

**Instructions:** Show all work. If you use your calculator, give calculator commands used. Use exact answers, or round appropriately. Answer all parts of each question.

1. Why is the assumption that  $p = 0.5$  a good, conservative estimate for a sampling distribution when the true value of  $p$  is unknown.

it produces the largest possible margin of error

2. Why do we use confidence intervals instead of point estimates?

point estimates are guaranteed to be wrong, and confidence intervals give info on how accurate the estimate is likely to be.

3. A sample of 140 people found a mean weight of 167 pounds with a standard deviation of 14.8 pounds.

- a. What is the margin of error for our mean?

$$\frac{14.8}{\sqrt{140}} = 1.25$$

- b. What is the 95% confidence interval?

$$1.96 \frac{14.8}{\sqrt{140}} = 2.45$$

$$(164.55, 169.45)$$

T-Interval  
(164.53, 169.47)  
in Calc.

4. If we wanted to get the margin of error of our sample down to 1 pound, what sample size is needed?

$$n = \left( \frac{1.96 * 14.8}{1} \right)^2 = 841.46$$

$\Rightarrow$  842 samples