Please indicate whether each statement is true or false

	True	False	Statement
1A		X	The Central Limit Theorem (CLT) suggests that an unbiased sample will be normally distributed if it is the result of a reasonably large number of draws from a population
1B	X		The mean of the sampling distribution for a proportion is expected to have the same value even when the sample size increases.
1C	X		The Central Limit Theorem (CLT) will apply in situations where the number of random draws (sample size of a random sample) is reasonably large and the population is normal.
1E		X	For a population that is not normally distributed, the distribution of sample percentages will have the same shape as the population when the sample (randomly drawn) is reasonably large.
1G	X		The sampling distribution for unbiased random samples of reasonable size will be centered on the expected value of the mean.
1H	X		The Central Limit Theorem (CLT) implies than when it's conditions are met, a sampling distribution can be correctly summarized by only an expected value and a standard deviation

2. In 2001, a survey organization takes a simple random sample of 1,600 adults in Los Angeles, California, a large American city. Among this sample of adults, it was found that 975 support the death penalty, 525 support life imprisonment with no parole and the rest did not believe in penalties for homicide. It was noted that support for the death penalty had changed from a survey taken in 1991 when approximately 80% of adults in Los Angeles supported the death penalty.

a. Is it possible to construct a 95% confidence interval for the population percentage of Los Angeles adults who support the death penalty in 2001. (circle one)

YES NO

If you circled YES, please construct a 95% confidence interval in the space below. If you circled NO, please use the space to explain why it is not possible to construct a 95% confidence interval.

$$\frac{975}{1600} = .6094 = \hat{p} \qquad .6094 \pm 1.96\sqrt{\frac{(.6094)(.3906)}{1600}} \Rightarrow .61 \pm .012$$

b. If the sample size were 400 instead of 1600 it would (circle one to fill in the blank) the width of any confidence interval constructed from the sample information

Increase Decrease Not Affect

c. If the level of confidence were 99% instead of 95% it would (circle one to fill in the blank) the width of any confidence interval from the sample information

Increase Decrease Not Affect

TYPO

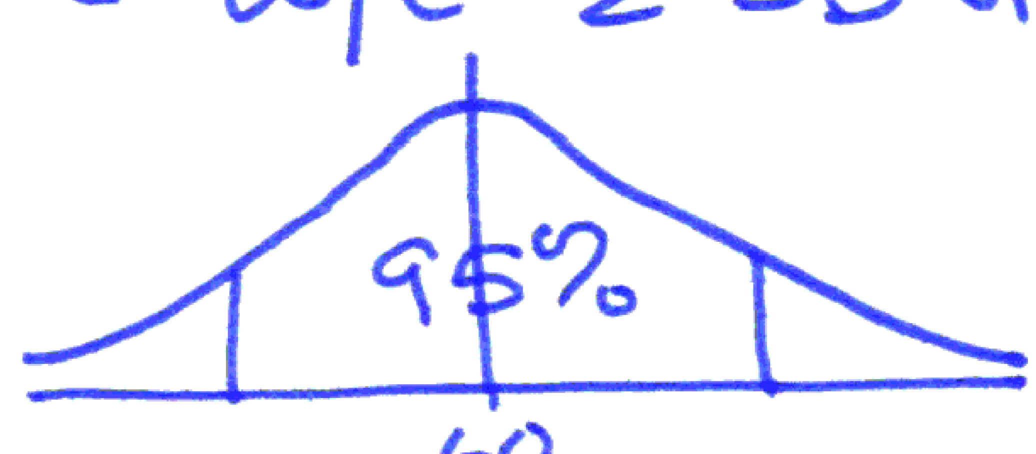
d. Suppose it was known that actually 60% of all adults in Los Angeles support the death penalty. So if a simple random sample of 625 adults were to be taken, the SE for the sample percentage of death penalty supporters is calculated to be about 2%. You should assume these numbers are correct. SD NOT SE

e. A student, looking at the numbers in part d, interprets them as follows: this means that there is about a 95% chance for the percentage of death penalty supporters in the sample to be in the range 60% ± 4%. (circle one)

The student is correct The student is not correct

Please explain your choice below:

625 is a large enough random sample
and $(625)(.60) = np > 10$ and $(625)(.40) = nq > 10$
the Central Limit Theorem suggests that 95%
of all samples should be found w/i ~2 SD of
the population parameter p
since 4% is 2×2% 60% ± 4% is
correct



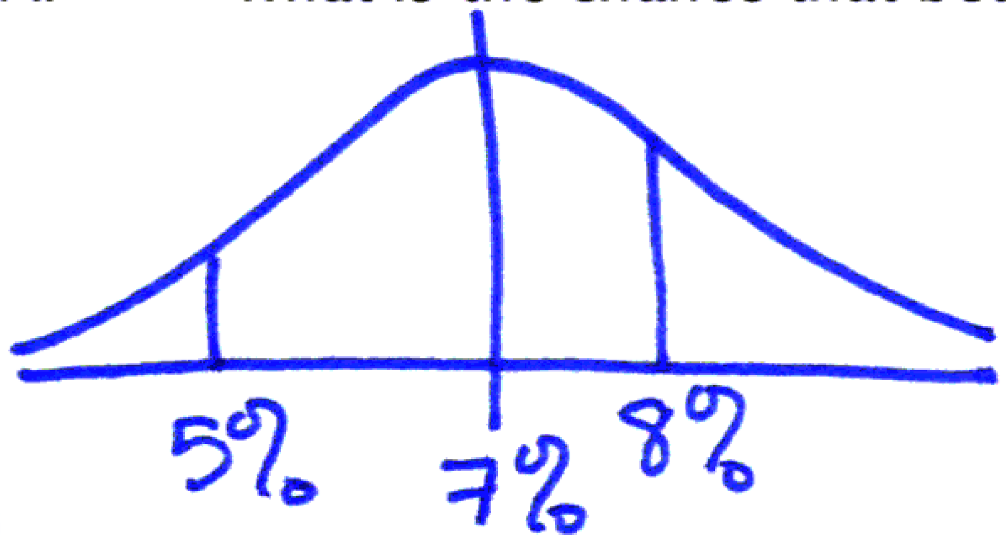
$100-(71+10+12)=7$

3. The most recent enrollment statistics for the entire Los Angeles Unified School District revealed that 71% were identified as "Hispanic", 10% as "Non-Hispanic White", 12% as "Black" or "African American" and the remainder were called "All Others". A recent survey of excellent quality conducted by UCLA on 225 students in the Los Angeles Unified School Districted revealed that 6% of the enrolled students were "Asian" → assume random

A. What is the chance that between 5% and 8% of students in a sample of 225 will be identified as "All Others"?

$np > 10$ $(225)(.07)$

$nq > 10$ $(225)(.93)$



$$z_{8\%} = \frac{.08-.07}{\sqrt{\frac{(.07)(.93)}{225}}} = .59$$

$$z_{5\%} = \frac{.05-.07}{\sqrt{\frac{(.07)(.93)}{225}}} = -1.18$$

TYPO

B. If the sample size were 400 instead of 225 it would (circle one to fill in the blank) the standard error for the sample ~~count~~ % of "All Others" students (or standard deviat

Increase Decrease Not be enough information to calculate

C. Can you construct a 90% confidence interval for the percentage of "Asian" students in the Los Angeles Unified School District using information from the original sample of 225? (circle one)

YES NO

If yes, please construct it in the space below, if no, please explain why this is not possible.

$np = (225)(.06) = 13.5 > 10$, random

$$.06 \pm 1.65\left(\sqrt{\frac{(.06)(.94)}{225}}\right) \Rightarrow .06 \pm .0261 \text{ or } 6\% \pm 2.6\%$$

(or 1.64)

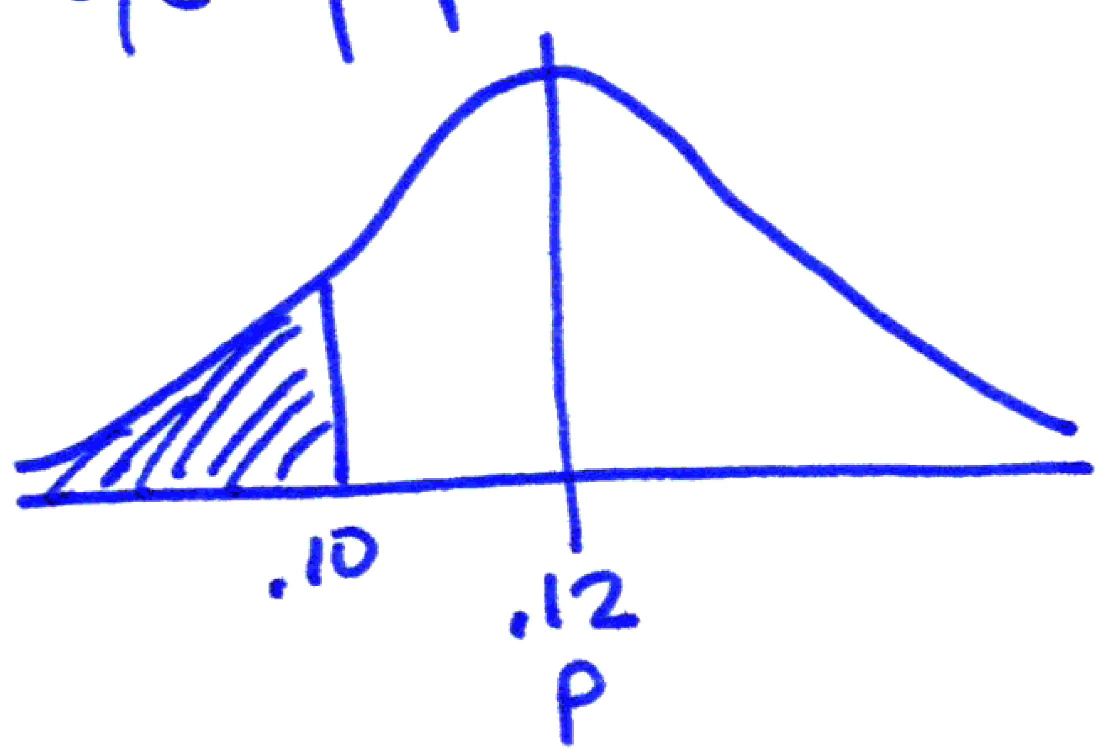
D. (continued from part C) Suppose it is possible to calculate a confidence interval. If the level of confidence were changed to 80% instead of 90% it would (circle one to fill in the blank) the width of any confidence interval from the sample information

Increase Decrease Not Affect

E. What percentage of random samples of size 225 will have fewer than 10% "Black or African American" students?

expect a random sample to have 12% "BLACK" or "AFR. AM" students

b/c population % is 12% (p)



$np = (225)(.12) = 27 > 10$

$nq > 10$

$$z = \frac{.10-.12}{\sqrt{\frac{(.12)(.88)}{225}}} = \boxed{-.92}$$

so about .1788 or $\boxed{\approx 17.9\%}$

4. Some friends take you to a casino and you are confronted with two games.

GAME A works like this: you can bet $8 on a number, and if your number comes up, you win $11, if not, you lose your $8. Your number comes up 35% of the time.

GAME B works like this: you can bet $3 on a number, and if your number comes up, you win $2, if not, you lose your $3. Your number comes up 55% of the time.

A) Please calculate the Expected Value and the Standard Deviation for each of these games

A

+11	-8
.35	.65

Expected Value

$(+11)(.35)+(-8)(.65)$

$= -1.35$

SD

$\sqrt{(.35)(11--1.35)^2+(.65)(-8--1.35)^2}$

$= 9.0624$

B

+2	-3
.55	.45

$(2)(.55)+(-3)(.45)$

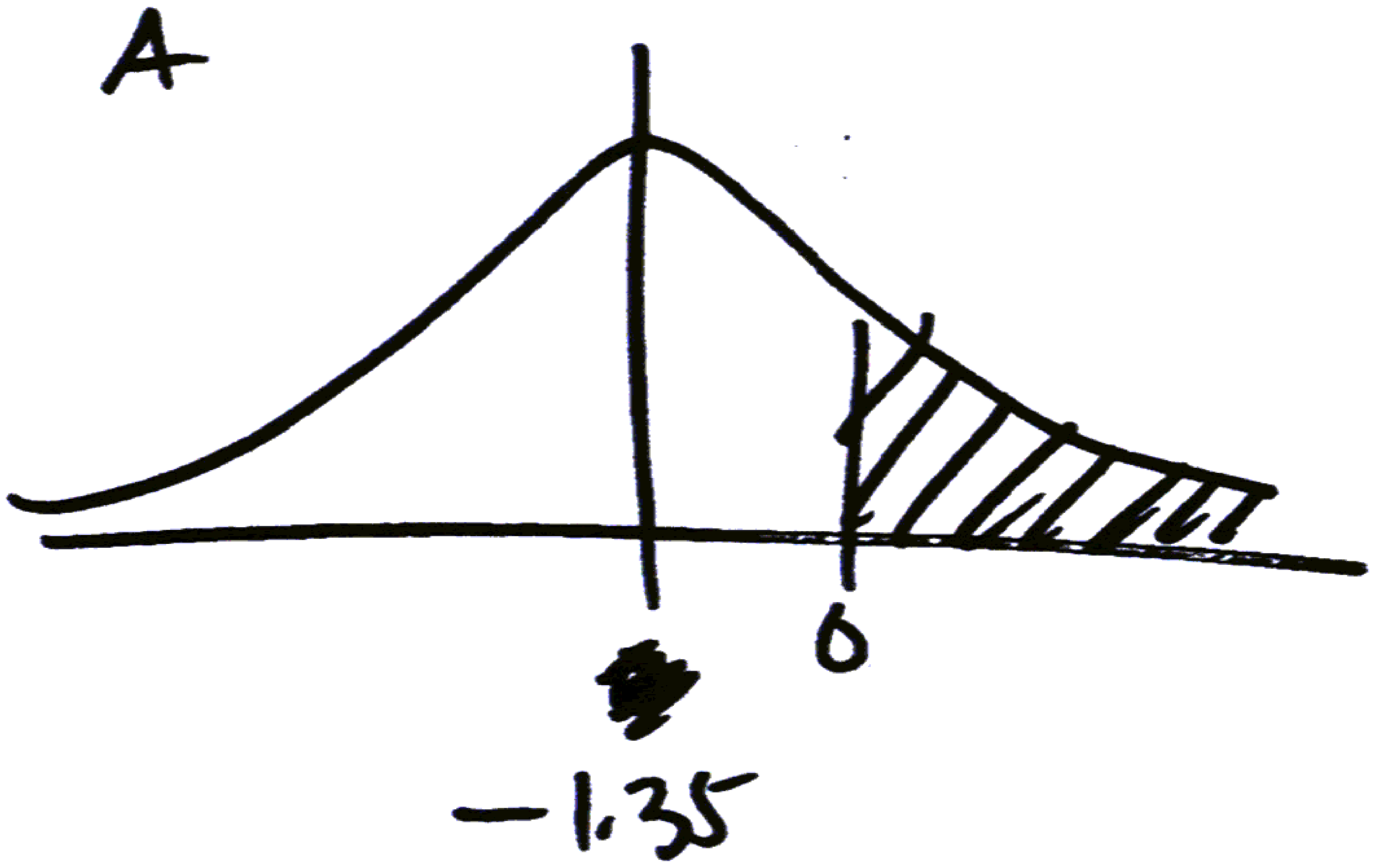
$= -.25$

$\sqrt{(.55)(2--.25)^2+(.45)(-3--.25)^2}$

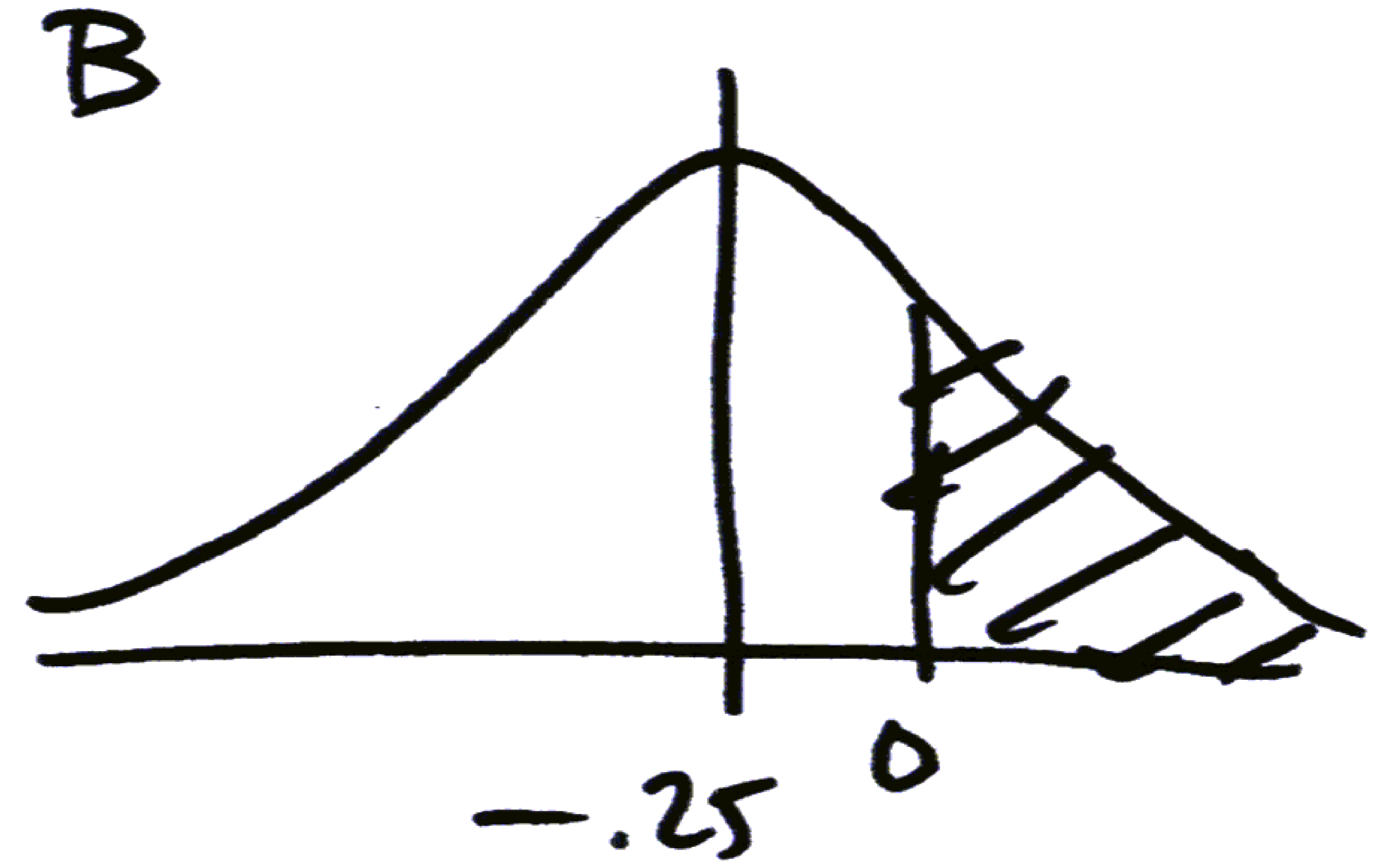
$= 2.4875$

B) Based on your calculations in part A, which game is more likely to give you winnings (as opposed to losing)? Justify your selection in the space below.

A



B



$z = \frac{0-(-1.35)}{9.0624} = .15$

$z = \frac{0-(-.25)}{2.4875} = .10$

GAME B, ~~the~~ area > 0 is larger

5. Indicate whether each statement is true or false concerning the following 68% confidence interval that a student generated from a sample of size 144. Suppose the population was not normal and suppose the confidence interval was correctly calculated:

$$21\% \pm 1 * \left(\frac{\sqrt{144} * \sqrt{.21 * .79}}{144} * 100\right) = 21\% \pm 3.39\%$$

WRONG FORMULA

	True	False	
6A			Assume for this statement, the confidence interval was correctly calculated, then in 68% of all samples, the true population percentage would lie within Sample percentage ± Standard Error for a Percentage.
6B			The value $\sqrt{.21 * .79}$ is also called the standard deviation for a percentage
6C			Suppose the sample size were increased to 169, the width of the confidence interval would also increase
6D			Suppose the confidence level were increased from 68% to 90%, the width of the confidence interval would also increase

7. So you went to college, but your best friend in high school decided to skip college and work for a fast food chain called "Down and Out Burgers". After 2 years, you are accumulating a lot of bills but your best friend has now been promoted to manager and is earning $90,000 per year. You however know a lot about statistics and decide to pay your friend a visit, hoping to get a free burger perhaps. Your friend tells you that managing a restaurant is not an easy job. His "Down and Out Burgers" was designed to accommodate 6,000 customers per day. If the restaurant has 6,000 customers it will earn $11,000 on that day. If instead there are 2,000 or fewer customers, the restaurant will lose $7,000 on that day. If there are 10,000 or more customers, it will lose $5,000 on that day. The history of the restaurant reveals that on 45% of the days the restaurant has 6,000 customers and on 35% of the days it has 2,000 or fewer customers.

e. What is the expected value of the earnings for this particular "Down and Out"?

outcome	11,000	-7000	-5000
proport	.45	.35	.20

$E(x) =$ \$1,500

b. What is the standard deviation of those earnings?

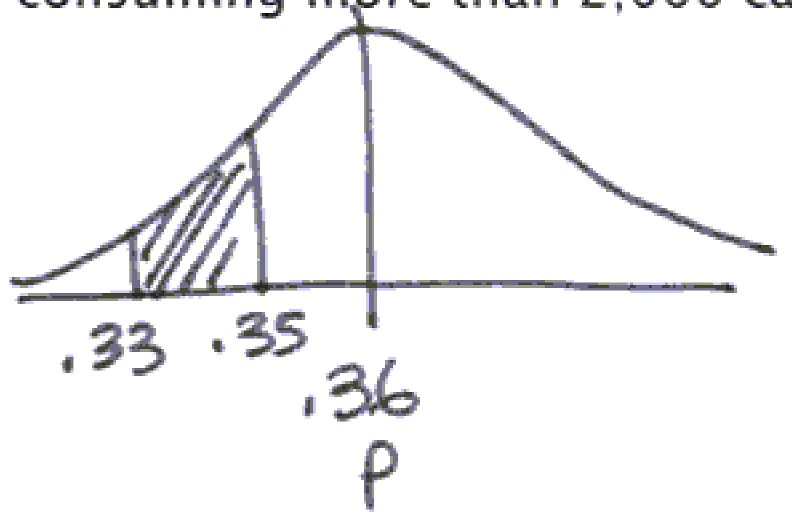
$$\sqrt{.45(11{,}000-1{,}500)^2 + .35(-7000-1{,}500)^2 + (.20)(-5000-1{,}500)^2}$$

$= \$8{,}623$

8. The Super Bowl is the number one party event of the year for Americans, exceeding even New Year's Eve celebrations. Suppose it is known that the typical party has an average of 17 partygoers with a standard deviation of 3.3. On an ordinary Sunday afternoon, the average number of calories consumed in America is 600 but 36% will consume more than 2,000 calories. And only 5% will get drunk. Please assume that calories are normally distributed

The Hardvard School of Public Health decided to study the effects of attending Super Bowl Sunday parties on the caloric consumption of Americans. 850 Americans were selected by random-digit dialing and interviewed by telephone. 490 Americans reported that they had attended a Super Bowl party, 110 did not attend a party but watched the Super Bowl on television at home. The remainder did not attend a Super Bowl party or watch the game. The calories consumed by the partygoers had a mean 1,330 with a standard deviation of 600. The calories consumed by the non-party goers had a mean of 560 with a standard deviation of 100. Among the party goers, 77% reported getting "drunk", among non-party goers who watched the game 15% reported getting "drunk" and only 7% of the non-party goers/non Bowl watchers reported getting "drunk" on Super Bowl Sunday. The average party had 19 partygoers. Please assume that all of the sample sizes are reasonably large and no biases exist.

A. What is the chance that a sample of size 850 will have between 33% and 35% of those surveyed consuming more than 2,000 calories? (5 points)



$\hat{p}$

$$z_{.35} = \frac{.35 - .36}{\sqrt{\frac{(.36)(.64)}{850}}} = -.61 \quad \text{area is } .2709$$

$$.2709 - .0344 = \boxed{.2365}$$

$$z_{.33} = \frac{.33 - .36}{\sqrt{\frac{(.36)(.64)}{850}}} = -1.82 \quad \text{area is } .0344$$

B. Please construct an approximate 75% confidence interval for the population percentage of partygoers who reported getting "drunk". (4 points)

$$\underset{\hat{p}}{.77} \pm \underset{z^*}{1.15}\left(\sqrt{\frac{(.77)(.23)}{490}}\right) \qquad \left(\sqrt{\frac{\hat{p}\hat{q}}{n}}\right)$$

490 = n = partygoers

$$\boxed{.77 \pm .0219 \text{ or } 77\% \pm 2.2\%}$$

(continued from above)

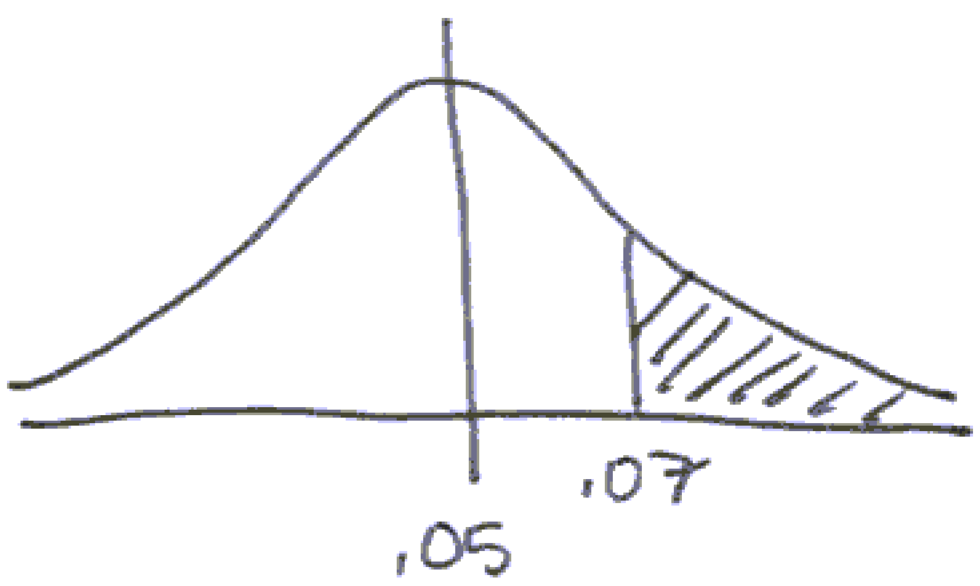
C. According to statistical theory, do we meet the conditions necessary to allow us to construct an 80% confidence interval for the population percentage of non-party going/non-Super Bowl watching Americans who got drunk on Super Bowl Sunday? (circle one)

YES NO $np = 250 \times .07 = 17.5$

If yes, please construct it in the space below, if no, please explain why this is not allowable.

$$.07 \pm 1.28\sqrt{\frac{(.07)(.93)}{250}} \Rightarrow 7\% \pm 2.07\%$$

D. If 5% of all Americans are drunk on a typical Sunday afternoon, what is the chance that a simple random sample of 256 Americans will show that at least 7% are drunk on a typical Sunday afternoon?



$$z = \frac{.07 - .05}{\sqrt{\frac{(.05)(.95)}{256}}} = +1.47$$

area is .0708 or about 7.1%
so 7.1% of all samples will give at least 7% drunk.

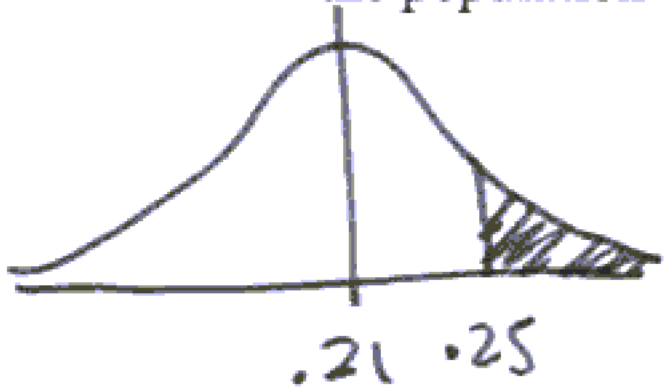
9.Indicate whether the statement is true or false

	True	False	
A		X	In hypothesis testing, an alpha=.10 means that there is a 10% chance that the null hypothesis is wrong
B	X		In hypothesis testing, a null rejected at alpha=.05 will always be rejected at alpha=.10
C	X		90% confidence means that there is a 90% chance that the sample you select will generate an interval that contains the true parameter value.
D		X	The proper use of the Z statistic requires that the population be normally distributed
E		X	For confidence intervals, decreasing the sample size will have the same effect as decreasing the confidence level.

not necessarily given Ch. 18

10. A marketing company wishes to determine the extent to which people who currently own personal computers would be willing to "upgrade" to handheld "communication devices" such as the Palm Pilot (manufactured by 3Com). Because of logistical considerations, the survey focused on households that purchased new personal computers within the last year. A list of all such households was obtained from manufacturers through warranty registration records, and from this list the marketing company determined that amount paid for a computer was normally distributed with an average of \$3,100 and a standard deviation of \$1355 and 21% of the households reported that they planned to purchase a handheld "communication device" in the next five years. From this list, the company selected a simple random sample (SRS) of size 64 and conducted in-person household interviews. Analysis of the sample revealed that the 64 households paid an average of \$2,850 for their personal computer (with a standard deviation of \$1200) and 25% of the households said they will purchase a handheld "communication device" sometime in the next five years.

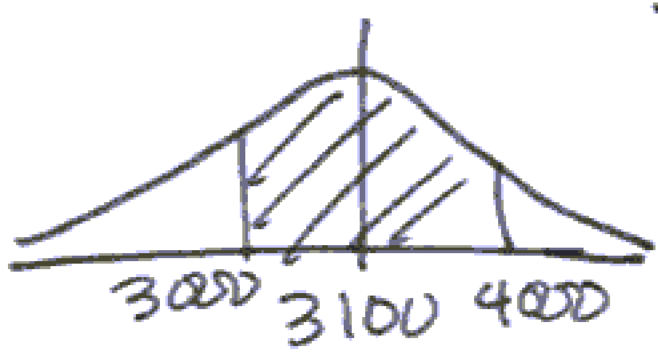
a. What is the chance of getting a sample proportion of 25% or more from a random sample of size 64 from the population of households? 25% in sample, expecting 21% b/c of pop.



$$z = \frac{.25 - .21}{\sqrt{\frac{(.21)(.79)}{64}}} = .79$$

$\boxed{\to 21.5\%}$

b. What percentage of all computers cost between \$3,000 and \$4,000?



$$z_{4000} = \frac{4000-3100}{1355} = .66$$

$$z_{3000} = \frac{3000-3100}{1355} = -.07$$

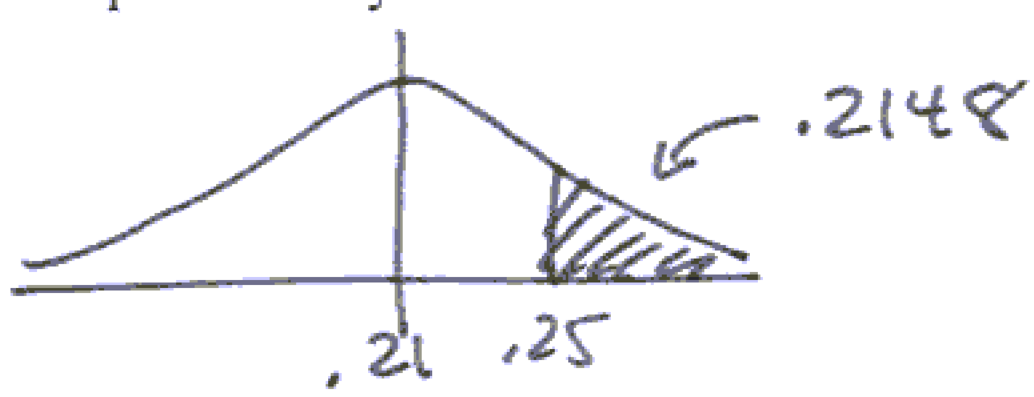
c. Please test the hypothesis that the percentage of households who plan to purchase a handheld "communication device" has increased. Use an alpha=.05 as your decision rule.

$H_0: p = .21$

H_1 or H_A: $p > .21$

$$z = \frac{.25 - .21}{\sqrt{\frac{(.21)(.79)}{64}}} = .79$$

p-value is .2148



$.2148 > .05$

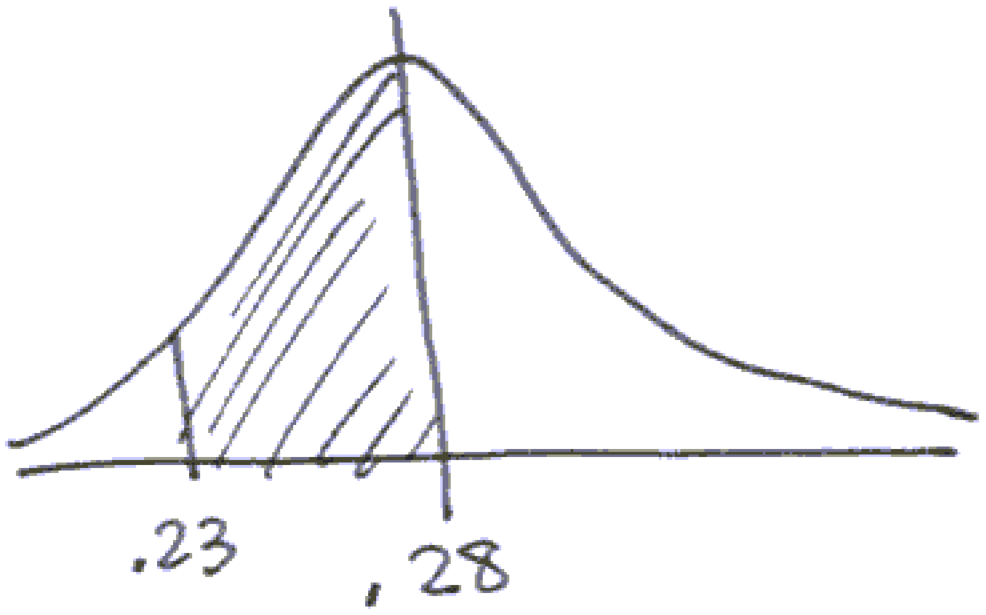
DO NOT REJECT THE NULL

$\hat{p} = 25\%$ IS NOT STATISTICALLY SIGNIFICANT. THERE IS NO EVIDENCE OF AN INCREASE IN PLANS TO PURCHASE THESE THINGS.

11. The Dull Computer Company manufactures its own computers and delivers them directly to customers who order them via the Internet. Dull's market dominance has arisen from its quick delivery and competitive pricing. The CEO of Dull has stated publicly that if customers make unassisted online purchases of their computers, they will have a mean delivery time of 36 hours from time of purchase with a standard deviation of 11 hours and a mean cost of $1,603 with a standard deviation of $400. He also went on to state that 28% of those computers are delivered in less than 24 hours. Assume that both delivery time and cost are normally distributed variables.

A consumer research organization decided to test the CEO's claim by purchasing 100 computers from Dull at randomly selected times and days. The 100 purchases were randomly divided into two groups: 51 were purchased by telephone and involved talking to a live salesperson, the remaining 49 were unassisted online purchases. The delivery time of the 49 had a mean of 35 hours with a standard deviation of 16 hours and they also had a mean cost of $1,588 with a standard deviation of $676. 11 of the 49 computers were delivered in less than 24 hours.

(a)What is the chance of selecting a sample of size 49 that has between 23% and 28% of the computers delivered in less than 24 hours? $np = (49)(.28) = 13.7 > 10$



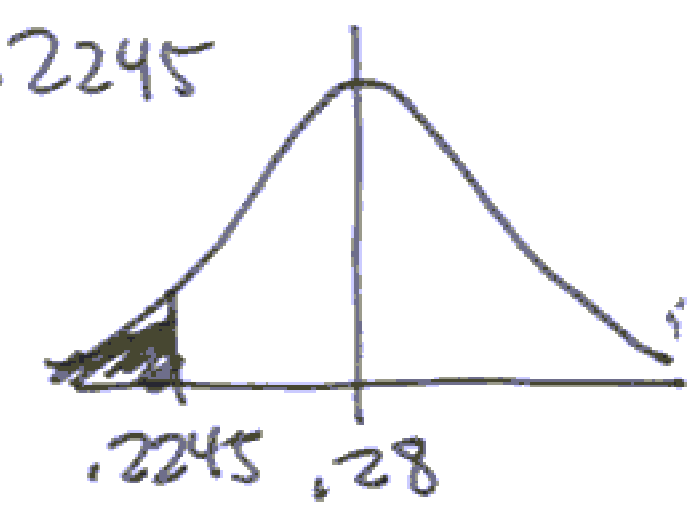
$$z = \frac{.23 - .28}{\sqrt{\frac{(.28)(.72)}{49}}} = -.78$$

z at .28 is = 0 so area is 50%

area is $(.50 - .2177) = .2823$ or 28.23%

(b)What is the chance getting 11 or fewer of the consumer research group's purchases delivered in less than 24 hours?

$\hat{p} = \frac{11}{49} = .2245$



$$z = \frac{.2245 - .28}{\sqrt{\frac{(.28)(.72)}{49}}} = -.87$$

$\boxed{\text{area is .1922 or 19.22\%}}$

(c) Please test the hypothesis that less than 28% of computers are being delivered in less than 24 hours. Use an alpha=.05 as your decision rule. OK. Sample says 11/49 delivered so

$H_0: p = .28$

$H_1: p < .28$

$$z = \frac{.2245 - .28}{\sqrt{\frac{(.28)(.72)}{49}}} = -.87$$

p-value is .1922

and $.1922 > .05$

DO NOT REJECT THE NULL

The evidence suggests that it is plausible that 28% of computers are delivered in less than 24 hrs.

TYPO

12.Congratulations, you have finished college. The bad news is this: you never learned a thing about the stock market, but find yourself applying for a job as a broker on Wall Street. You discover that the field has been narrowed down to you and one other applicant, "The Oracle". Both of you were told to select 36 different stocks for a portfolio (a collection of stocks) and the winner (the one with the higher return) gets the job. Since you know nothing about stocks, you selected [redacted] 36 at random. Here are the results:

Portfolio	Number of Stocks Selected	Proportion that Made Money
Yours	36	53%
Oracle's	36	55%

You can assume that a sample of 36 is large enough and that Oracle chose his randomly too.

The director says to you "I like you better because you are a nice person, but unfortunately, you did not do as well as the Oracle". You respond that you can demonstrate that your return is, statistically speaking, equal to and not less than Oracle's return. Surprised, the director says, "Can you? Well, if you can prove it, I'll hire you instead!"

a) Please state a null and alternative hypothesis consistent with the claim.

$H_0: p = .55$ (for a population equivalent to Oracle's)

$H_1: p < .55$ (that you are not doing as well)

b) Please provide the appropriate statistical test to test this claim. Give a numerical result

$$Z = \frac{.53 - .55}{\sqrt{\frac{(.55)(.45)}{36}}} = -.2412$$

c) Please state the p-value for this test

p-value is .4052 ≈ .41

d) Use an alpha=.05 as your decision rule. On the basis of the test results did you get the job or not?

(circle one) YES NO

Please briefly explain your choice.

.41 > .05 so the difference is not statistically significant (a .53 is just by chance different from .55, but w/ a bigger or different sample could be the same as .55) There is really no difference between you and Oracle.

13. You got a job working for a marketing company and your supervisor is planning a sample survey of households in Los Angeles. Your supervisor instructs you to contact households by random-digit dialing phone numbers. Your supervisor knows from past experience that about 70% of the households you contact in this manner will respond.

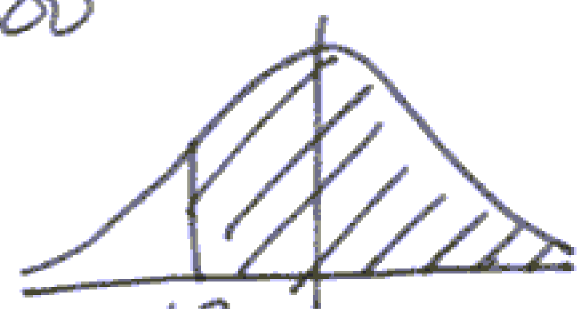
TYPO (a) If you randomly sample and then dial 1500 telephone numbers, based on your supervisor's knowledge of household response, what are the mean and standard ~~error~~ deviation of the percentage of households who respond?

mean = $p = .70$ so $np = 1500 * .70 = 1050 > 10$ $nq > 10$ too

$$SD = \sqrt{\frac{(.70)(.30)}{1500}} = .0118$$

(b) In a random sample of size 1500 households, based on your supervisor's knowledge of household response, please find the chance that you will get at least 1000 responses.

$\hat{p} = \frac{1000}{1500} = .67$ or 67% we are expecting .70 so



.67 .70

$$z = \frac{.67 - .70}{\sqrt{\frac{(.70)(.30)}{1500}}} = -2.54$$

area is .0055

so $1 - .0055 =$ $\boxed{99.45\%}$

(c) Assume your supervisor is unintelligent and does not know the business. Suppose you dialed 1500 phone numbers at random and got 1001 responses. Please construct an 80% confidence interval for the percentage of households who respond.

$\frac{1001}{1500} = .6673 = \hat{p}$

$$.6673 \pm 1.28\left(\sqrt{\frac{(.6673)(.3327)}{1500}}\right)$$

$\boxed{.6673 \pm .0156}$ or $66.7\% \pm 1.6\%$

(d) Suppose you dialed 1500 phone numbers at random and got 1001 responses, please test the hypothesis that the your supervisor's percentage of 70% has decreased. Please use an alpha=.05 for your decision rule.

$H_0: p = .70$ (what ~~you~~ the supervisor thinks he knows)

$H_1: p < .70$ (what you believe to be true, a decrease)

$$z = \frac{.6673 - .70}{\sqrt{\frac{(.70)(.30)}{1500}}} = -2.76$$

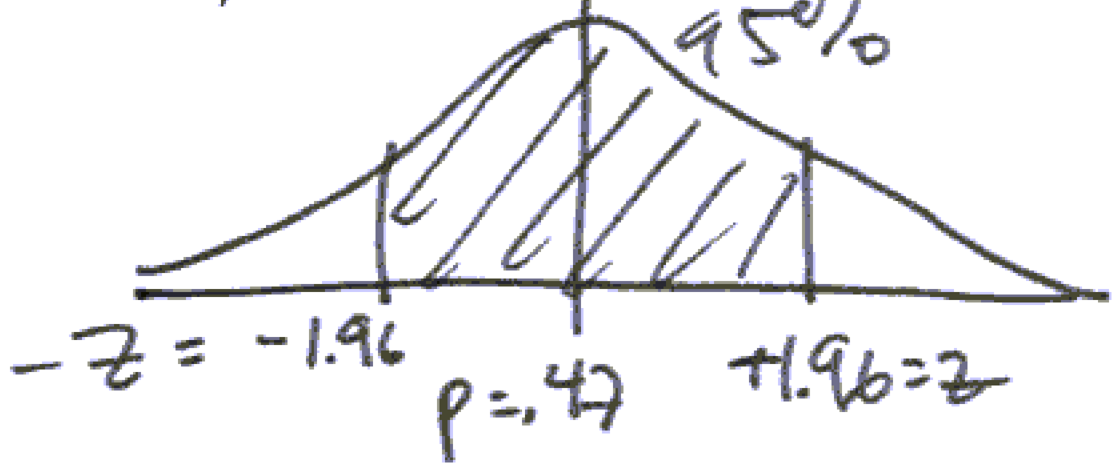
$\frac{1001}{1500} = .6673 = \hat{p}$

p-value is .0029

Conclusion → reject the null, the evidence suggests that the true p is probably less than .70

~~13~~ 14. Suppose that 47% of all adult women think they did not get enough time for themselves. An opinion poll interviews 1025 randomly chosen women and records the sample proportion that doesn't feel they get enough time for themselves. This statistic will vary from sample to sample if the poll is repeated.

a) The ~~truth about the~~ Suppose population is 0.47. In what range will the middle 95% of all sample results fall for samples of size 1,025?

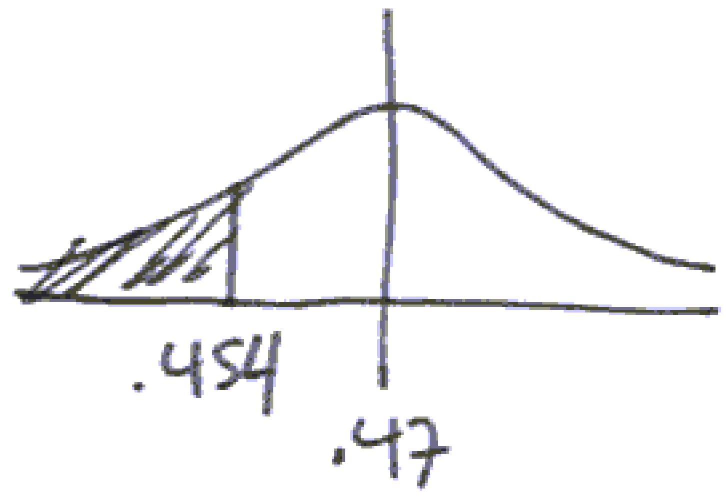


$$.47 \pm (1.96)\left(\sqrt{\frac{(.47)(.53)}{1025}}\right)$$

$$.47 \pm .0306$$

looks like a CI but it's not b/c p is a known "truth"

b) What is the probability that a new poll of size 1,025 gets a sample in which fewer than 45.4% say they do not get enough time for themselves? Suppose $p = .47$ $\hat{p}$



$$z = \frac{.454 - .47}{\sqrt{\frac{(.47)(.53)}{1025}}} \doteq -1.03$$

area is .1515 so prob is .1515

TYPO c) Please construct a 99% confidence interval for the percentage of women who do not get enough time for themselves. if ~~we~~ assume $\hat{p} = .454$ (from part B)

$$.454 \pm 2.58 \left(\sqrt{\frac{(.454)(.546)}{1025}}\right) \Rightarrow .454 \pm .0401$$

(or 2.57)

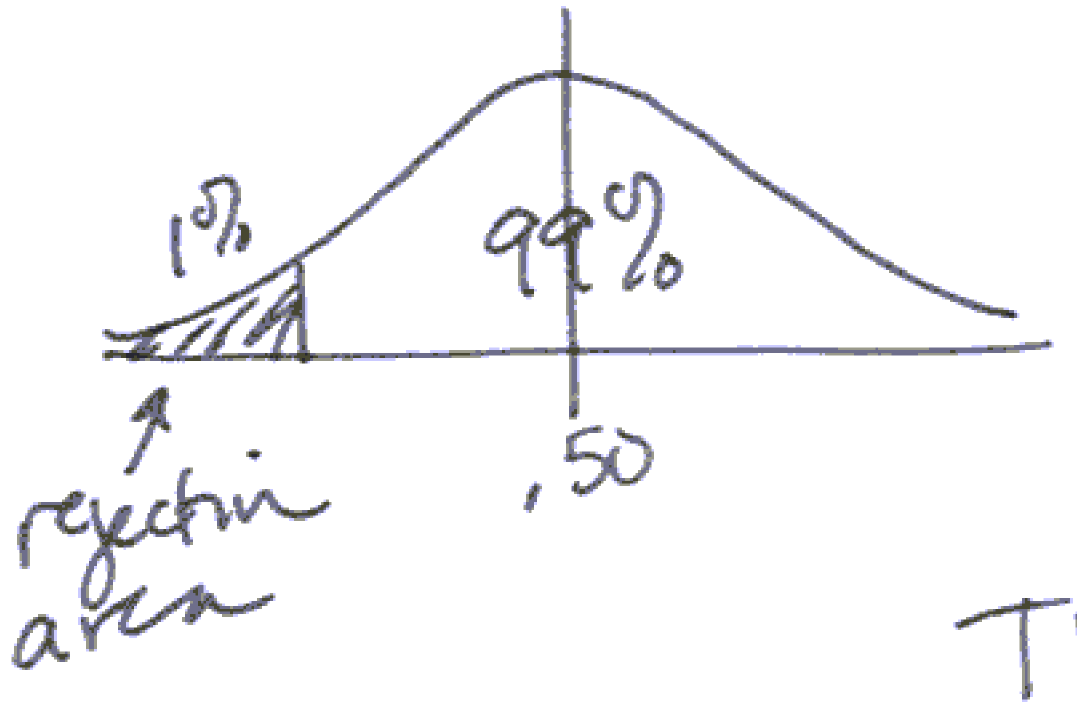
~~14~~ 15 You are planning to perform a significance test of

H_0: proportion = .50

Versus

H_1: proportion < .50

What values of Z would lead you to reject H_0 at the 1% level of significance? Then answer this question: True or False and explain why. A significance test that is significant at the 1% level of significance must always be significant at the 5% level of significance.



if $z = -2.33$ you would reject so anything more extreme that is $z < -2.33$ (so -2.34, -2.35 etc) will lead you to reject

True. If a test is sig. at 1% this means its z is at most -2.33 and p-value is < .01. A 5% $z = -1.96$ and p-value is < .05 well -2.33 always < -1.96 and .01 is always < .05

16 The UCLA-USC football game is the number one party event of the year for Bruins, exceeding even commencement celebrations (mostly because parents are present at commencement). Suppose it is known that the typical Bruin football party has 14 UCLA students on average with a standard deviation of 4.3 UCLA students. Many activities will occur on that game day and for all UCLA students, their activities will result in a mean change of -18% in their financial assets (e.g. cash, credit) with a standard deviation of 24%. None of the variables listed above are normally distributed.

Researchers working at the UCLA Management School decided to study the effects of the UCLA-USC game day parties on UCLA students. 225 UCLA students were randomly sampled (therefore insuring independence) from the registrar's list of enrolled students. Of that 225, 144 students reported that they had attended a football party, 43 did not attend a party but watched the football game on television at home. The remainder did not attend a party or watch the game on television. The change in financial assets experienced by all the UCLA students in the sample had a mean of -20% with a standard deviation of 6%. Among the party attending UCLA students, 74% reported getting "drunk", only 5% of the non-party going UCLA students reported getting "drunk". ~~228 (144)~~

a) Is it possible to construct a 98% confidence interval for the population percentage of non-party going UCLA students who got drunk on the UCLA-USC game day. (circle one) (1 point)

YES NO

If you circled YES, please construct a 98% confidence interval in the space below. If you circled NO, please use the space to explain why it is not possible to construct a 98% confidence interval. (6 points)

$\hat{p} = .05$ $(225-144)$ the sample needs to be larger
$n = 81$ or $\hat{p}$ needs to be higher
$n\hat{p} < 10$ to satisfy $n\hat{p}$

b) Is it possible to construct a 98% confidence interval for the population percentage of UCLA students who attended a football party and ~~got~~ drunk on the UCLA-USC game day. (circle one) (1 point)

YES NO

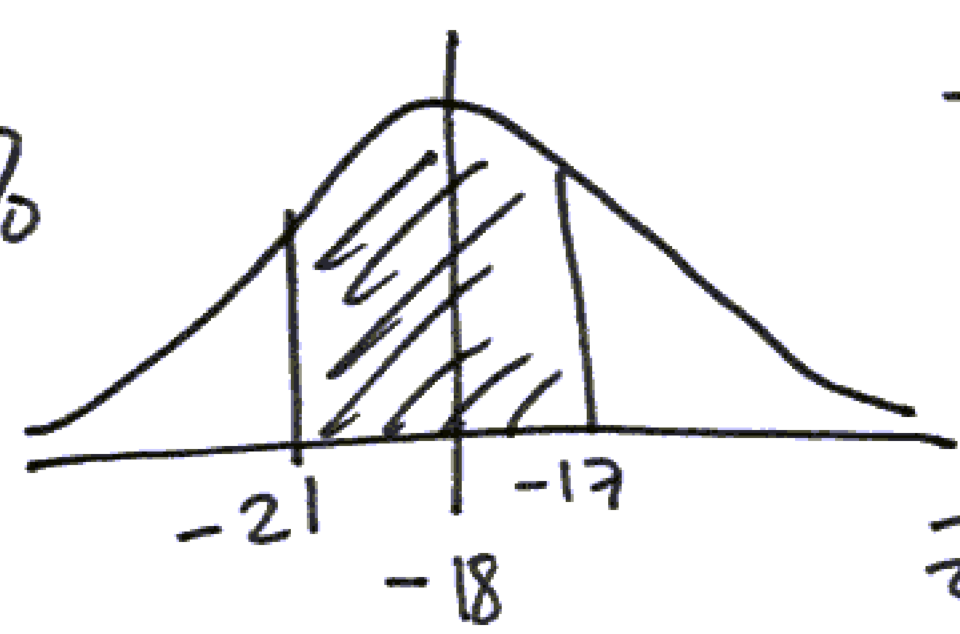
If you circled YES, please construct a 98% confidence interval in the space below. If you circled NO, please use the space to explain why it is not possible to construct a 98% confidence interval. (6 points)

$n = 144$
$\hat{p} = .74$

$$.74 \pm 2.33\left(\sqrt{\frac{(.74)(.26)}{144}}\right) \Rightarrow .74 \pm .0852$$

c) What is the chance that a random sample of size 225 UCLA students will reveal a mean change in financial assets between -17% and -21% ? (9 points)

$\mu = -18\%$
$\sigma = 24\%$
$n = 225$
$\frac{\sigma}{\sqrt{n}} = \frac{24}{\sqrt{225}}$
use $z = \frac{\bar{Y} - \mu}{\sigma/\sqrt{n}}$



$z_{-17} = \frac{-17-(-18)}{24/\sqrt{225}} = .625$ (area is .7357)

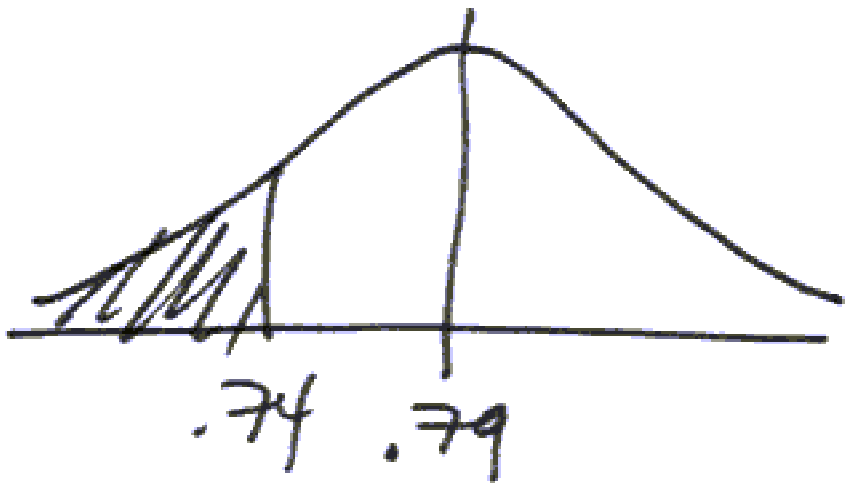
$z_{-21} = \frac{-21-(-18)}{24/\sqrt{225}} = -1.88$ (area is .0301)

$.7357 - .0301 = .7056$ or 70.56%

(continued from above)
d) Two years ago, the UCLA Management School conducted a comparable study that showed that for UCLA students who attended parties on the UCLA-USC game day, 79% reported getting "drunk". Please test the hypothesis that UCLA has experienced a decline in the proportion (or percentage) of students who get drunk while attending parties. Clearly state a null hypothesis, an alternative hypothesis, perform a test of significance, clearly state a p-value, tell me if you reject or did not reject the null, and finally give a very brief interpretation of your results while using an alpha level of .05 to make your decision.

$H_0: p = .79$

$H_1: p < .79$



$$Z = \frac{.74 - .79}{\sqrt{\frac{(.79)(.21)}{144}}} = -1.47$$

p-value is .0708

$.0708 > .05$

DO NOT REJECT NULL

The result is not statistically significant meaning the evidence does not suggest the % of drinking has declined. In other words, it could still conceivably be 79%

17. ~~16~~. A marketing survey interviewed 1,089 adults drawn randomly from the population of all U.S. adults. Of the adults, 529 said they currently own a computer. When asked about the manufacturer of their computer, 144 of them said "Dell", 121 of them said "Compaq", 94 of them said "Gateway", 81 of them said "Apple", 64 of them said "some other company", and 25 of them said "I don't know". The variable, computer manufacturer, is not normally distributed.

A Compaq executive saw the survey and is now upset, he believes that the survey was poorly done and argues that Compaq's true market share is 25% (i.e. he thinks that 25% of all adults who own computers own a Compaq) and cannot be nearly as low as the survey suggests.

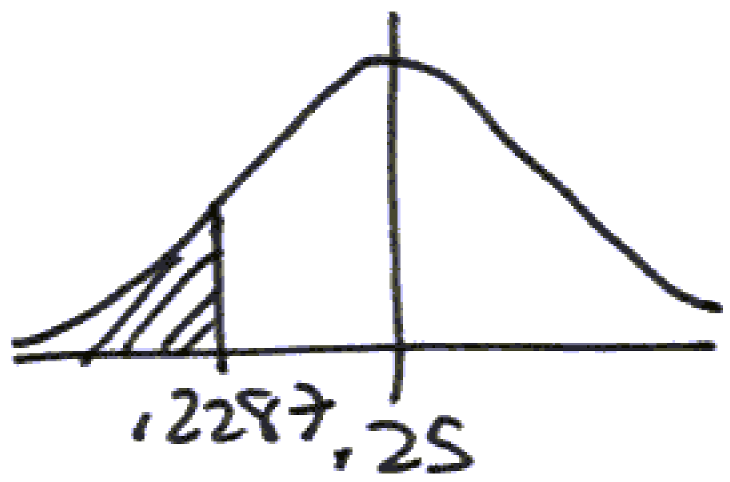
Please test the hypothesis that Compaq's market share is actually 25%. Use an alpha=.05 to make your decision.

$H_0: p = .25$ (believed to be true ?)

$H_1: p < .25$ (from survey)

$$\frac{121}{529} = .2287$$

$$Z = \frac{.2287 - .25}{\sqrt{\frac{(.25)(.75)}{529}}} = -1.13$$



p-value is .1292

$.1292 > .05$

DO NOT REJECT NULL, NOT STATISTICALLY SIGNIFICANT

the executive is probably correct, ~~which~~ while the sample is low, there is not enough evidence to suggest that the true % is < 25.