Discussion
Section 6

\[ f_{x_1}(x) = \begin{cases} \frac{c_1 (x+10)^2}{9000} & \text{for } -10 \leq x \leq 20 \\ 0 & \text{else} \end{cases} \]

\[ F_{x_1}(x) = \begin{cases} 0 & \text{for } x \leq -10 \\ \frac{(x+10)^3}{27000} & \text{for } -10 \leq x \leq 20 \\ 1 & \text{for } x \geq 20 \end{cases} \]

\[ x \sim F_{x_1} \]

\[ F_{x_1}(x) \sim U(0,1) \]

\[ x_1 = \frac{(x_1 + 10)^3}{27000} \]

\[ x_1 = F_{x_1}^{-1}(p) = 30 p^{\frac{1}{3}} - 10 \]
\( f_{X,Y}(x,y) = \begin{cases} \frac{21x^2y}{4} & \text{for } 0 \leq x^2+y^2 \leq 1 \\ 0 & \text{else} \end{cases} \)
\[ f(x) = 3e^{-3y} x^y \]

\[ f_{Y|X}(y | x = 0) = 3e^{-3y} \]

\[ f_{Y|X}(y | x = 1) = \frac{3e^{-3y}}{(2^3)^y} \text{ for } y > \frac{1}{3} \]

\[ f_{Y|X}(y | x = -2) = \frac{3e^{-3y}}{x^{\frac{1}{3}}} \]

\[ f_{X}(x) = \begin{cases} 
 0 & \text{for } x \leq 0 \\
 (\frac{2}{3})^x \cdot \frac{1}{3} & \text{for } x > 0
\end{cases} \]