HW6

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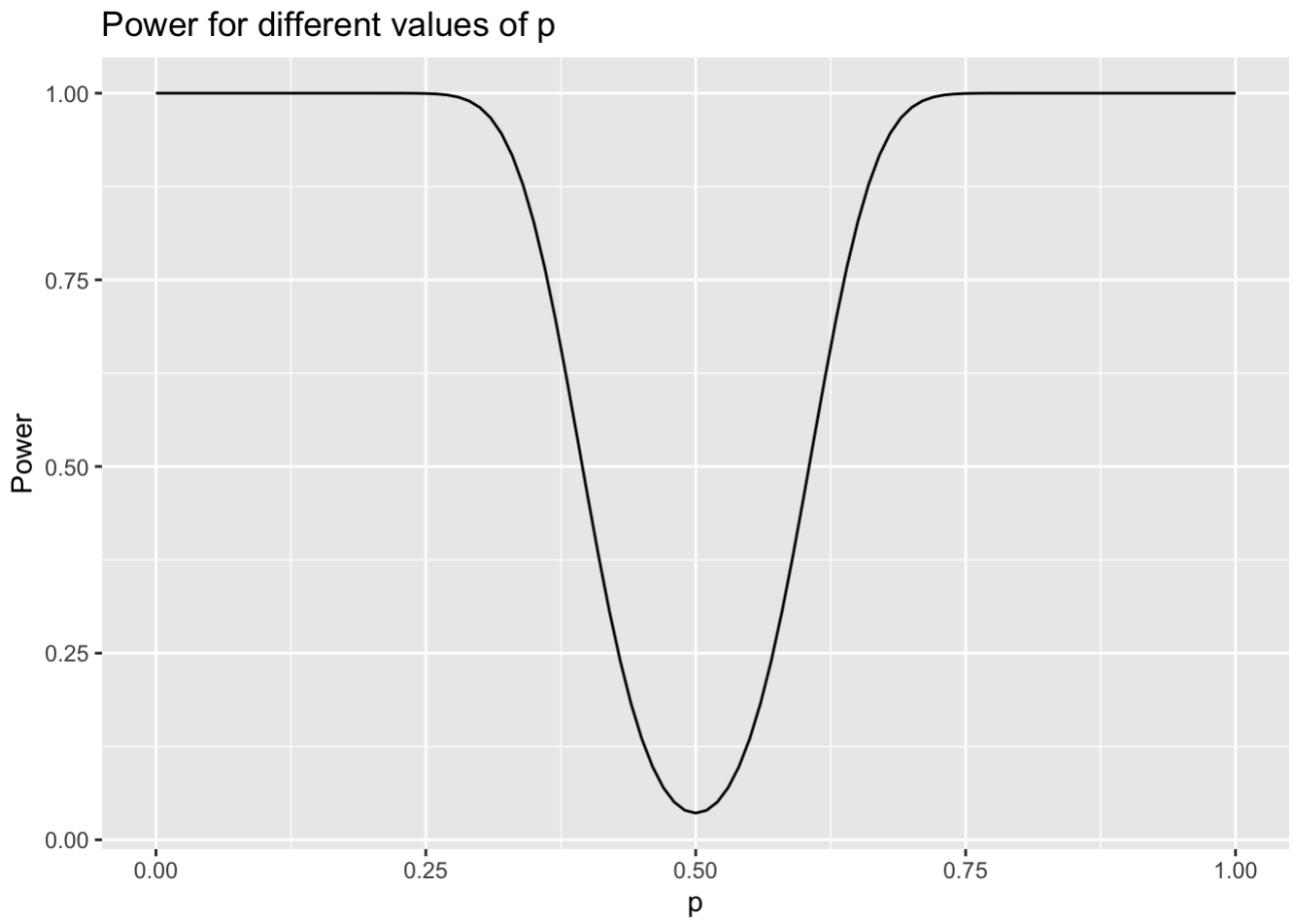
Problem 6A

part b)

```
df <- data.frame(x = seq(0, 1, by=0.01))
df$y <- 1 - pnorm((6.05 - (10*df$x))/sqrt(df$x - (df$x)^2)) + pnorm((3.95 - (10*df$x))/s
qrt(df$x - (df$x)^2))

ggplot(df, aes(x=x, y=y)) +
  geom_line() +
  ggtitle("Power for different values of p") +
  xlab("p") +
  ylab("Power")
```

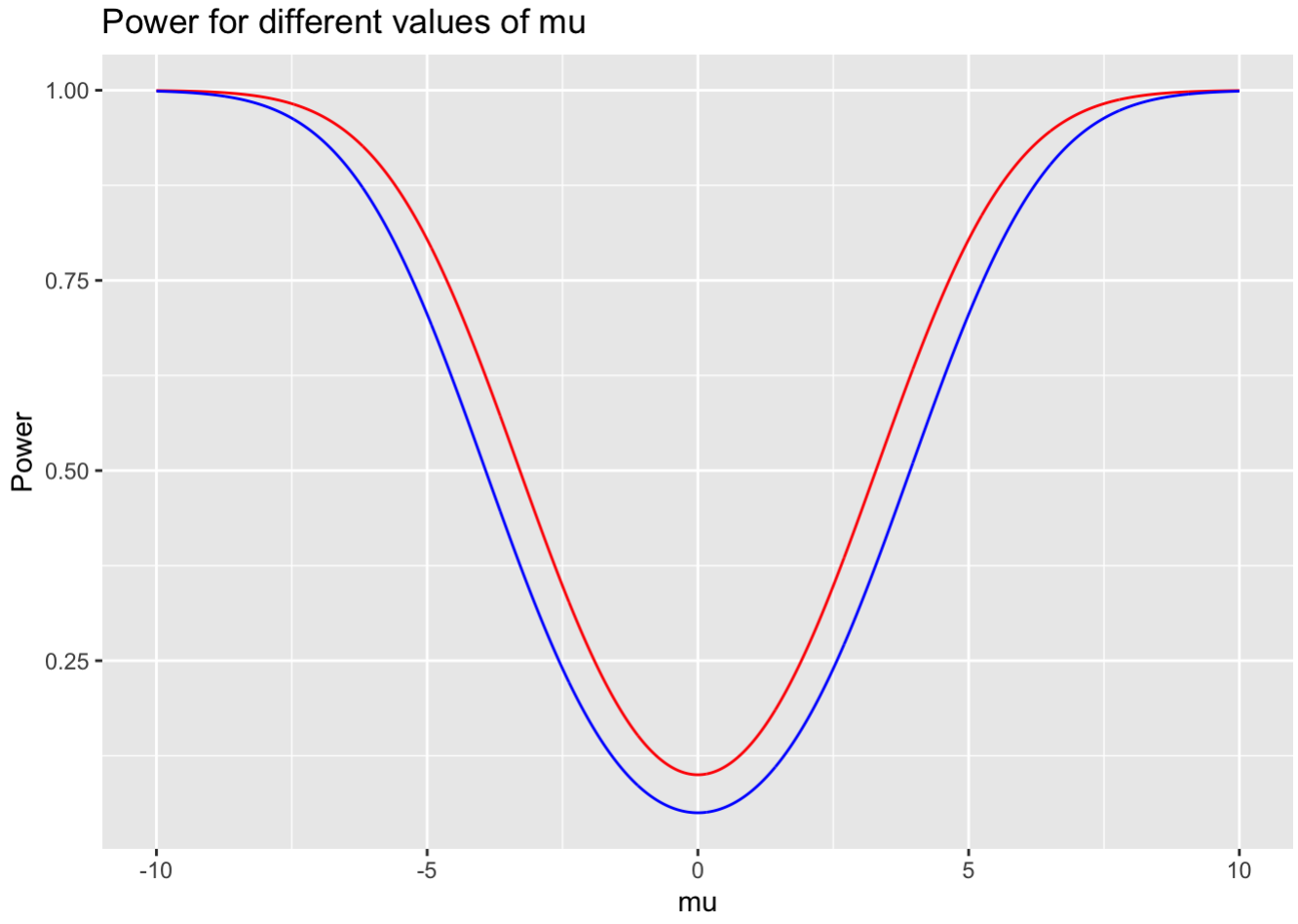


Problem 6B

```
b_df <- data.frame(mu = seq(-10, 10, by=0.01))
b_df$y10 <- 1 + pnorm(qnorm(.10/2) - ((b_df$mu)/2)) - pnorm(qnorm(1 -.10/2) - ((b_df$m
u)/2))
b_df$y05 <- 1 + pnorm(qnorm(.05/2) - ((b_df$mu)/2)) - pnorm(qnorm(1- .05/2) - ((b_df$m
u)/2))
head(b_df)
```

```
##       mu       y10       y05
## 1 -10.00 0.9996034 0.9988173
## 2  -9.99 0.9995962 0.9987975
## 3  -9.98 0.9995888 0.9987774
## 4  -9.97 0.9995813 0.9987570
## 5  -9.96 0.9995737 0.9987363
## 6  -9.95 0.9995660 0.9987153
```

```
ggplot(b_df) +
  geom_line(aes(x=mu, y=y10), color="red") +
  geom_line(aes(x=mu, y=y05), color="blue") +
  ggtitle("Power for different values of mu") +
  xlab("mu") +
  ylab("Power")
```



Problem 6F

```
#Part d
sum <- 0
for (i in 3:7) {
  sum <- sum + choose(10, i)*(0.5^10)
}

alpha <- 1 - sum
alpha
```

```
## [1] 0.109375
```

```
#Part e
1 - pbinom(60, 100,0.5) + pbinom(40,100,0.5)
```

```
## [1] 0.04604407
```

Problem 6G

```
smoker_data <- read.table("/Users/nataliebrewer/Desktop/Stat 135/HW6/6G_data.csv", sep
=",")
smoker_vec <- c(smoker_data$V1)
smoker_vec
```

```
##  [1] 103.768  92.295 100.615 102.754  88.602  61.675  88.017 108.579  73.003
## [10]  90.677  71.210  73.154 123.086  84.023  82.115 106.755  91.052  76.014
## [19]  89.222  90.479
```

```
xbar <- mean(smoker_vec)
xbar
```

```
## [1] 89.85475
```

```
sd <- sd(smoker_vec)
sd
```

```
## [1] 14.90353
```

```
test_stat <- (xbar - 100)/(sd/sqrt(20))
test_stat
```

```
## [1] -3.044309
```