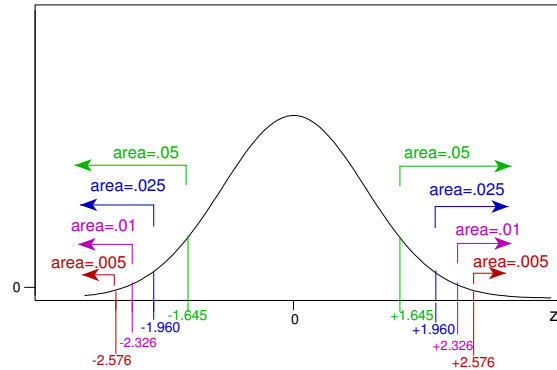# Practice Quiz 6

Statistics 0200   Spring 2018   Dr. Nancy Pfenning

1. (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 0.005 (ii) between 0.005 and 0.01 (iii) between 0.01 and 0.025
(iv) between 0.025 and 0.05 (v) greater than 0.05

(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

2. (3 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, etc.) is 0.20.

(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 $\sqrt{0.20(1 - 0.20)/64} = 0.05$ 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 0.20 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 with dangerous weapons; this proportion is (i) extremely low (ii) somewhat low (iii) somewhat high (iv) extremely high

3. (3 pts.) In an Allegheny County Health Department survey, the proportion of respondents aged 18 to 29 who were sexually abstinent in 2002 was 0.06. Approximately 600 people in this age group were surveyed.

(a) Identify 0.06: (i) X (ii) n (iii) p (iv) $\hat{p}$

(b) Identify 600: (i) X (ii) n (iii) p (iv) $\hat{p}$

(c) Identify $0.06(600) = 36$: (i) X (ii) n (iii) p (iv) $\hat{p}$

(d) If a sample of size 600 yields a sample proportion of 0.06, the approximate standard deviation of the distribution of sample proportion is $\sqrt{0.06(1 - 0.06)/600} = 0.01$. Give an approximate 95% confidence interval for the proportion of all people in this age group in Allegheny County who were abstinent.

(e) Is it plausible that more than 0.10 of residents in this age group were abstinent?

(f) To interpret your interval in (d), circle **one** of the following:

    i. The population proportion has a 95% probability of falling in this interval.
    ii. The sample proportion has a 95% probability of falling in this interval.
    iii. We are 95% confident that sample proportion falls in this interval.
    iv. We are 95% confident that population proportion falls in this interval.

(g) A narrower interval would be produced with a
(i) lower (ii) higher level of confidence; or (iii) doesn't it matter?

(h) A narrower interval would be produced with a (i) smaller (ii) larger sample size; or (iii) doesn't it matter? A narrower interval would be produced with a (i) smaller (ii) larger population size; or (iii) doesn't it matter?