Homework

```
library(ggplot2)
ap0.6 <- function(m){
  ##pbinom <= m-1 cumulative probability
  1 - pbinom(m-1, 100, 0.6)
}
## get the value of m
## type I error : alpha(p)
for (i in 1:100){
  if (ap0.6(i) > 0.05){
    i <- i + 1
  }
  else{
    print(i)
    break
  }
}
```

```
## [1] 69
```

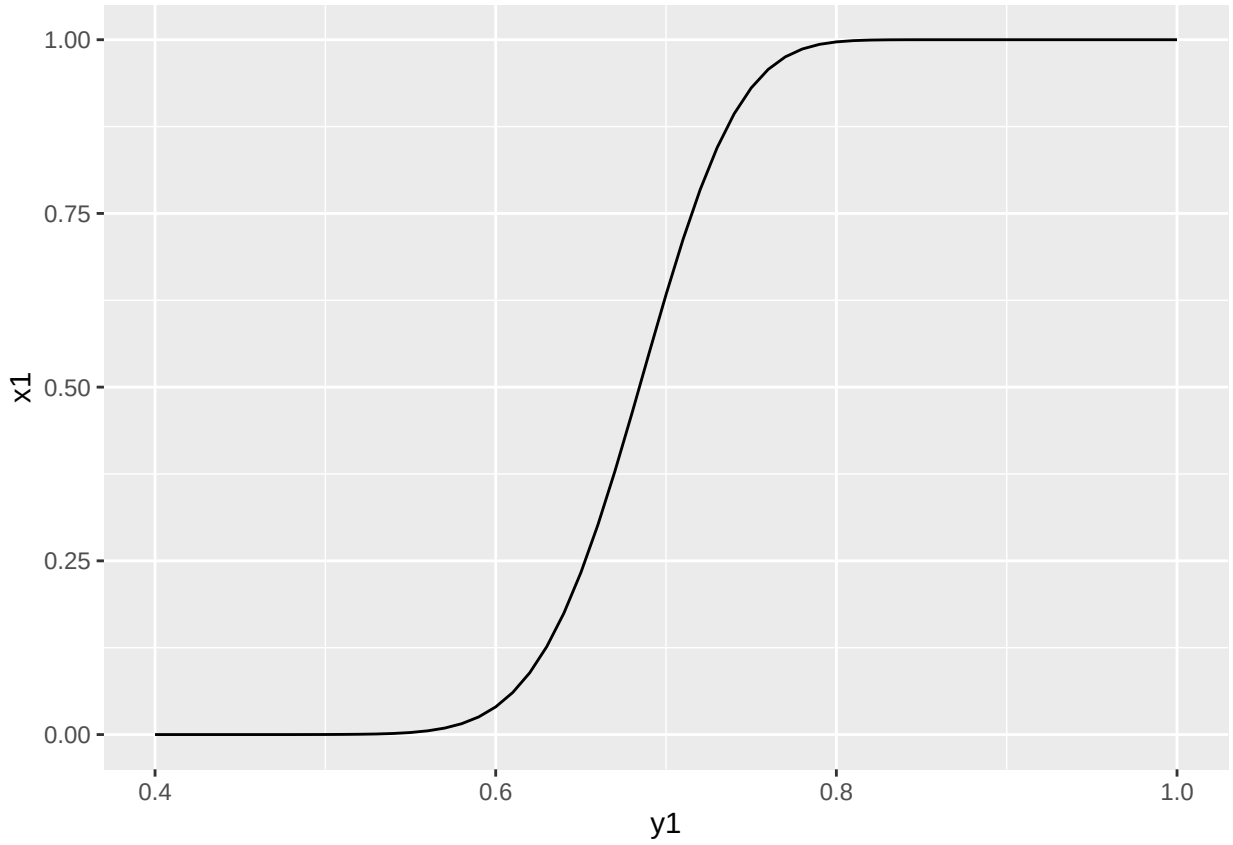
```
ap0.8 <- function(m){
  ##pbinom <= m-1 cumulative probability
  1 - pbinom(m-1, 100, 0.8)
}
## Type II error : 1- alpha(p)
for (k in 1:100){
  if (1 - ap0.8(k) < 0.05){
    k <- k + 1
  }
  else{
    print(k)
    break
  }
}
```

```
## [1] 74
```

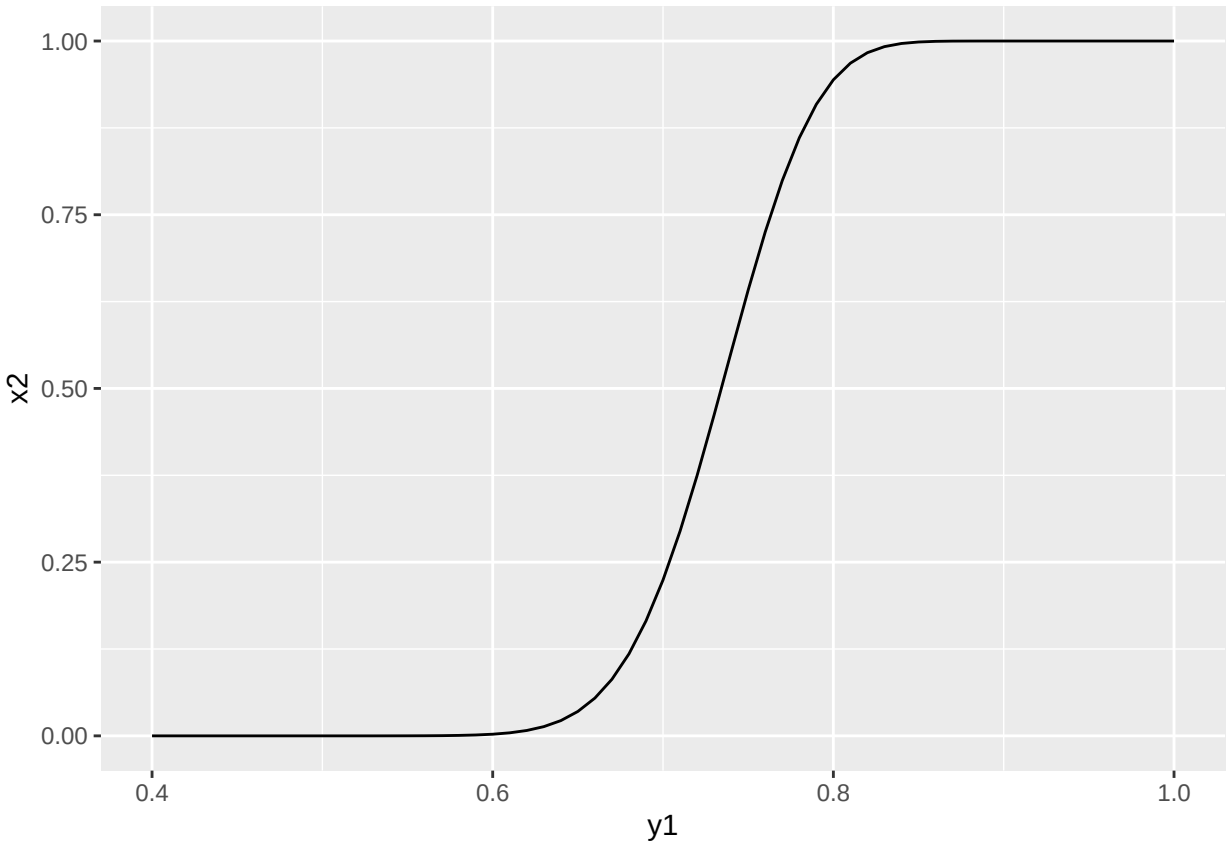
```
## ask jiacheng feng for explaination for how to get m value, how to express type I, II probability
```

```
## write a function determines the probability of both type1 and type2 error
ap <- function(n,m,p){
  ## initialize probability
  k = 0
  for (i in m:n){
    k = k + dbinom(i,n,p)  ## calculate the probability at specific point
  }
  return(k)
}
```

```r
y1 <- seq(0.4,1,by = 0.01)

x1 <- ap(100,69,y1)

df1 <- data.frame(y1, x1)

ggplot(aes(x = y1, y = x1), data = df1) +
  geom_line()
```




```r
x2 <- ap(100,74,y1)

df2 <- data.frame(y1, x2)

ggplot(aes(x = y1, y = x2), data = df2) +
  geom_line()
```




```
## work with donghao xue for powercurve
```

From my understanding, the power function is defined as the probability alpha(p) of making type I error. The probability of making type II error is (1 - alpha(p)). When we set p equal to 0.6, the value of alpha(0.6) is the probability of making type I error. When we set p to other values for example 0.8 in the book, the value of (1 - alpha(p)) is the probability of making type II error. As a result, we set alpha(p) to 0.95 in order to get m value.