Lab 1 - STA250

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1. The function call dpois(x, lambda) evaluates the Poisson(lambda) pdf at the value x. Calculate the value of the Poisson pdf at x = 4 for lambda = 5.2 in R.

```
val = dpois(4, 5.2)
print(val)
```

```
## [1] 0.1680625
```

2. Create a vector p with elements 0.0, 0.25, 0.5, . . . , 2.00. Calculate 2*p. Describe what happens when you multiply a constant times a vector in a comment in your script.

```
p = c();
for (i in 1:9) {
  p[i] = (i-1)/4.0;
}
print(2*p)
```

```
## [1] 0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0
```

When you multiply a vector times a constant, every value in the vector is multiplied by that constant.

3. The function call pnorm(x,mean,sd) calculates the cdf of a Gaussian random variable (RV) with mean mean and standard deviation sd at the value x. Write your own function that calculates the probability that a Gaussian RV with a user specified mean and standard deviation is between two user-specified values x1 and x2 (i.e. calculate F(x2)-F(x1) where F is the cdf of the specified Gaussian RV). Assume that x1 < x2.

```
gauss = function(mu, sd, x1, x2) {
  return (pnorm(x2, mu, sd) - pnorm(x1, mu, sd));
}
print(gauss(3, 3, 2, 4)) #this works!
```

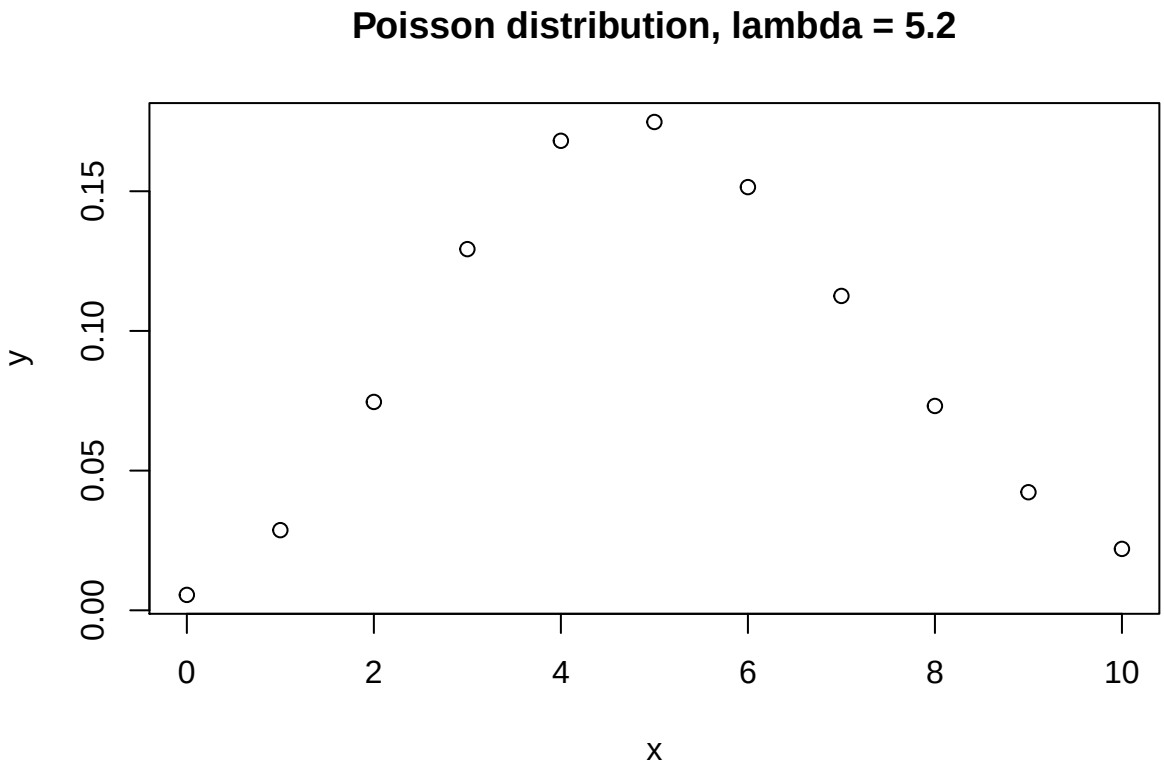
```
## [1] 0.2611173
```

4. Plot the Poisson pdf for the values of x ranging from 0 to 10 for a Poisson with lambda = 5.2.

```
x = 0:10
print(x)
```

```
##  [1]  0  1  2  3  4  5  6  7  8  9 10
```

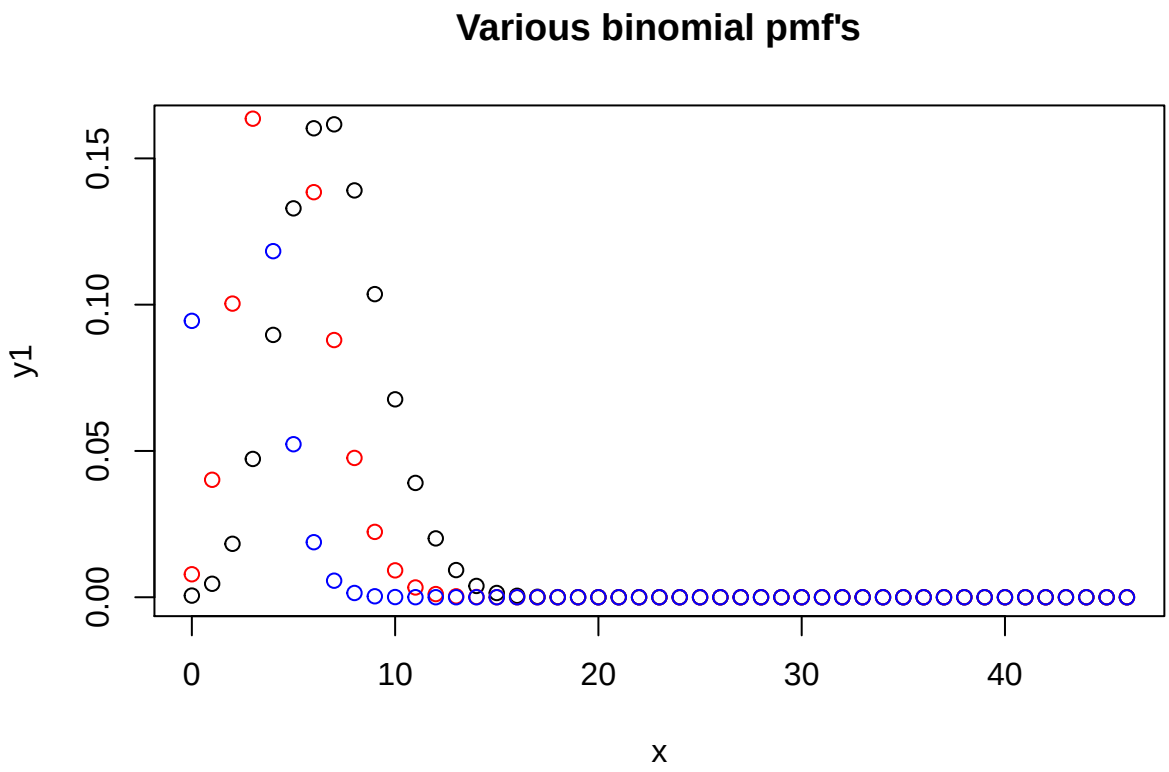
```
y = dpois(x, 5.2)
plot(x, y, title("Poisson distribution, lambda = 5.2"))
```



5. Make a plot of the Binomial(46,0.15) pmf. What x should you use to satisfactorily represent the pmf? Add to your plot graphs of Binomial(46,0.05) and Binomial(46,0.1) pmfs. Use three different colors for the three pmfs. The function dbinom(x,size,prob) returns the value of a Binomial(n,p) RV at the values x.

To satisfactorily represent the pmf, my x should go from 0 to 46.

```
x = 0:46
y1 = dbinom(x, 46, .15)
y2 = dbinom(x, 46, .1)
y3 = dbinom(x, 46, .05)
plot(x, y1, title("Various binomial pmf's"))
lines(x, y2, col="red", ty="o", lty=0)
lines(x, y3, col="blue",ty="o", lty=0)
```


Various binomial pmf's
y1
0.00
0.05
0.10
0.15
0
10
20
30
40
x