Study Session – Inference with proportions

- Sign in

- Grab a calculator

- Use a sheet of paper (in your notebook) to practice along with us

- Make sure I give you formula sheets as well

A company manufacturing computer chips finds that 8% of all chips manufactured are defective. Management is concerned that employee inattention is partially responsible for the high defect rate. In an effort to decrease the percentage of defective chips, management decides to offer incentives to employees who have lower defect rates on their shifts. The incentive program is instituted for one month. If successful, the company will continue with the incentive program.

Write the company's null and alternative hypotheses:

$$H_0: p = 0.08$$

$$H_A: p < 0.08$$

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ART

$\ast H_O: p = 0.08$

$H_A: p < 0.08$

In this context describe a Type I error and the impact such an error would have on the company.

The company believes that the percent of defective parts is 8%, but it is not.

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False

BFF

$H_O: p = 0.08$

$H_A: p < 0.08$

In this context describe a Type II error and the impact such an error would have on the company.

The company believes that the defect rate is still 8%, when in fact it has dropped.

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$ME = \boxed{z^* SE}$

$H_O: p = 0.08$

$H_A: p < 0.08$

Management wants to create a 95% confidence interval to estimate percent that are defective. Using a margin of error of 1%, how large should their sample be?

$\left(\dfrac{0.01}{1.96}\right) = 1.96\sqrt{\dfrac{(.5)(5)}{n}}$

$\dfrac{1.96}{1.96}$

$n \cdot \dfrac{0.000026}{0.000026} = \dfrac{.25}{n} \cdot n$

$\dfrac{}{.000026}$

$n = 9604$

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$$H_O: p = 0.08$$
$$H_A: p < 0.08$$

Based on the data they collected during the trial program, management found that a 95% confidence interval for the percentage of defective chips was (0.05, 0.07). What conclusion should management reach about the new incentive program? Explain.
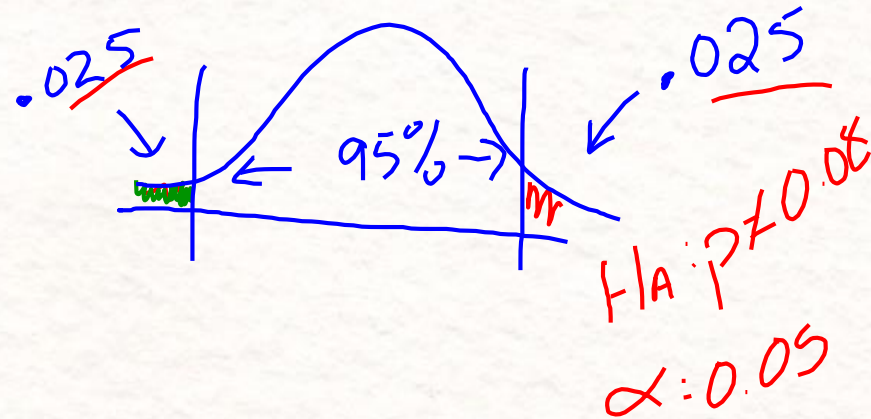
$.06 \pm 0.01$

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$H_O: p = 0.08$

If they created a 95% confidence interval, what level of significance did management use?

$H_A: p < 0.08$

$\alpha = 0.025$

.025

.025

95%→

$H_A: p \neq 0.08$

$\alpha : 0.05$

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$$H_O: p = 0.08$$
$$H_A: p < 0.08$$

Describe to management an advantage and disadvantage of using a 1% alpha level of significance instead.

type I decrease

increase type II

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$H_O: p = 0.08$

$H_A: p < 0.08$

Management decided to extend the incentive program so that the decision can be made on three months of data increase. Will the power increase, decrease, or remain the same?

∝

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$H_O: p = 0.08$

$H_A: p < 0.08$

When the significance test was run, a p-value of 0.042 was calculated. Interpret this p-value in context.

The probability of getting results as extreme as we did given that p = 0.08.

Questions?