HW1

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1

(a) $Pr(Y = 1) = 0.25 + 0.1 + 0.15 = 0.5$

(b) $Pr(X = 2 \cap Y = 1) = 0.1$

(c) $Pr(X = 2 \cap Y = 1) = \frac{0.1}{0.5} = 0.2$

(d) $Pr(X = 3 \cap Y = 2) = 0.2$
$1 - (0.25 + 0.1 + 0.15 + 0.1 + 0.2) = 0.2$

2

E[B+H] = E[B] + E[H]
E[B] = $1 \times 0.25 + 3 \times 0.25 + 4 \times 0.25 + 7 \times 0.25 = 3.75$

$$E[H = x] = \int_a^b xf(x)dx = \int_{-1}^{4} \frac{1}{5}(x)dx = \frac{1}{5}\int_{-1}^{4} xdx = \frac{1}{5} \times \frac{x^2}{2}\Big|_{-1}^{4} = 1.5 \quad (1)$$

$$E[B + H] = 3.75 + 1.5 = 5.25mi \quad (2)$$

3

Pr(M=0) = 0.3
$\sum_{x \in D}(-|M - x|/2) + |D|ln(\frac{1}{4}) + ln(0.3) = (-|0 - (-1)|/2)) + (-|0 - (6)|/2)) + (-|0 - 0|/2)) + (-|0 - 2|/2)) + (-|0 - (-1)|/2)) + (-|0 - 7|/2)) + (-|0 - 7|/2)) + (-|0 - 8|/2)) + (-|0 - 4|/2)) + (-|0 - (-2)|/2)) + ln(0.3) = -20.2$

Pr(M=2) = 0.3
$\sum_{x \in D}(-|M - x|/2) + |D|ln(\frac{1}{4}) + ln(0.3) = (-|2 - (-1)|/2)) + (-|2 - (6)|/2)) + (-|2 - 0|/2)) + (-|2 - 2|/2)) + (-|2 - (-1)|/2)) + (-|2 - 7|/2)) + (-|2 - 7|/2)) +$

$(-|2-8|/2)) + (-|2-4|/2)) + (-|2-(-2)|/2)) + ln(0.3) = -18.2$

Pr(M=4) = 0.4
$\sum_{x \in D}(-|M-x|/2) + |D|ln(\frac{1}{4}) + ln(0.3) = (-|4-(-1)|/2)) + (-|4-(6)|/2)) +$
$(-|4-0|/2)) + (-|4-2|/2)) + (-|4-(-1)|/2)) + (-|4-7|/2)) + (-|4-7|/2)) +$
$(-|4-8|/2)) + (-|4-4|/2)) + (-|4-(-2)|/2)) + ln(0.4) = -17.9$

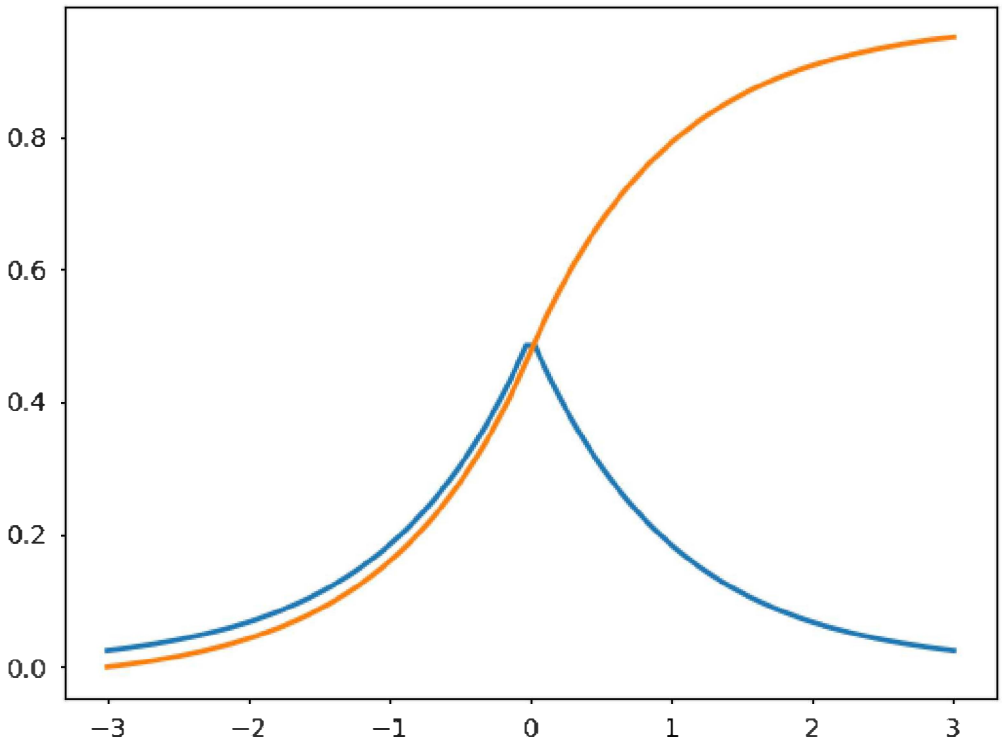
Because M = 4 is the largest number in the set, we can deduce that actually M is equal to 4.

In [2]:
```
import matplotlib as mpl
%matplotlib nbagg
#mpl.use('PDF')
import matplotlib.pyplot as plt
import matplotlib.mlab as mlab
from scipy.stats import laplace
import scipy.special as sps
import numpy as np
import math
```

In [3]:
```
mean, var, skew, kurt = laplace.stats(moments='mvsk')
```

In [4]:
```
x = np.linspace(-3, 3, 100)
```

In [5]:
```
 plt.plot(x, laplace.pdf(x),linewidth=2.0, label='Laplace PDF')
```



Out[5]:
```
[<matplotlib.lines.Line2D at 0x9c16978>]
```

In [6]:
```
 plt.plot(x, laplace.cdf(x) -.024893,linewidth=2.0, label='Laplace CDF')
```

Out[6]:
```
[<matplotlib.lines.Line2D at 0x9dd0c88>]
```

In [ ]:
```
plt.legend(bbox_to_anchor=(.35,1))
```