

Statistical Reasoning
Normal Distribution

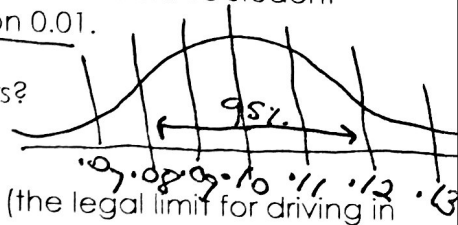
Name: key Date: _____ Class: _____

Normal Distribution Practice

Use the following information for the next three questions. Suppose that the Blood Alcohol Content (B.A.C.) of male students at a particular college who drink 5 beers varies from student to student according to a Normal distribution with mean 0.10 and standard deviation 0.01.

1. What are the BAS's of the middle 95% of students who drink 5 beers?

.08 to .12

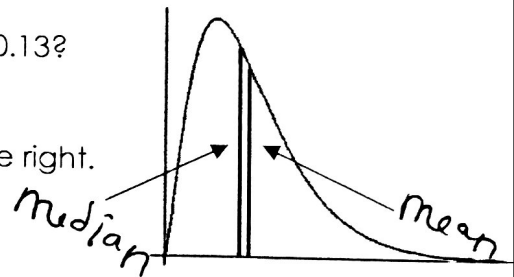


2. What percent of students who drink 5 beers have BAC above 0.08 (the legal limit for driving in most states)?

97.5 %

3. What percent of students who drink 5 beers have BAC above 0.13?

.15 %



4. Two measures of center are marked on the density curve to the right. Identify which one is the median and which one is the mean?

5. You are told that your score on an exam is at the 85 percentile of the distribution of scores. What does this mean?

You scored above 85% of students tested

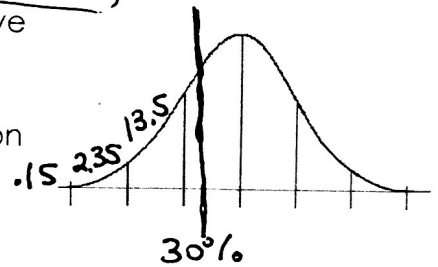
6. The mean is 80 and the standard deviation is 10. What is the percentile for an observation of 90?



.15 + 2.35 + 13.5 + 34 + 34 = 84%

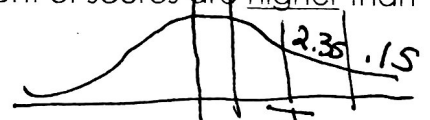
7. What does a Normal distribution look like? A Bell Curve

8. Wayne's buddy Garth took the SAT. He scored better than 30 % of all other test takers. Sketch approximately where his score's position is on a Normal curve.



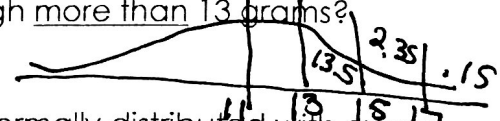
9. Scores on the Graduate Record Examination (GRE) follow a Normal distribution. Jennifer's score is 2 standard deviations above the mean. About what percent of scores are higher than Jennifer's?

2.5 %

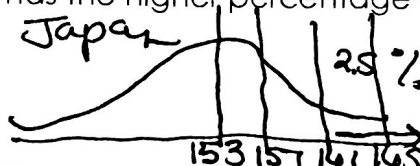
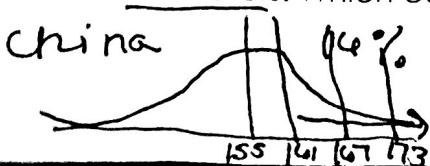


10. Entomologist Heinz Kaefer has a colony of bongo spiders in his lab. There are 1000 adult spiders in the colony, and their weights are Normally distributed with mean 11 grams and standard deviation 2 grams. About how many spiders in the colony weigh more than 13 grams?

16% .16(1000) = 160 spiders



11. Suppose that adult women in China have heights which are Normally distributed with mean 155 centimeters and standard deviation 6 centimeters. Adult women in Japan have heights which are Normally distributed with mean 153 centimeters and standard deviation 4 centimeters. Which country has the higher percentage of women taller than 161 centimeters?



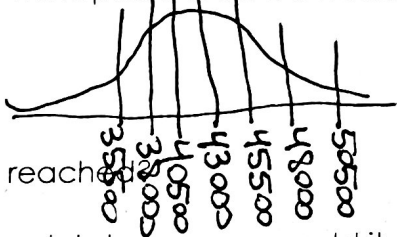
China



Use the following information for the next six questions. Kitchen appliances don't last forever. The lifespan of all microwave ovens is Normally distributed with a mean of 9 years and a standard deviation of 2.5 years.

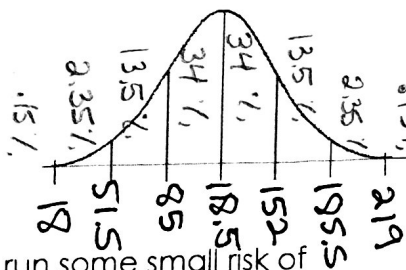
- 12. What percentage of microwave ovens last more than 14 years? **2.5 %**
- 13. What percentage of microwave ovens last less than 4 years? **2.5 %**
- 14. What percentage of microwave ovens last between 4 and 16.5 years? **97.35 %**
- 15. The middle 95% of all microwave ovens last between how many years?
4 and 14 years
- 16. What is the median for the lifespan of all microwaves?
9 years
- 17. What percentile is a microwave in if it lasts 1.5 years?
.15 %

Use the following information for the next three questions. The lifetime of a certain brand of tires is approximately normally distributed, with a mean of 43,000 miles and a standard deviation of 2,500 miles under normal driving conditions. Tire wear is greatly affected by road, weather and driver conditions along with proper maintenance of the tires. A driver who aggressively accelerates or makes quick stops, for example, will wear out a tire much more quickly. The brand carries a warranty of 35,500 miles under normal driving conditions, i.e., the company will replace a tire if it wears out before this mileage limit is reached.



- 18. What percent of tires will exceed 48,000 miles?
2.5 %
- 19. What percent of the tires will fail before the warranty limit is reached?
(Before 35,500) .15 %
- 20. If the company sold 250,000 of these tires this year, approximately how many would it expect to have to replace under the warranty conditions?
 $.0015 (250,000) = 375$ tires

Use the following information for the next two questions. Syracuse, New York is the snowiest metropolitan area in the United States. Based on 59 years of data from the National Weather Center, the mean annual snowfall is 118.5 inches with a standard deviation of 33.5 inches. The annual snowfall in Syracuse follows a roughly normal distribution.



- 21. Sketch a normal curve to illustrate the annual snowfall in Syracuse. Be sure to mark the mean and the points that determine one, two, and three standard deviations away from the mean.
- 22. Each year the city of Syracuse budgets enough money for snow removal to take care of all but the snowiest 2.5% of years. It is willing to run some small risk of this happening, especially in a tight budget year. How much would it have to snow in a particular year in order for the city to exceed its snow-removal budget?

**above 185.5 inches
(15.45 feet!)**