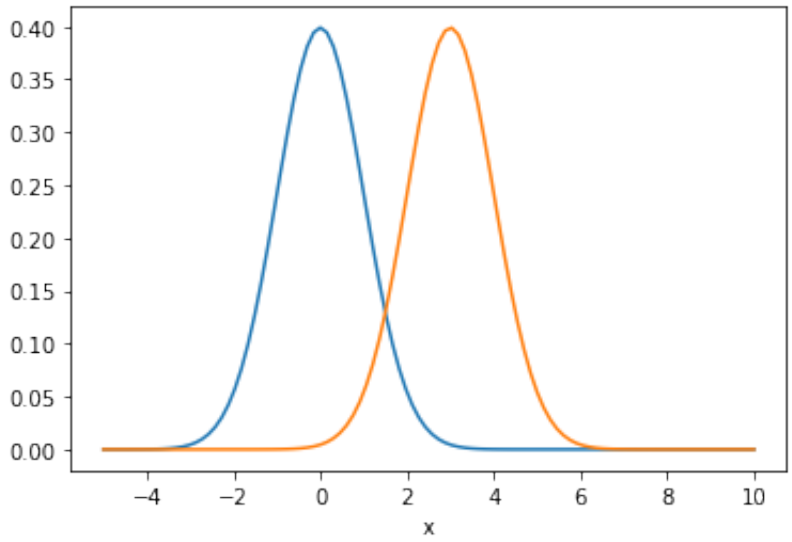
Question 1

a

In [2]:
```
import numpy as np
import matplotlib.pyplot as plt
from scipy.stats import norm

x = np.linspace(-5,10,100)

mu1 = 0
var1 = 1
pdf1 = norm.pdf(x, mu1, np.sqrt(var1))

mu2 = 3
var2 = 1
pdf2 = norm.pdf(x, mu2, np.sqrt(var2))

plt.plot(x,pdf1)
plt.plot(x,pdf2)

plt.xlabel('x')
plt.show()
```



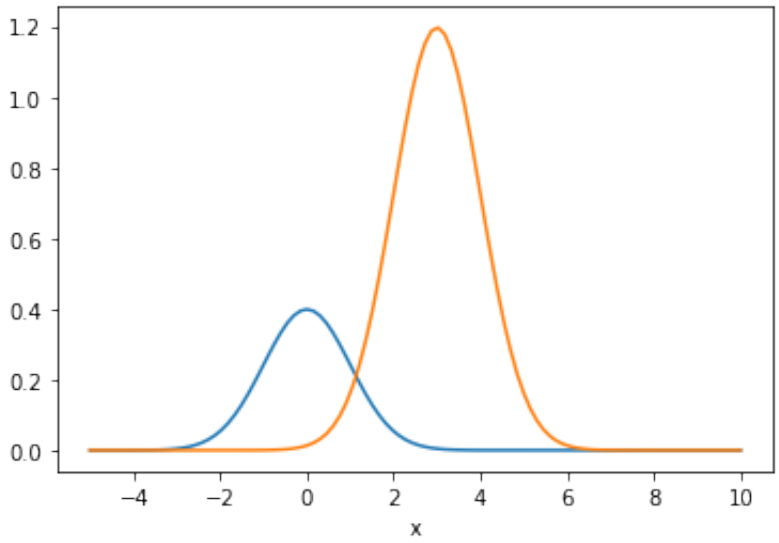
c

In [10]:
```
import scipy.stats
x_given_y0 = scipy.stats.norm(0, 1)
x_given_y1 = scipy.stats.norm(3, 1)
p1 = (x_given_y0.pdf(1.5) * (3/4)) / (.75 * x_given_y0.pdf(1.5) + .25
p2 = (x_given_y1.pdf(1.5) * .25) / (.75 * x_given_y0.pdf(1.5) + .25 *
print(p1)
print(p2)
```

```
0.75
0.25
```

d

In [12]:
```
x = np.linspace(-5,10,100)

mu1 = 0
var1 = 1
pdf1 = norm.pdf(x, mu1, np.sqrt(var1))

mu2 = 3
var2 = 1
pdf2 = norm.pdf(x, mu2, np.sqrt(var2))

plt.plot(x,pdf1)
plt.plot(x,3 * pdf2)

plt.xlabel('x')
plt.show()
```



x is the intersection of the 2 curves, at roughly 1

In [15]:
```
# given x =
pa = (x_given_y0.pdf(x) * (3/4)) / (.75 * x_given_y0.pdf(x) + .25 * x_
pb = p1 = (x_given_y1.pdf(x) * (1/4)) / (.75 * x_given_y0.pdf(x) + .25
if pa > pb:
    y_head = 0
else:
    y_head = 1
```

In [ ]:
```

```