Assignment 7

September 15, 2018

In [2]:
```
using Distributions;
using Gadfly, Cairo;

white_panel = Theme(panel_fill = colorant"white",
                    default_color= colorant"blue",
                    major_label_font_size=14pt,
                    minor_label_font_size=10pt,
                    major_label_color=colorant"black",
                    minor_label_color=colorant"black");

# Q1.a Find the probability that the down time is not more than 2 hours.
ans_1a = cdf(Gamma(4,1.5), 2)
```

Out[2]:
```
0.04649430286533402
```

In [4]:
```
# Q2.a If $700 is budgeted to cover repairs for next week, what is the probability that
# will exceed the budgeted amount?

p_x_moreThan700 = cdf(Normal(600,40),700);
p_x_lessThan700 = 1 - p_x_moreThan700
```

Out[4]:
```
0.006209665325776159
```

In [34]:
```
# How much should be budgeted weekly for maintenance and repairs to ensure that the pro
# that the budgeted amount will be exceeded in any given week is only 0.1?
# which mean at what point on the normal distribution will it exceed 90%

ans_2b = 1 - cdf(Normal(600,40),651)
# When the budget exceeds $651 it will exceed 90%
```

Out[34]:
```
0.10115462099558581
```

In [6]:
```
# Q3.a Suppose that a batch with more than 30% impurities cannot be sold. What is the pr
# a randomly selected batch cannot be sold for this reason? (This is a Beta distribution
# the parameters and write Julia code)

# alpha=4  beta=2
p_x_lessThan30 = cdf(Beta(4,2), 0.3);
p_x_moreThan30 = 1 - p_x_lessThan30
```

```
Out[6]: 0.96922
```

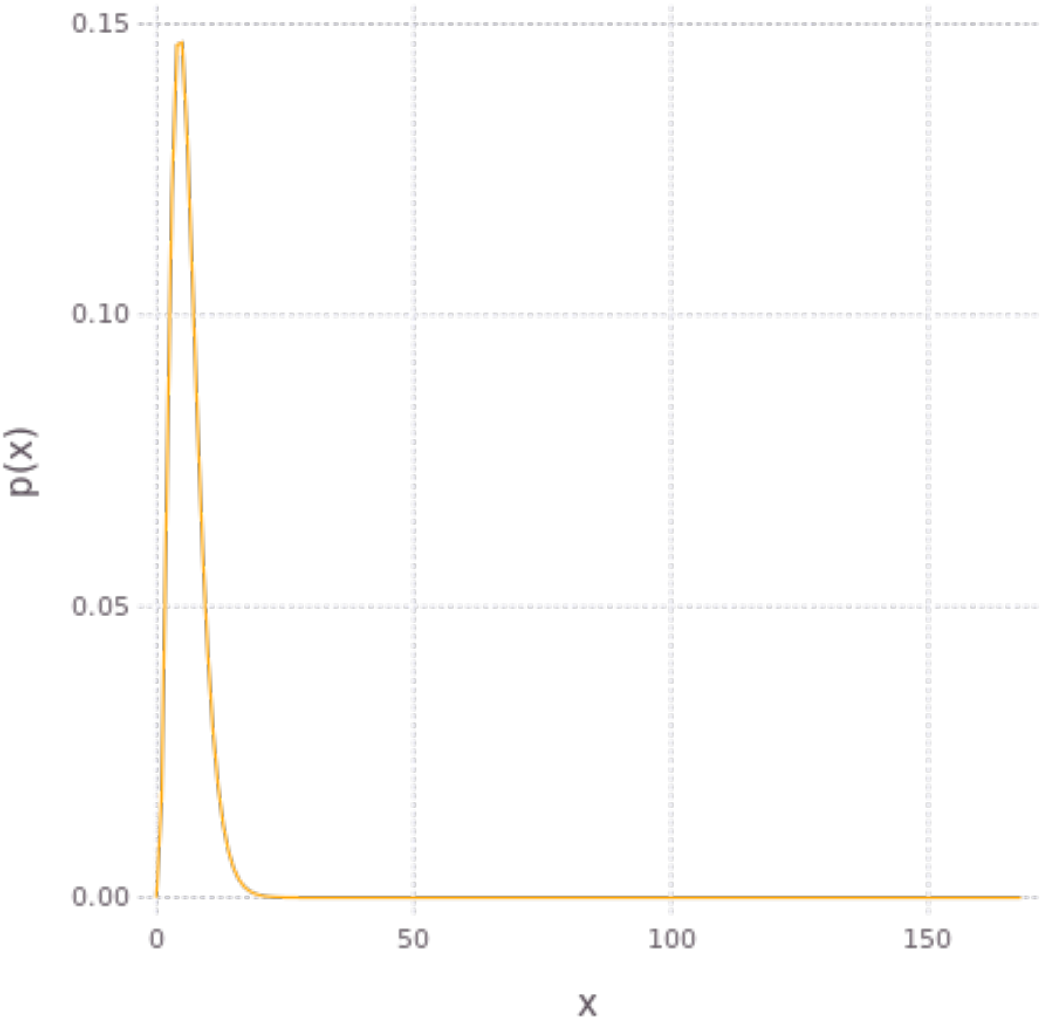
```
In [35]: # Q3 b. Suppose that the dollar value of each batch is given by v = 10  0.75x. Find the
         # and variance of v

         Expected = mean(Beta(4,2))
         Variance = var(Beta(4.2))

         E_x = 10 -0.75*Expected
```

```
Out[35]: 9.5
```

```
In [11]: # 4 What is the probability that a randomly selected bearing of this type will fail in
         # hours? (Write Julia code)

         ans_4a = cdf(Weibull(4,2),2)
```

```
Out[11]: 0.6321205588285577
```

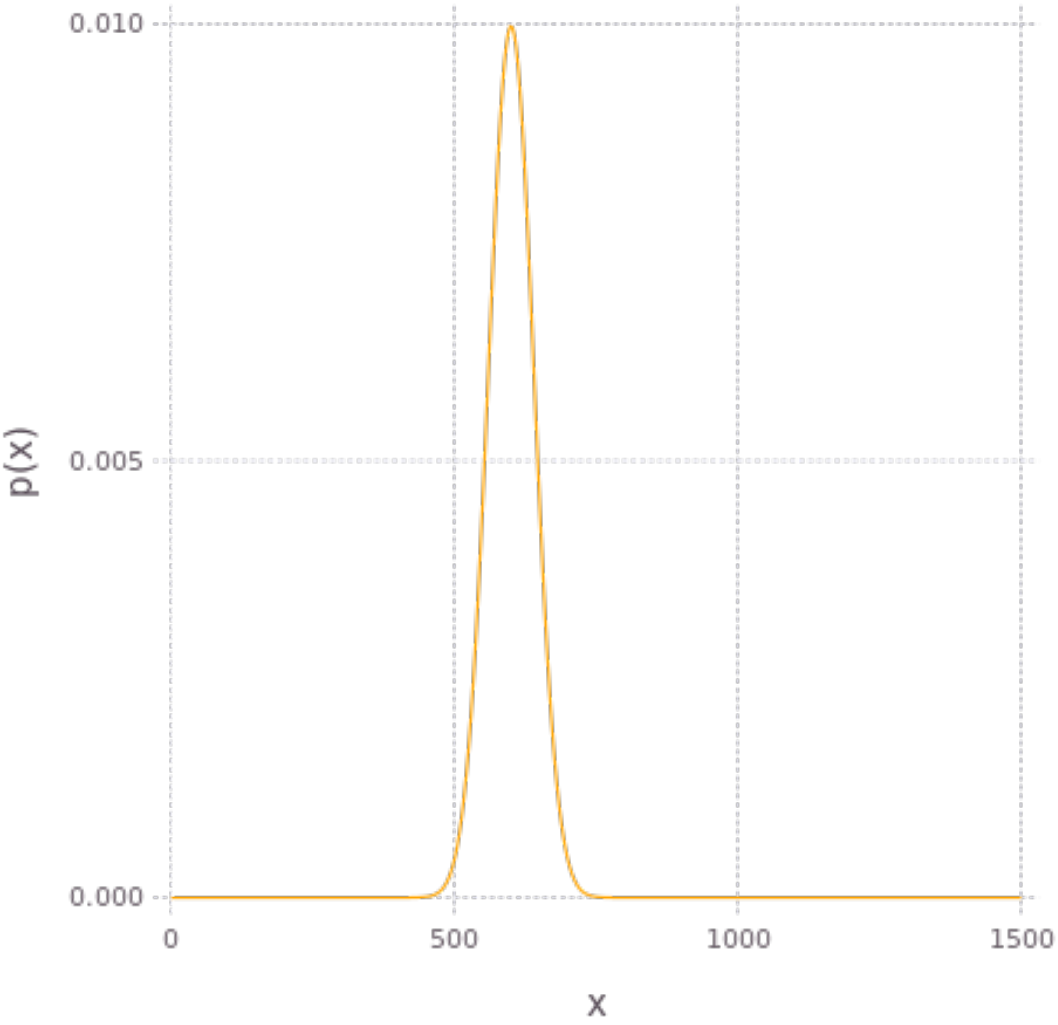
```
In [9]: # pdf of the distributions
        # 5.1 Gamma

        x1 = collect(0:1:24*7);
        y1 = pdf.(Gamma(4,1.5),x1)

        myplot = plot(layer(x=x1, y=y1, Geom.line, Theme(default_color=colorant"orange")),
        Coord.Cartesian(xmin=0, xmax=24*7), Guide.ylabel("p(x)"));
        draw(PNG(5inch, 5inch), myplot)
```



Out[9]: false

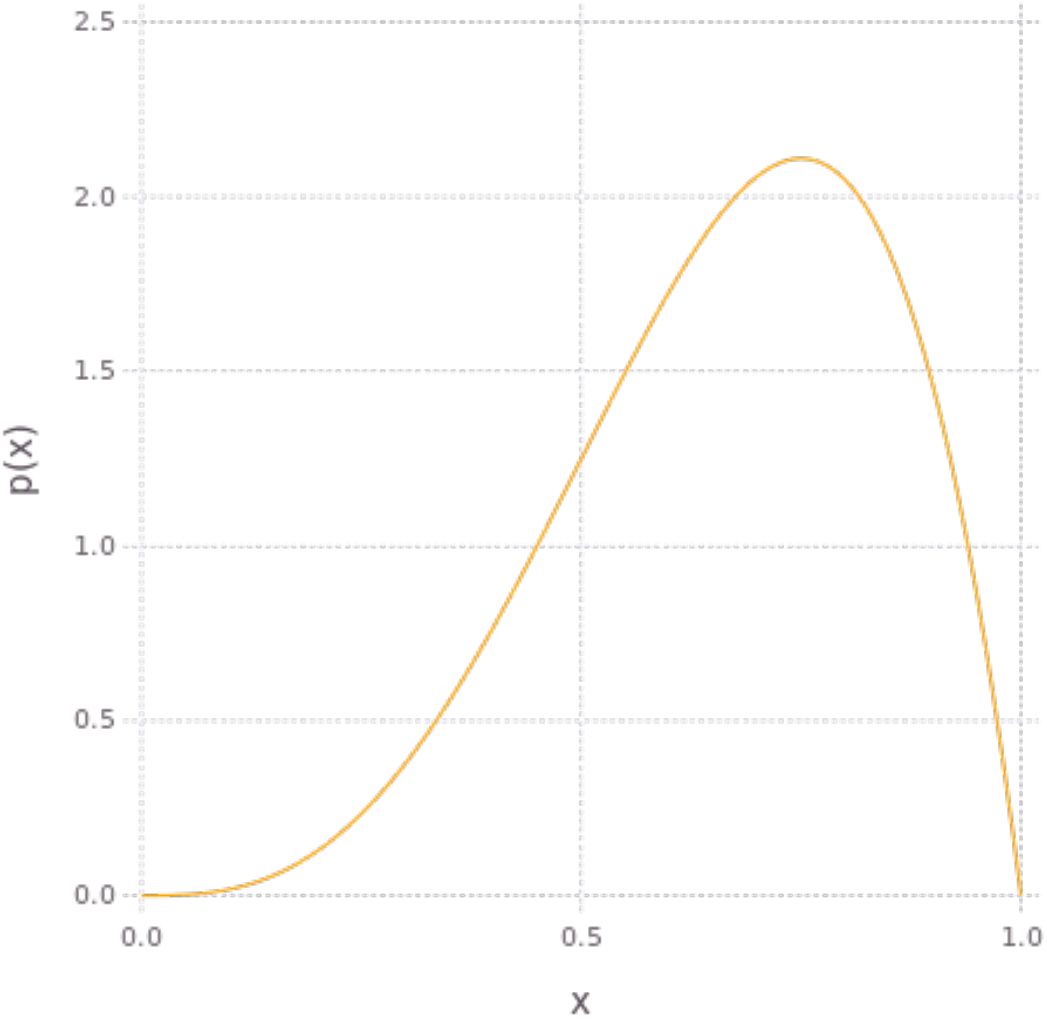
In [10]: *# 5.2 Normal*

```
x2 = collect(0:1:1500)
y2 = pdf.(Normal(600,40),x2)
myplot = plot(layer(x=x2, y=y2, Geom.line, Theme(default_color=colorant"orange")),
Coord.Cartesian(xmin=0, xmax=1500), Guide.ylabel("p(x)"));
draw(PNG(5inch, 5inch), myplot)
```



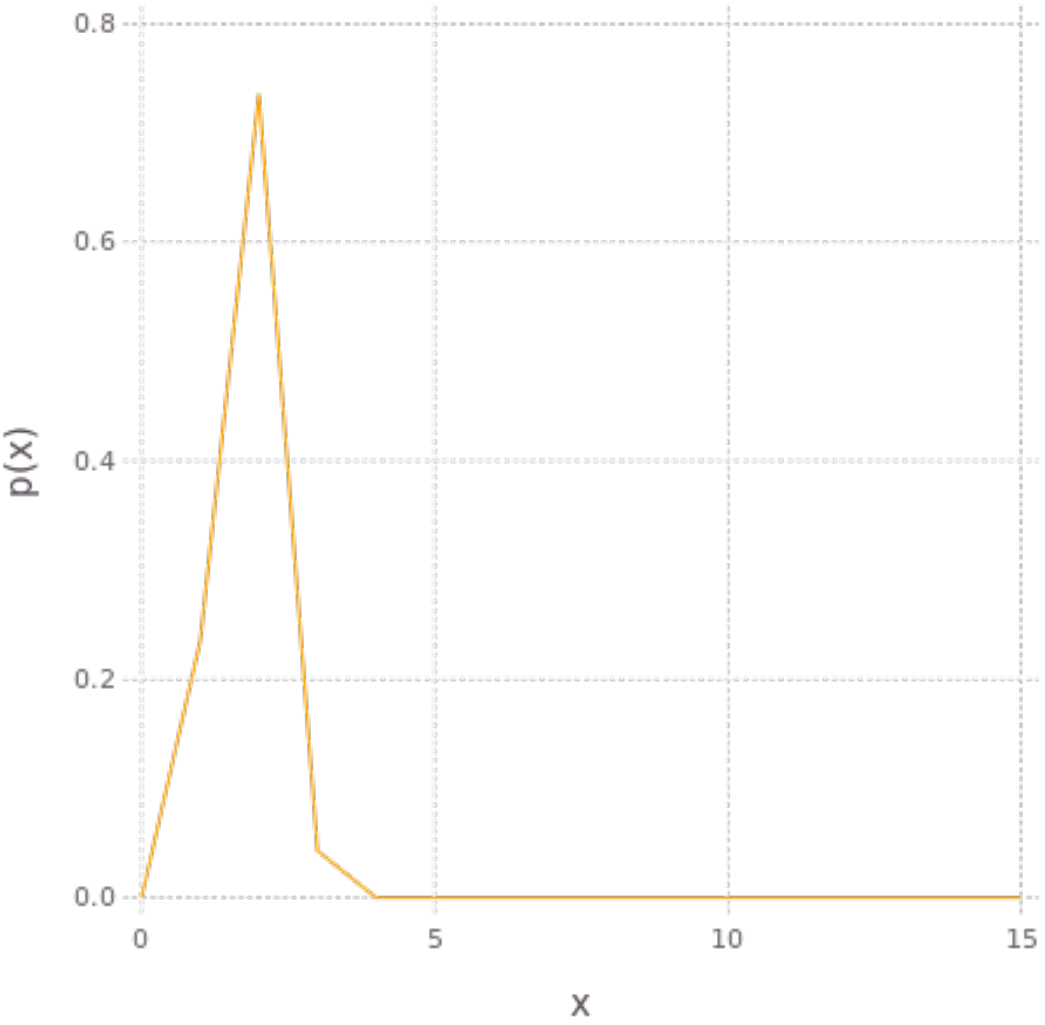
Out[10]: false

In [12]:
```
# 5.3 Beta

x3 = collect(0:0.01:1)
y3 = pdf.(Beta(4,2),x3)
myplot = plot(layer(x=x3, y=y3, Geom.line, Theme(default_color=colorant"orange")),
Coord.Cartesian(xmin=0, xmax=1), Guide.ylabel("p(x)"));
draw(PNG(5inch, 5inch), myplot)
```



Out[12]: false

In [13]:
```
#  5.4 Weibull
x4 = collect(0:1:15)
y4 = pdf.(Weibull(4,2),x4)

myplot = plot(layer(x=x4, y=y4, Geom.line, Theme(default_color=colorant"orange")),
Coord.Cartesian(xmin=0, xmax=15), Guide.ylabel("p(x)"));
draw(PNG(5inch, 5inch), myplot)
```



Out[13]: false

In [ ]: