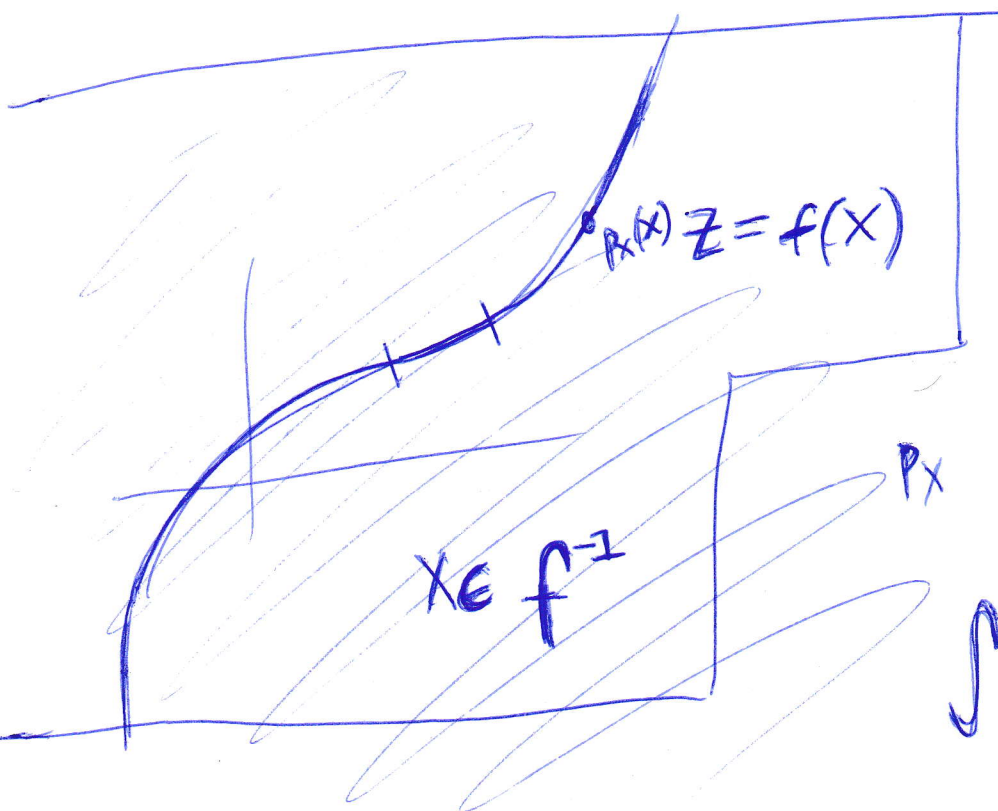


$$\lim_a \frac{P(Y \leq y+a, Z \leq z) - P(Y \leq y, Z \leq z)}{a}$$

) would add
not

$$\lim_a P(Y \in (y, y+a], Z \leq z)$$

Then next deriv is: $\lim_a \lim_b P(Y \in (y, y+a], Z \leq z+b) - \lim_a P(Y \in (y, y+a], Z \leq z)$



\mathbb{R}^{n-1}

$$P(Y \in D | X \in A) = \frac{P(Y \in D, X \in A)}{P(X \in A)} = \frac{\int_A \int_{\mathbb{R}} P_{X,Y}(x,y) dx dy}{\int_A P_X(x) dx}$$