

EX 3

$$X \sim N(1, 1)$$

$$W \sim N(0, 1)$$

X, W independent

$$Y = X^2 + W$$

$$1) \quad X=x, Y=y \quad ? w \mid P(X=x, Y=y) = P(X=x, W=w)$$

$$P(X=x, Y=y) = \underbrace{P(X=x)}_{\text{independence}} \cdot P(W=w)$$

$$P(W=y-x^2) \stackrel{(\Rightarrow)}{=} P(W=w) \quad (\Leftrightarrow) \quad w = y - x^2$$