

## Clark

Admin

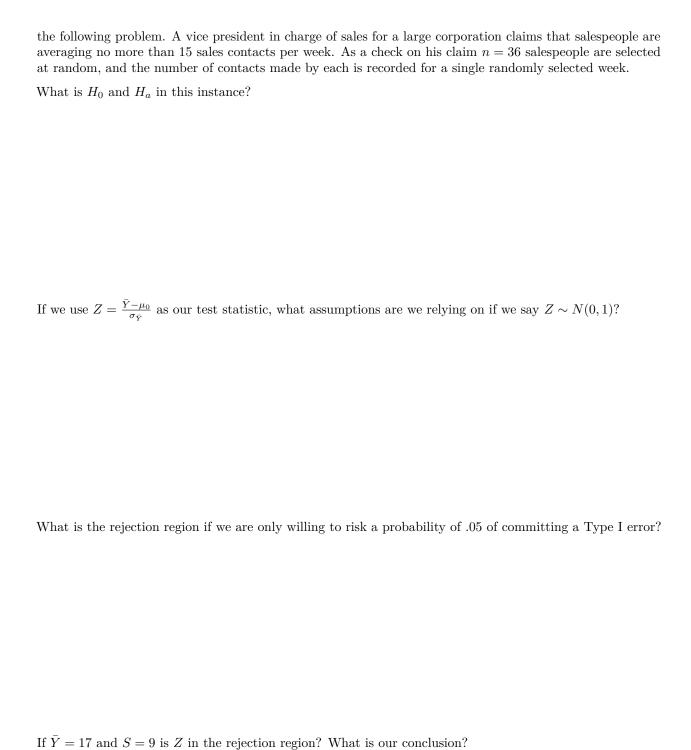
Review Writ

Problem 10.6, n=50

Recall that in many instances we can rely on the Central Limit Theorem to find the distribution of

$$Z = \frac{\hat{\theta} - \theta}{\sigma_{\hat{\theta}}}$$

In those instances we have a natural way to formulate statistical hypothesis tests. For example, let's look at



The key to these problems when n is large is relying on table 8.1. In these case we can use the CLT, but oftentimes we have to think about how we can estimate the standard error. For  $\bar{Y}$  it makes sense to use the unbiased estimator of  $S^2$  for  $\sigma^2$ . When we are using the CLT for  $\hat{p}$  we have to remember that we calculate the distribution of our test statistic under  $H_0$ . So, under  $H_0$  the best estimate for  $\sqrt{\frac{p_0q_0}{n}}$  but rather  $\sqrt{\frac{p_0q_0}{n}}$ 

For example:

We can do the same sort of problems with other statistics, let's look at problem 10.32. In March 2001, a Gallup poll asked, "How would you rate the overall quality of the environment in this country today?" Of 1060 adults nationwide, 46% said excellent or good. Is this convincing evidence that a majority of the nation's adults think the quality of the environment is fair or poor?

## As another example:

The commercialism of the U.S. space program has been a topic of great interest since Dennis Tito paid \$20 million to ride along with the Russian cosmonauts on the spac eshuttle. In a survey of 500 men and 500 women, 20% of the men and 26% of the women responded that space should be commercial free.

Does statistically significant evidence exist to suggest that there is a difference in the population proportions of men and women who think that space should remain commercial free?

Write out our null hypothesis, alternative hypothesis, and test statistic.

Assuming a .05 level test what is our rejection region.

What is the rejection region in terms of  $p_1 - p_2$ ?