

$$\Rightarrow P(Y \leq y | X=u) = \frac{d}{dx} \bigg|_u P(Y \leq y, X \leq x) = \frac{p(x,y)}{p_X(u)}$$



diff again to get  $p_{Y|X}$   
wrt y

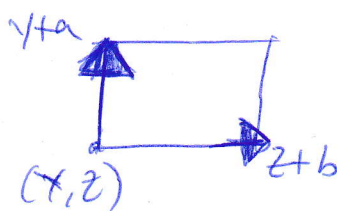
$p_X(u)$

$$P_i = F_z(y_i)$$

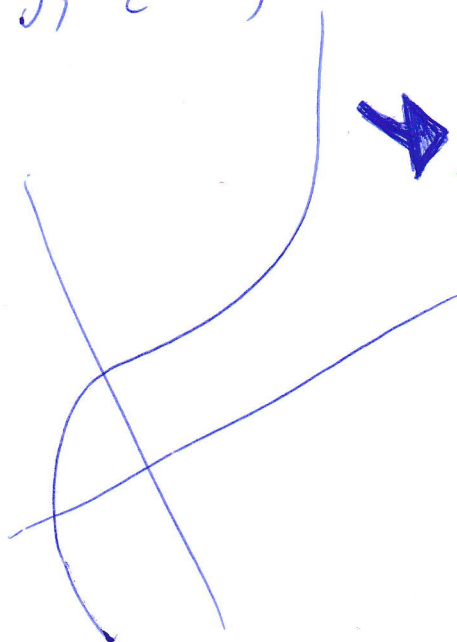
$$P(Y \in D | P_i = p_i)$$

$$= \frac{d}{dp_i} \bigg|_{p_i} P(P \in D, P_i \leq p_i)$$

$$p(p_i)$$



$$p(y, z) = P(Y \leq y, Z \leq z)$$



$$\{z \mapsto f(z) \in \mathbb{R}^2\}$$

$$z \mapsto f: \mathbb{R} \rightarrow \mathbb{R}^2 \text{ gives the curve}$$

$$P(f(z) \in D) \\ = P(z \in f^{-1}(D))$$