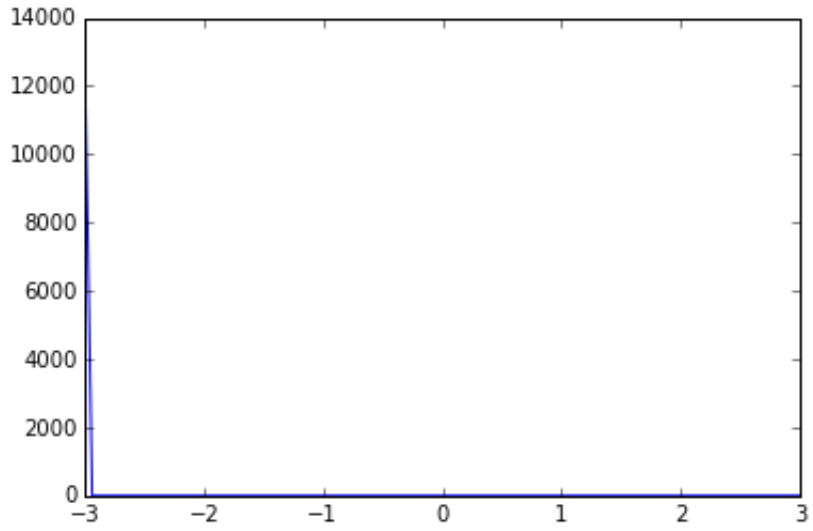
In [103]:
```
#Melanie Daugherty, Samuel Lee, Ryan Somerfield
#IE 300 Case Study 3
import numpy as np
import matplotlib.pyplot as plt
import matplotlib.mlab as mlab
import math
```

In [116]:
```
x= np.linspace (-3, 3, 100)
mean = x[0]
variance = 0.000000001 #impossible to graph as variance approaches
zero
sigma = math.sqrt(variance)
```

In [117]:
```
%matplotlib inline
x = np.linspace(-3,3,100)
y = mlab.normpdf(x,mean,sigma)
```

In [118]:
```
plt.plot(x,y)
```

Out[118]:
```
[<matplotlib.lines.Line2D at 0x109072e80>]
```

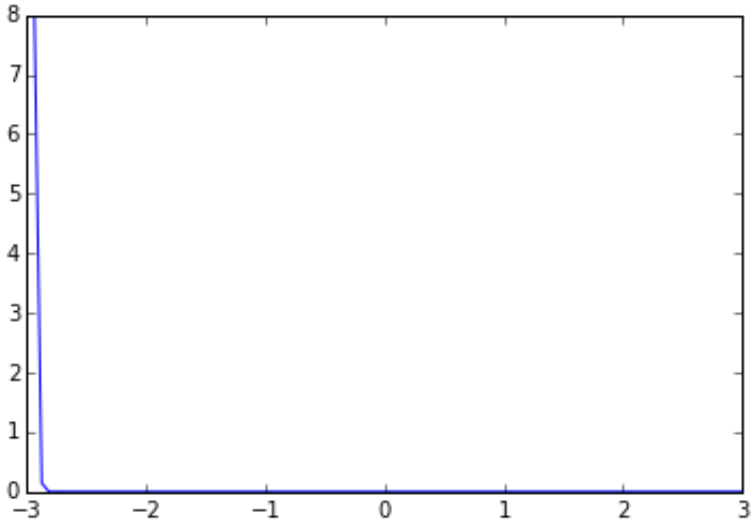


In [107]:
```
x= np.linspace (-3, 3, 100)
y= 1/2*(x[0]+x[1])
mean = np.mean(x[range(0,2)])
variance = np.var(x[range(0,2)])
sigma = math.sqrt(variance)
```

In [108]:
```
%matplotlib inline
x = np.linspace(-3,3,100)
y = mlab.normpdf(x,mean,sigma)
```

In [109]:
```
plt.plot(x,y)
```

Out[109]:
```
[<matplotlib.lines.Line2D at 0x1083d5c50>]
```

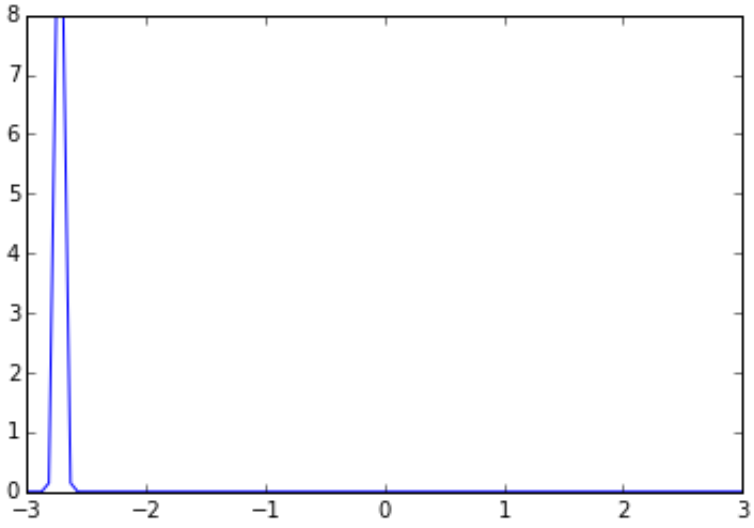


In [110]:
```
x= np.linspace (-3, 3, 100)
mean = np.mean(x[range(0,10)])
var = np.var(x[range(0,10)])
var
sigma = math.sqrt(variance)
```

In [111]:
```
%matplotlib inline
x = np.linspace(-3,3,100)
y = mlab.normpdf(x,mean,sigma)
```

In [112]:
```
plt.plot(x,y)
```

Out[112]:
```
[<matplotlib.lines.Line2D at 0x108721198>]
```



In [113]:
```
lmnda = 1.5
x = np.arange (-3, 3, 0.001)
y = np.zeros (len(x))
```

In [114]:
```
for j in range(0,len(x)):
    if (x[j] > 0):
        y[j] = lmnda * np.exp(-lmnda*x[j])
    else:
        y[j] = 0
```

In [115]:
```
plt.plot(x,y,'k--',label = 'Exponential')
plt.legend(loc=0)
plt.xlabel('x')
plt.ylabel('Density function, f(x)')
plt.legend()
plt.show()
```