

Example 1.7  $f_X(x) = k(2-x^2)$  (on  $(-1, 1)$ )

Find  $k$ :

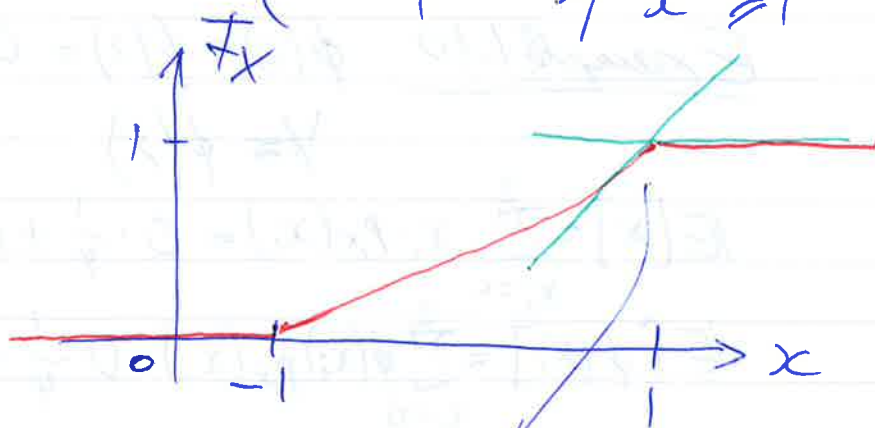
$$1 = \int_{-\infty}^{\infty} f_X(x) dx = \int_{-1}^1 k(2-x^2) dx = \frac{10}{3} k \Rightarrow k = \frac{3}{10}$$

i.e.  $f(x) = 0$   
for all  $x \notin (-1, 1)$

Similarly  $F_X(y) = \int_{-\infty}^y f_X(x) dx$

yields

$$F_X(x) = \begin{cases} 0 & \text{if } x \leq -1 \\ -\frac{1}{10}x^3 + \frac{3}{5}x + \frac{1}{2} & \text{if } -1 < x < 1 \\ 1 & \text{if } x \geq 1 \end{cases}$$



slopes different, therefore  
not differentiable.