 Z-scores

Section: _____

Name: _____

Use Excel to find the mean and standard deviation of the following data sets then answer the questions.
Note: You will need to use the z-table from the course packet to work the following problems.

1. Body temperature measured in degrees Fahrenheit of randomly selected normal/healthy adults:

98.6 98.6 98.0 99.0 98.4 98.4 98.4 98.7 98.9 98.8

- a. The mean body temperature is :

98.57778 or 98.6

- b. The standard deviation of the body temperatures is:

.311359028 or .311

- c. Assuming body temperature is normally distributed, what is the range (low to high) of body temperatures for the middle 68% of normal and healthy adults?

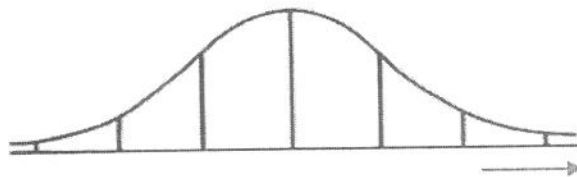
- d. What is the range (low to high) of body temperatures for the middle 95% of normal and healthy adults?

- e. Use this range of values in a meaningful sentence.

- f. What is the Z-score for an adult with a body temperature of 99 degrees Fahrenheit? $Z =$

- g. Use the z-table to determine the likelihood a normal/healthy adult has a body temperature over 99 degrees Fahrenheit. Diagram this problem by shading the desired region under the bell curve, and write a sentence using the probability from the table.

Probability =



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2. Weights measured in grams of randomly selected M&M plain candies:

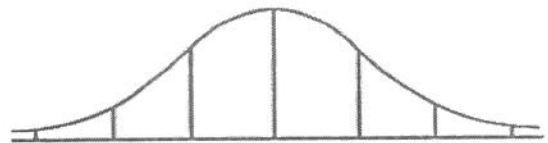
0.957 0.912 0.925 0.886 0.920 0.958

0.915 0.914 0.947 0.939 0.842

- The mean weight of the M&M's is:
- The standard deviation of the weight of the M&M's is:
- Assuming the weight of M&M's is normally distributed, what is the range (low to high) of weights of the middle 68% of M&M's?
- What is the range of weights (low to high) of the middle 95% of M&M's?
- Use this range in a meaningful sentence.
- Calculate the z-score of finding an M&M candy weighing less than 0.886 grams. $Z =$
- Use a z-table to find the probability of finding an M&M candy weighing less than 0.886 grams.

Diagram this problem by shading the desired region under the bell curve, and write a sentence using the probability from the table.

Probability =



3. Professor Ivy's students have a Mean grade of 69.5 and a Standard Deviation of 6.5.

a. If Johnny has an 82 in the class, what would the z-score for Johnny's grade be?

b. What percentile does Johnny's score put him in?

4. Professor Ivy's students have a Mean grade of 69.5 and a Standard Deviation of 6.5.

a. If Johnny has a 62 in the class, what would the z-score for Johnny's grade be?

b. What percentile does Johnny's score put him in?

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5. The average IQ score is 100 points with a standard deviation of 15 points. Uncle Bob says that his IQ is in the 90th percentile. Use this information and a z-table to find Uncle Bob's IQ. *Hint: Use the z-table to look up his z-score then solve for his score x in the z-score formula.*

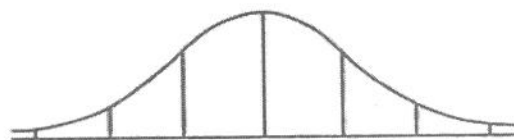
6. The average height of men in the US is 177.6 cm

a. How tall is this in inches?

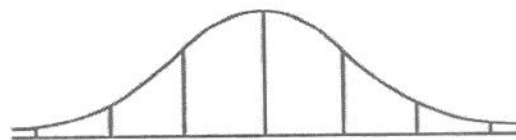
b. If the standard deviation for the heights is 3 inches, and Uncle Bob claims that he is also in the 90th percentile for height, how tall is he? *Hint: Use the z-table to look up his z-score then solve for his score x in the z-score formula.*

Answer the following by drawing the bell (normal) curve. Label and shade the region desired. You will need to use the z-table from the class session to work the following problems.

7. Patients wait 126 days on average for a heart transplant with a standard deviation of 24 days. What proportion waits fewer than 90 days? Diagram this problem by drawing and labeling the bell curve and shading the desired region.

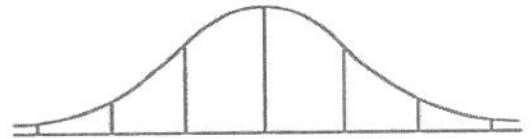


8. The life of a 9-volt battery is normally distributed with a mean of $\mu = 2000$ hours and a standard deviation of $\sigma = 40$ hours. What is the proportion of batteries with an average life of 2100 hours or more? Draw a normal curve, label the mean and standard deviation, and shade the proportion of batteries with an average life of 2100 hours or more.

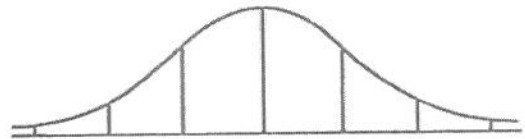


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9. People spend an average of 7 hours per day on their home computers with a standard deviation of 1 hour. What proportion spends at least 5 hours per day on their home computers? Write a sentence that states your findings.



10. Roadworthy tires last an average of 30,000 miles with a standard deviation of 2500 miles. What proportion of these tires do not last more than 25,000 miles?



11. The average annual consumption of ice cream per capita is $\mu = 16.5$ lbs. in the US. Estimate the total consumption of ice cream in the US. (You may need to look up some information to calculate this). If the standard deviation is $\sigma = 2.5$ lbs, what proportion of the US consumes less than 10 lbs. per year?

Total consumption = _____

Proportion who consume less than 10 lbs. per year = _____

