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STAT 121, SEC 28
Writing Assignment #2

**Part A.**
At the $\alpha$ = 0.05 level, is there sufficient evidence to conclude that fewer than half of American adults think that humans developed from earlier species of animals?

1) I will use a one-sided lower-tailed test.
2) The parameter, p, is American adults that think humans developed from earlier species of animals.
3) $H_0$: $\mu$ = 0.5, $H_A$: $\mu$ < 0.5
4) $\alpha$ = 0.05
5) - (384)(0.5) = 192 < 10 and (384)(1-0.5) = 192 < 10
   - Random sample of American adults
   - Is normal
6) x` = 165/384 = 0.4297
7) test statistic: -2.76
   (0.4297 - 0.5) = -0.0703
   sqrt( (0.5(1-0.5)) / 384) = 0.0255
   -0.0703 / 0.0255 = -2.76
   p-value: 0.0029

8) Assuming the null hypothesis is true, there is a 0.0029 probability of obtaining a sample statistic as extreme or more extreme than what we calculated.

   Since the p-value = 0.0029 is < $\alpha$ = 0.05, we reject the null hypothesis. The true proportion of Americans who believe in evolution is less than 0.5.

**Part B.**
What is a 90% confidence interval estimate for the proportion of all American adults who think that humans developed from earlier species of animals?

1) I will use a one-sided lower-tailed test.
2) (384)(0.5) = 192 < 10 and (384)(1-0.5) = 192 < 10
3) C = 0.05, z* = 1.645
4) 165/384 = 0.4297
   1.645 * sqrt((0.4297(1-0.4297)) / 384) = 0.0416
   0.4297 + 0.0416 = 0.471
   0.4297 - 0.0416 = 0.388
   Confidence interval = (0.388, 0.471)
5) We are 90% confident that the true proportion of all American adults who think that humans developed from earlier species of animals lies between 0.388 and 0.471.