1) n=22,   
  
A) Mean = n = 22\*0.72 = 15.84  
 SD , 2.105991

B) P(Y ≤ 16) = 0.6100871

C) P(Y < 16) = 0.422552

D) P(16 ≤ Y < 18) = 0.1701999

E) P(Y = 18) = 0.1215714

F) P(Y ≥ 18) = 0.2197129

G) without continuity correction,  
P(Y≥18) = 1 – P(Y<18) = 1 - P(Y≤17) = 1-pnorm(17,mean=15.84,sd=2.105991,lower.tail = TRUE)

so, without continuity correction , P(Y≥18) = 0.2908821

H) with continuity correction,

P(Y≥18) = 1 – P(Y<18) = 1 - P(Y≤17.5) = 1-pnorm(17.5,mean=15.84,sd=2.105991,lower.tail = TRUE)

so, without continuity correction , P(Y≥18) = 0.2152818

2) n = #of students = 75 (trial)  
 y = #of STEM majors = 51 (success)A) [Estimate of STEM population proportion]

Estimate of standard deviation, SE() = = = = 0.05386403

B) 95% confidence interval for true population proportion =

C) H0 :   
 HA :

,,

Test statistics z =

Rejection region, z, or z z

In this case, , so we can reject the null hypothesis with 95% confidence, which means we can conclude (with 95% certainty) that the population proportion of STEM majors is greater than 0.5.

From running prop.test, p-value = 0.00091114. (Ans)

1-sample proportions test without continuity correction

data: 51 out of 75, null probability 0.5

X-squared = 9.72, df = 1, p-value = 0.0009114

alternative hypothesis: true p is greater than 0.5

95 percent confidence interval:

0.5864651 1.0000000

sample estimates:

p

0.68

3) n = #of items = 60 (trial)  
 y = #of defective items = 10 (success)A) [Estimate of population proportion]

B) α = 0.1, 90% confidence interval = ( 0.0958273,0.2691848)

1-sample proportions test with continuity correction

data: 10 out of 60, null probability 0.5

X-squared = 25.35, df = 1, p-value = 4.782e-07

alternative hypothesis: true p is not equal to 0.5

90 percent confidence interval:

0.0958273 0.2691848

sample estimates:

p

0.1666667

C) 90% confidence interval = (0.09330693 0.26629080)

Exact binomial test

data: 10 and 60

number of successes = 10, number of trials = 60, p-value =

1.616e-07

alternative hypothesis: true probability of success is not equal to 0.5

90 percent confidence interval:

0.09330693 0.26629080

sample estimates:

probability of success

0.1666667