```
library(dplyr)

v1 <- dpois(c(0:100), 20) /((dpois(c(0:100), 10) + dpois(c(0:100),40))/2)
o1 <- order(v1) # order (by default this function will be ascending format)
o2 <- rev(o1) # reverse the ordering so we can order in descending order
o2

v2 <-(o2[c(1)]-1)
sum((dpois(v2,10)+dpois(v2,40))/2)

# representing the distribution of alternative hypothesis being poisson of 20
alternative <- dpois(c(0:100),20)

# this is subsetting the vector to just the first two elements - 14 gives sum the closet to 0.05
# 14 is the critical value for the v
v2 <-(o2[c(1:14)]-1) # this is too low
#v2 <-(o2[c(1:14)]-1) # just right so the cutoff ratio is 1:14
#v2 <-(o2[c(1:15)]-1) # this is too high
# represents alpha value we are using for this poisson dist hypothesis test
# summing the region over the null hypothesis
sum((dpois(v2,10)+dpois(v2,40))/2) # this value represents the cutoff value we use to
determine result of the test
# represents critical value for poisson of lambda 10
# probability of being more extreme than the critical value under poisson of 10
critical_10 <- qpois(1-0.025,10)
critical_10
prob_critical10 <- 1-ppois(critical_10, 10)
prob_critical10
# represents critical value for poisson of lambda 40
# probability of being more extreme than the critical value under poisson of 40
critical_40 <- qpois(0.025,40)
critical_40
prob_critical40 <- ppois(critical_40, 40)
prob_critical40
# summing the region over the alternative hypothesis - power of poisson with lambda 10
power <- sum(alternative[v2 >= critical_10])
power
```