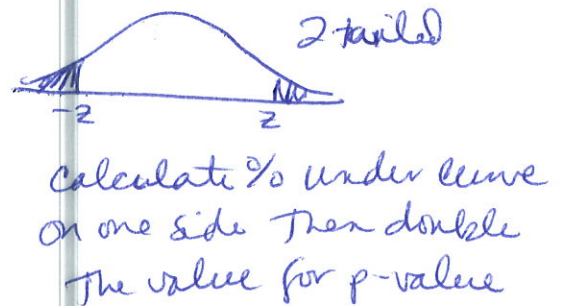
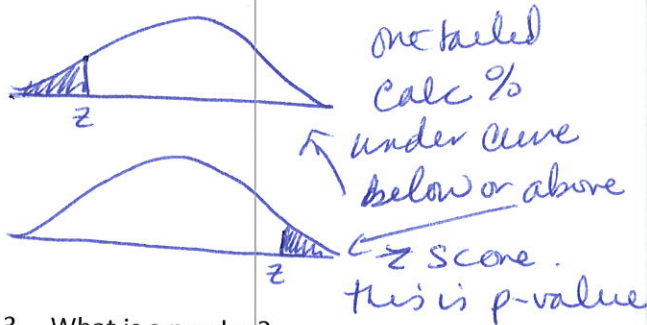


MAT 223, Discussion Questions 11.23

1. When are hypothesis tests one-tailed or two-tailed?

\neq two tailed
 $< \text{ or } >$ one-tailed } in H_a

2. How do the procedures for one-tailed and two-tailed tests differ? Draw a graph to illustrate.



3. What is a p-value?

it is the probability of obtaining a value that extreme or more extreme given the assumptions of the H_0 .

4. How do we use p-values to test hypotheses?

Compare to significance level. if $p < \alpha$ reject H_0 . if $p > \alpha$ fail to reject H_0

5. For small samples, why do we use t-tests instead of z-tests?

greater variability; may be using an estimate for standard deviations which may also produce more extreme observations

6. An engineer designs an improved light bulb. The previous design had an average lifetime of 1200 hours. The new bulb had a lifetime of 1200.2 hours, using a sample of 40,000 bulbs. Although the difference is quite small, the effect was statistically significant. The most likely explanation for this result is what?

*the very large sample size produces
a very small margin of error*

7. A paint manufacturer fills cans of paint using a machine that has been calibrated to fill the cans to contain an average μ of 1 gallon (128 ounces) each. To test whether their machine has come out of calibration, the manufacturer takes a random sample of 25 cans and finds that they average 128.2 ounces with a standard deviation of 2 ounces. Is this strong evidence that the filling machine is set too high and thus is no longer calibrated properly?

$H_0: \mu = 128$ T-Test $\mu \neq \mu_0$ *fail to reject H_0*
 $H_a: \mu \neq 128$ $\mu_0 = 128$ $t = .5$
 $\bar{x} = 128.2$ $p = .62 > 0.05$
 $s_x = 2$ *not strong evidence*
 $n = 25$ *do not recalibrate machine*

8. Read and comment on the article at <http://sciblogs.co.nz/kidney-punch/2015/01/15/beyond-reasonable-doubt-a-significant-improvement/>.