P8116 HW8

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1.

Effect size=-5

$\sigma = 10$

$Z_\beta = 0.84$

$Z_\alpha = 1.96$

$$n = \frac{2\sigma^2(Z_\beta + Z_{\alpha/2})^2}{(Effectsize)^2} = 62.72 \approx 63$$

Effect size=2

$$n = \frac{2\sigma^2(Z_\beta + Z_{\alpha/2})^2}{(Effectsize)^2} = 392$$

2.

Power simulated is 80.6%

>sum(NI)/10000
[1] 0.806

R code:

```
set.seed(23)
NI<-c()

for (i in 1:10000){
  x1<-rbinom(255,1,0.2)
  p1<-sum(x1)/255
  x2<-rbinom(255,1,0.2)
  p2<-sum(x2)/255
  UB<-p1-p2+1.96*sqrt(p1*(1-p1)/255+p2*(1-p2)/255)
  NI[i]<-ifelse(UB<=0.1,1,0)
}
```