Math 181A HW6

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Problem 14-1

a. Let the null hypothesis be $H_0 : p = 50\%$ and the alternative hypothesis be $H_1 : p > 50\%$. Then the test statistic is

$$Z = \frac{\hat{p} - p}{Var(p)}; \quad \hat{p} = \frac{548}{1053}; \quad Var(p) = \sqrt{\frac{p(1-p)}{n}}$$
$$Z = \frac{548/1053 - 0.5}{\sqrt{\frac{0.5(1-0.5)}{1053}}} \approx 1.325 < 1.96.$$
$$p\text{-}value = P(Z > 1.325) \approx 0.0918 > 0.05.$$

Hence, we failed to reject H_0. The data does not provide sufficient evidence to conclude that the majority of US adults favor passage.

b.

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> prop.test(x=548, n=1053, p=0.5, alternative=c("greater"), conf.level=0.95)

        1-sample proportions test with continuity correction

data:  548 out of 1053, null probability 0.5
X-squared = 1.6752, df = 1, p-value = 0.09778
alternative hypothesis: true p is greater than 0.5
95 percent confidence interval:
 0.4946 1.0000
sample estimates:
        p
0.5204179

> prop.test(x=548, n=1053, p=0.5, alternative=c("greater"), conf.level=0.95, correct=FALSE)

        1-sample proportions test without continuity correction

data:  548 out of 1053, null probability 0.5
X-squared = 1.7559, df = 1, p-value = 0.09257
alternative hypothesis: true p is greater than 0.5
95 percent confidence interval:
 0.4950746 1.0000000
sample estimates:
        p
0.5204179
```

The hypothesis test with Yate's continuity correction yields a p-value of 0.09778, while the one without Yate's continuity correction yields a p-value of 0.0.09257. They are similar to our calculation in part (a). Both p-values are greater than 0.05, so we failed to reject H_0. The data does not provide sufficient evidence to conclude that the majority of US adults favor passage.