$$P(\omega_{z}|x) = P(x|\omega_{z}) P(\omega_{z})$$

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$$P(\omega_{z}|x) = P(x|\omega_{z}) P(\omega_{z})$$

$$P(\omega_{z}|x) = 3x^{2} - P(x|\omega_{z}) P(\omega_{z})$$

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$$P(x|x) = P(x|\omega_{z}) P(x|\omega_{z}) P(x|\omega_{z})$$

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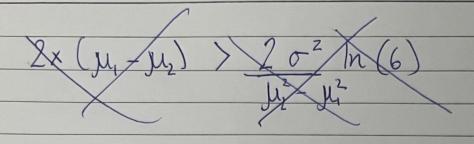
$$P(x|x) = P(x|x) P(x|x) P(x|x)$$

$$P(x|x) = P(x|x)$$

$$P(x|x$$

 Q_{2} $\lambda_{H} = \lambda_{22} = 0$; $\lambda_{1} = \frac{1}{4}$, $\lambda_{12} = \frac{3}{4}$ Based on Decision rule, if w, 121 P(w) p(x |w) > 1,2 P(w2) p(x |w2) $= \frac{1}{4} \times \frac{1}{3} \times N(\mu_{1}, \sigma^{2}) > \frac{3}{4} \times \frac{2}{3} \times N(\mu_{2}, \sigma^{2})$ $\frac{1}{12} \times N(\mu_1, \sigma^2) > \frac{1}{7} \times N(\mu_2, \sigma^2)$ $N(\mu, \sigma^2) > 6 \times N(\mu, \sigma^2)$ $\frac{-N(\mu,\sigma^2)>6}{N(\mu_2,\sigma^2)}$ Take In ie natural log on both sides: $\frac{x^{2}+\mu_{2}^{2}-2x\mu_{2}-x^{2}+2x\mu_{1}}{2\sigma^{2}}+2x\mu_{1} + 2x\mu_{1} + 2x\mu_{1} + 2x\mu_{1}$ = $(y_2^2-y_1^2)+2x(y_1-y_2) > 20^2 ln(6)$

//_



2 1 x (y,-y2) > (y2-y2)+02 ln (6)-2

2

X Dividing both sides by 2.

 $X(\mu_1 - \mu_2)$ $(\mu_1^2 - \mu_2^2) + \sigma^2 \ln(6)$

i. The decision rule is to choose cut, if x > threshold.

Otherwise, if $\mu_1 < \mu_2$:

 $X < (u_1 + u_2) + \sigma^2 \ln(6)$ $2 \qquad u_1 - u_2$

93 a) P(N=Yes D=Yes, W=No) = P(N=Yes B=Yes, W=No)P(B=Yes D=Yes) P(N= Yes | B=NO, W=No)P(B=No D= Yes $= 0.8 \times 0.8 + 0.1 \times 0.2$ = 0.64 + 0.02 = 0.66D= Yes: D, D= No: D, same for all letters P(OIN) = P(NID) P(D) P(B) = P(B|D) P(D) + P(B|D') P(D' 0.16 + 0.08 = 0.24P(B') = 0.76P(N) = P(N|B', W') P(B') P(W') + P(N|B', W) P(B) P(W) + P(N|B, W') P(B) P(W') + P(N|B, W) P(B) P(W) (0.1x0.76 *0.6) + (0.3 x0.76 x0.4) + (0.8x0.24 x0.6) + (0.9x 0.24 × 0.4) 0.0456 + 0.0912 + 0.1152 + 0.08640.3384 P(ND) = P(NB, W') P(B') P(W') + P(NB, W) P(D)
+ P(NB, W') P(D') P(

P(NID) = P(NIB, W) P(B|D) P(W) + P(NIB, W) P(B|D) P(W) + P(NIB', W) P(B'|D) P(W')

 $= (0.9 \times 0.8 \times 0.4) + (0.8 \times 0.8 \times 0.6) + (0.3 \times 0.2 \times 0.4) + (0.4 \times 0.2 \times 0.6)$

= 0.288 + 0.384 + 0.024 + 0.012

= 0.708

 $P(D|N) = 0.708 \times 0.2 = 0.41844$ 0.3384

N(u o2) > 6

8 (- (x-M))

(104-X)-)

(14-x)-(4-x)

lake hi se natural leg on hoth sides

x+115-2x4 - 14-115+2x4, 1 1.(6

(1) 11 50 8 (21-21) (5+(21-31)