

## Assignment #12

6.6  
6.96

$$H_0: \eta = 80$$

$$H_a: \eta > 80$$

$$\alpha = 0.10$$

Assume the sample is from a normally distributed population and the distribution is continuous.

Test Statistic:  $S = 16$

Observed significance level:

$$\begin{aligned} p\text{-value} &= P(X \geq 16) = 1 - \text{binomialcdf}(25, 0.5, 15) \\ &= 0.115 \end{aligned}$$

Rejection Region:

Reject  $H_0$  if  $p\text{-value} < \alpha = 0.10$

In this case our  $p$ -value is greater than 0.10.  
So, we do not reject  $H_0$ .

Hence, we have insufficient evidence to conclude that the population median exceeds 80 at  $\alpha = 0.10$ .

6.6  
6.96

a)  $H_0: \eta = 300$

$$H_a: \eta > 300$$

b)  $S = 4$

c)  $P(X \geq 4) = 1 - P(X \leq 3) = 1 - \text{binomialcdf}(6, 0.5, 3)$

$$= 1 - 0.656 = 0.344$$

d) Since  $p\text{-value} = 0.344 > \alpha = 0.05$  we cannot reject  $H_0$ . So, we cannot conclude that the median amount of caffeine exceeds 300 at  $\alpha = 0.05$ .