1)

> mu = 6

> sigma = 1

a)  
z = (x - mu)/sigma  
z = (6.2 - 6)/1  
z = 0.2/1  
z =0.2  
p = 0.57926  
  
b)  
z = (x - mu)/(sigma/√n)  
z = (6.2 - 6)/(1/√100)  
z = 0.2 / 0.1  
z =2  
p = 0.9772  
  
  
c )The manager is confusing the chance of a sample mean being less than 6.2 with the probability of a single man's head being less than 6.2. From question a, we can see than 42% of men will have heads greater than 6.2 inches, so if the helmets are this small, they won't fit almost half the customers.

2)

The null hypothesis is that *μ*= 15*.*4. We begin with computing the test statistic.

> xbar = 14.6            # sample mean   
> mu0 = 15.4             # hypothesized value   
> s = 2.5                # sample standard deviation   
> n = 35                 # sample size   
> t = (xbar−mu0)/(s/sqrt(n))   
> t                      # test statistic   
[1] −1.8931

We then compute the critical values at .05 significance level.

> alpha = .05   
> t.half.alpha = qt(1−alpha/2, df=n−1)   
> c(−t.half.alpha, t.half.alpha)   
[1] −2.0322  2.0322

The test statistic -1.8931 lies between the critical values -2.0322, and 2.0322. Hence, at .05 significance level, we do *not*reject the null hypothesis that the mean penguin weight does not differ from last year.