```
import numpy as np
from scipy.stats import norm
import math
import seaborn
import matplotlib.pyplot as plt
%matplotlib inline
```

```
sum(np.random.binomial(12,0.2,20000) == 4)/20000
```

```
0.13235
```

```
sum(np.random.binomial(12,0.2,20000) <= 4)/20000
```

```
0.9277
```

```
sum(np.random.binomial(9,0.1,20000) == 0)/20000
```

```
0.3841
```

```
sum(np.random.poisson(12,10000) >= 17)/10000
```

```
0.1011
```

```
sum(np.random.uniform(0,20,1000) > 5)/1000
```

```
0.757
```

```
sum(np.random.uniform(0,20,1000) <10)/ 1000
```

```
0.516
```

```
sum(np.random.uniform(0,20,1000) > 5)/1000 - sum(np.random.uniform(0,20,1000) <10)/ 1000
```

```
0.254
```

```
s = np.random.uniform(-1,0,1000)
np.all(s >= 0)
```

```
False
```

```
np.all( s< 20)
```

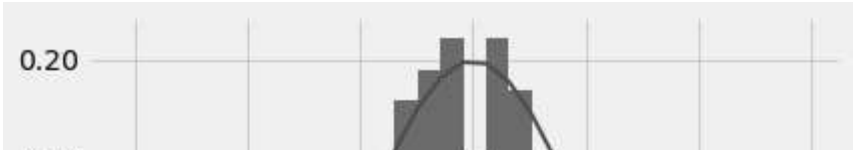
```
True
```

```
mu = 10
sigma = 2
sum(np.random.normal(mu,sigma,1000) >13)/ 1000
```

```
0.075
```

```
s = np.random.normal(mu,sigma,1000)
```

```
plt.style.use('fivethirtyeight')
count, bins, ignored = plt.hist(s,30,density=True)
plt.plot(bins, 1/(sigma * np.sqrt(2*np.pi)) * np.exp(- (bins - mu)**2 / (2 * sigma**2)), l
plt.show()
```




```
sum(np.random.exponential(scale=1.4, size=10000) <0.5)/10000
```

```
0.3012
```

```
x = -(0.5/1.4)
1-math.exp(x)
```

```
0.30032746262486965
```

```
sum(np.random.exponential(scale=12, size=10000) <8)/10000
```

```
0.485
```

```
x = -(8/12)
1-math.exp(x)
```

```
0.486582880967408
```

```
np.random.seed(1234)
samples=np.random.lognormal(mean=1.,sigma=.4,size=10000)
```

```
samples
```

```
array([3.28239739, 1.68811027, 4.82148893, ..., 1.78428134, 2.22759552,
       2.45370106])
```

```
num_bins=50
```

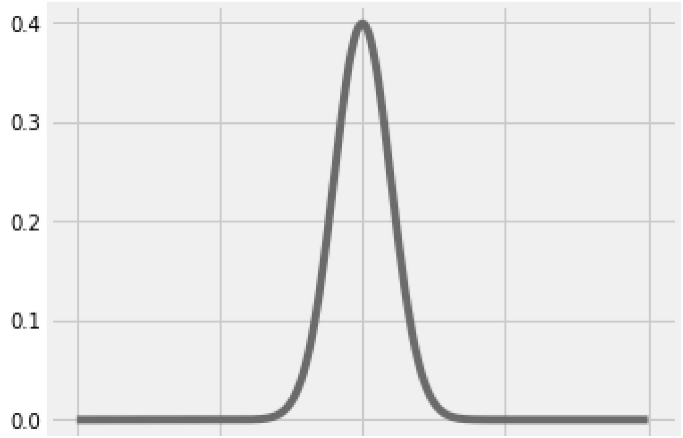
```
plt.hist(samples,bins=num_bins,color="g");
```


```
mu =756.7
sigma=49.12
x1=700
x2=3100
```

```
z1= (x1 - mu) / sigma
z2= (x2 - mu) / sigma
```


```
x = np.arange(z1,z2,0.001)
x_all = np.arange(-10,10,0.001)
y=norm.pdf(x,0,1)
y2=norm.pdf(x_all,0,1)


fig, ax = plt.subplots(figsize=(5,4))
plt.style.use('fivethirtyeight')
ax.plot(x_all,y2);
```


0.4
0.3
0.2
0.1
0.0

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