1. A nationally televised news program offered people the opportunity to express their reactions to a change in the tax laws. People could call one number to indicate support for the change, people could call another number to express their opposition to the change. Each call costs \$1.00. During the evening, 379,275 calls indicated support and 120,725 expressed opposition. Please construct a 95% confidence interval for the population proportion, p, (those who support the change in the tax laws). If constructing a 95% confidence interval is not the appropriate thing to do, please write "not appropriate" below and then please explain why.

NOT APPROPRIATE

NOT A REPRESENTATIVE SAMPLE THEREFORE THE RESULTING C.I. IS NOT A RELIABLE ESTIMATOR

2.The Los Angeles Times conducted a survey of Asian-owned businesses by randomly sampling 144 businesses from state tax records. Assume the sample is of good quality. From their sample, the technical staff gave a 90% confidence interval for the average age of Asian business owners of:

51.1 years ± 2.74 years

Suppose the population standard deviation, sigma, σ, is known and it is 20 years and suppose the editor is very unhappy with the confidence interval and he told them he would like the 90% confidence interval to be no larger than ± 1.00 years of the average age. Please indicate if this is (a) possible to do and if it is possible (b) describe how to accomplish this -- calculations may be necessary. If it is not possible, discuss why this is not possible

(a) Possible or not possible? If possible, just write "possible" in the space below and continue on to (b). If not possible, write "not possible" in the space below, justify your response, and leave part (b) blank.

POSSIBLE

(b) It is possible and shown below is how a 90% confidence that is no larger than ± 1.00 years of the average age could be constructed :

51.1 ± 2.74

$\Downarrow$

$1.00 = 1.645 \cdot \left(\frac{20}{\sqrt{n}}\right)$

Solve for n = 1082 or 1083

3. 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. 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 21% of the households surveyed said they will purchase a handheld "communication device" sometime in the next five years.

a. Construct a 99% confidence interval for the population proportion, p, (the percentage who will purchase a handheld "communication device" of the households that purchased a computer last year).

$\hat{p} = .21$

99% CI

$$.21 \pm 2.576\left(\sqrt{\frac{(.21)(.79)}{64}}\right)$$

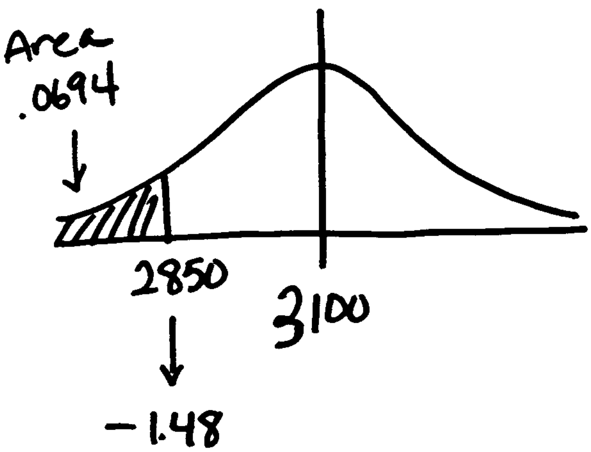
$$.21 \pm .1312$$

$$(.0788, .3412)$$

b. What is the chance of getting a sample average of \$2,850 or lower for a sample of size 64 from the population of households that purchased a computer last year?

$$z = \frac{2850 - 3100}{1355/\sqrt{64}} = -1.476$$

$$\approx -1.48$$



$$\boxed{.0694 \text{ or } 6.94\%}$$

(continued from the previous problem)

c. Suppose the CEO of 3Com claims to know (he's an extra smart guy, right) that everyone would be willing to upgrade to a Palm Pilot if the price was right. He thinks the "right price" is an average of $259 for the product but he didn't give information about the standard deviation. The marketing company found that in its sample of 64, the "right price" had an average of $235 with a standard deviation of $110. The marketing company thinks the CEO's claim is too high and they hire you to test his claim. Please test the CEO's claim using information from the sample. First, state the null and alternative hypotheses (5 points). Second, if it is possible, construct a test statistic, state the resulting p-value and render a decision using a 5% level of significance -- do you reject his claim or not? If it is not possible to test his claim, please indicate that it is "not possible" and explain why.

$H_0: \mu = 259$

$H_a: \mu < 259$

$$Z = \frac{235-259}{110/\sqrt{64}} = -1.746 \sim -1.75$$

p-value is .0401 or 4.01%

4.01% < 5%

reject the null

"right price" is less than $259

4. Congratulations, you're a traveling salesperson for a large manufacturer. You make 3 calls per year on each client. Your chance of a sale each time is 75%. Let X denote the total number of sales in a year.

a. Fill out this table

F(x)	0	1	2	3
P(x)	.0156	.1406	.4219	.4219

b. Suppose you have 100 clients, what is your expected number of sales in a year?

$$\text{mean} = \sum x_i p_i = (0 \times .0156) + (1 \times .1406) + (2 \times .4219) + (3 \times .4219) = 2.2501$$

$$100 \times 2.2501 \approx 225 \text{ sales}$$

c. What is the standard deviation for your expected number of sales in a year?

$$\sigma_x = \sqrt{(0-2.25)^2(.0156) + (1-2.25)^2(.1406) + (2-2.25)^2(.4219) + (3-2.25)^2(.4219)}$$

$$\boxed{\sigma_x = .7499}$$

d. Suppose you get $5,000 per sale. What are your expected earnings in a year?

$$5000 * 225 = \boxed{1,125,000}$$