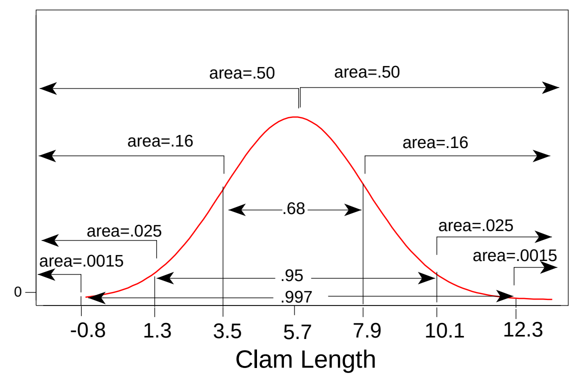
Practice Quiz 6

Statistics 0200 Spring 2009 Dr. Nancy Pfenning

1. (2 pts.) This graph shows the distribution of butter clam lengths (in centimeters), based on mean and standard deviation and the 68-95-99.7 Rule:



   (a) 68% of lengths are between ______ and ______ centimeters long.

   (b) The probability of being more than 11 centimeters is (i) smaller than .0015 (ii) between .0015 and .025 (iii) between .025 and .16 (iv) between .16 and .50 (v) greater than .50

   (c) Which of these is your best guess for the probability of being less than 4 centimeters? (i) .02 (ii) .12 (iii) .22

   (d) Which of these is your best guess for the length that has 5% of all values below it? (i) 2.1 (ii) 4.1 (iii) 6.1

2. (2 pts.) The proportion of all assaults on U.S. law enforcement officers that are made with dangerous weapons (firearms, knives, etc. instead of hands, feet, fists, etc.) is .20.

   (a) What proportion should lie at the center of the distribution of sample proportions of assaults made with dangerous weapons? ______

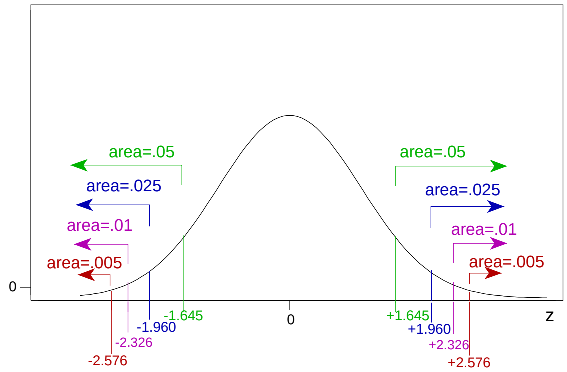
   (b) The standard deviation of the distribution of sample proportion for samples of size 64 is $\sqrt{.20(1-.20)/64} = .05$ as long as the sample is less than one tenth the size of the population. Is it? (Answer yes or no.)

   (c) The shape of the distribution of sample proportion is approximately normal as long as the expected counts in and out of the category of interest are at least 10. In samples of 64 assaults where overall .20 are made with dangerous weapons, we expect to see about ______ made with dangerous weapons and ______ made with hands, feet, fists, etc.

(d) Sketch a normal curve showing the distribution of sample proportion of assaults made with dangerous weapons for samples of size 64, using the center from (a) and the standard deviation mentioned in (b), based on the 68-95-99.7 Rule.

(e) Suppose 8 in a sample of 64 assaults are made with dangerous weapons; this proportion can be characterized as
(i) extremely low (ii) somewhat low (iii) somewhat high (iv) extremely high

3. (2 pts.) Butter clams' lengths (in centimeters) have mean 5.7 and standard deviation 2.2. Once z scores are found, this sketch of the tails of the normal curve can be used to estimate probabilities.



(a) Find the z score when a clam is 11 centimeters long.

(b) The probability of being more than 11 centimeters long is between
(i) 0 and .005 (ii) .005 and .01 (iii) .01 and .025 (iv) .025 and .05

(c) Find the z score when a clam is 5.0 centimeters long.

(d) A length of 5 centimeters is
(i) somewhat small (ii) unusually small (iii) virtually impossible

4. (4 pts.) In fall 2004, mean SAT score of all Pitt incoming freshmen was 1230. Assume standard deviation was 120. The shape of the distribution was approximately normal.

(a) Since 1230 describes the entire population of incoming freshmen, it is (i) a parameter denoted μ (ii) a parameter denoted $\bar{x}$ (iii) a statistic denoted μ (iv) a statistic denoted $\bar{x}$

(b) How do we denote the number 120? ______

(c) Circle any of the following that are approximately normally distributed:

i. sample mean SAT for a small sample of incoming freshmen

ii. sample mean SAT for a large sample of incoming freshmen

(d) Sample mean SAT for a sample of 36 incoming freshmen has mean ______and standard deviation ______.

(e) Find the z-score if a sample of 36 incoming freshmen has mean 1240. ______

(f) Use the sketch above, showing tails of the standard normal distribution, to give a range for the probability of sample mean SAT being 1240 or more:
(i) less than .005 (ii) between .005 and .01 (iii) between .01 and .025
(iv) between .025 and .05 (v) greater than .05

(g) If sample mean SAT for a sample of 36 incoming freshmen enrolled in introductory statistics is found to be 1240, this can be characterized as
(i) not uncommon (ii) unusually high (iii) almost impossible