Qualifying Exam

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1. Using the poisson distribution, p(X=0) given lambda = 3.2

dpois(0,3.2)

## [1] 0.0407622

b.Expected Value = lambda x 1 = 3.2 variance = lambda = 3.2

2.

#a)  
#P(yi<=2)=p(y=0)+p(y=1)+p(y=2)  
0.005+0.010+0.035

## [1] 0.05

#b)  
#P(yi>0)=p(y=1)+p(y=2)+p(y=3)+p(y=4)  
0.010+0.035+0.050+0.09

## [1] 0.185

#c)mu = sigma(x.P(x))  
mu<-0\*0.005+1\*0.01+2\*0.035+3\*0.050+4\*0.9  
  
#d)  
temp <-(0^2)\*0.005+(1^2)\*0.010+(2^2)\*0.035+(3^2)\*0.050+(4^2)\*0.9  
var <-sqrt(temp-mu^2)  
var

## [1] 0.5754129

sd <-var^2  
sd

## [1] 0.3311

3.

mu = 70  
sigma = 3  
#64  
(64-70)/3

## [1] -2

(76-70)/3

## [1] 2

#between -2 and +2  
pnorm(2) - pnorm(-2)

## [1] 0.9544997

4.

#a)Sample mean  
values <-c(13.3,14.5,15.3,15.3,14.3,14.8,15.2,14.9,14.6,14.1)  
mean(values)

## [1] 14.63

#b)sample variance  
var(values)

## [1] 0.389

#sample standard deviation  
sqrt(var(values))

## [1] 0.6236986

#c)  
xbar <- 14.63 # sample mean   
mu0 <- 14.90 # hypothesized value   
s <- sqrt(0.389) # sample standard deviation   
n <- 10 # sample size   
  
test\_statistic <- (xbar-mu0)/(s/sqrt(n))  
test\_statistic

## [1] -1.368954

alpha = .01  
df <- n-1  
t.half.alpha <- qt(1-alpha/2,df=n-1)  
c(-t.half.alpha,t.half.alpha)

## [1] -3.249836 3.249836

pval <- 2\*pt(test\_statistic,df=n-1)  
pval

## [1] 0.2042047

#http://www.r-tutor.com/elementary-statistics/hypothesis-testing/two-tailed-test-population-mean-unknown-variance  
  
  
e <-qt(0.9,df=n-1)\*s  
e

## [1] 0.8625932

c(xbar-e,xbar+e)

## [1] 13.76741 15.49259

#true mean is between this confidence interval so it has not been changed.

5) 1. c

1. b
2. c
3. c
4. a