Ex 1:
X: prediction after testing.
G: Given
0: not infected.
1: infected
P(G = 1) = 0.05 => P(G = 0) = 0.95
P(X=1|G=1) = 0.98
P(X=1|G=0) = 0.03
Ex2:

$$P(G=1|H=1) = (P(X=1G=1)P(G=1))/(P(X=1))$$

$$= (P(X=1G=1)P(G=1))/(P(X=1G=1)P(G=1)+P(X=1G=0)P(G=0))$$

$$= ((0.05)(0.98))/P((0.05)(0.98)+(0.95)*(0.03)) = 0.623$$

$$f(x) = \frac{1}{\sigma\sqrt{2\pi}}e^{(\frac{-1}{2}\frac{x-u}{\sigma})}$$

$$\int f(x)dx = \int \frac{1}{\sigma\sqrt{2\pi}}e^{(\frac{-1}{2}\frac{(x-u)^2}{\sigma})}$$

Choose:

$$a = \frac{x-u}{\sigma} => dx = \sigma da$$

$$\int f(x)dx = \int \frac{1}{\sigma\sqrt{2\pi}e^{\frac{-a^2}{2}\sigma dx}}$$

$$\int f(x)dx = \int \frac{1}{\sqrt{2\pi}e^{\frac{-a^2}{2}dx}}$$

$$choose : y^2 = \frac{a^2}{2} => y = \frac{a}{\sqrt{2}} => da = \sqrt{2}dy$$

$$\int f(x)dx = \int \frac{1}{\sqrt{2\pi}e^{y^2}}dy$$

Have:

$$\int e^{y^2}dy = \sqrt{\pi}$$

$$\int f(x)dx = \int \frac{1}{2\pi}e^{\frac{-a^2}{2}}dx = 1$$

*Mean

$$E[x] = \int xf(x)dx = \int x.\frac{1}{\sigma\sqrt{2\pi}}e^{(\frac{-1}{2}\frac{(x-u)^2}{\sigma})}$$

Choose:

$$y = x-u => dx = dy$$

$$E[x] = \frac{1}{\sigma\sqrt{2\pi}}\int (y+u)e^{\frac{-1}{2}(\frac{y}{\sigma})^2}$$

$$E[x] = \frac{1}{\sigma\sqrt{2\pi}}\int y.e^{\frac{-1}{2}(\frac{y}{\sigma})^2}dx + \frac{1}{\sigma\sqrt{2\pi}}\int y.e^{\frac{-1}{2}(\frac{u}{\sigma})^2}dx$$

$$y.e^{-y^e} isoldfunction$$

=>

$$\frac{1}{\sigma\sqrt{2\pi}}\int y.e^{\frac{-1}{2}(\frac{y}{\sigma})^2}dx = 0$$

$$E[x] = \frac{1}{\sigma\sqrt{2\pi}} \int u.e^{\frac{-1}{2}(\frac{u}{\sigma})^2} dx$$

$$E[x] = u\frac{1}{\sigma\sqrt{2\pi}} \int e^{\frac{-1}{2}(\frac{u}{\sigma})^2} dx$$

$$=> E(x) = u$$