

$$F_X(x) = \begin{cases} \frac{x+1}{3} & x \in (-1, 2), \\ 0 & x \leq -1, \\ 1 & x \geq 2. \end{cases}$$

Name:

Quiz 02, Attempt 1

Find the cdf of $Y = X^2$ if $X \sim \text{UNIF}(-1, 2)$

$$P(X^2 \leq y) = \mathbb{1}_{\{y > 0\}} P(-\sqrt{y} \leq X \leq \sqrt{y})$$

$$= \mathbb{1}_{\{y > 0\}} (F_X(\sqrt{y}) - F_X(-\sqrt{y}))$$

$$= \begin{cases} \left(\frac{\sqrt{y}+1}{3} - \frac{-\sqrt{y}+1}{3} \right) & y \in (0, 1), \\ \frac{\sqrt{y}+1}{3} & y \in [1, 4), \\ 0 & y \leq 0 \\ 1 & y \geq 4 \end{cases}$$

$$= \begin{cases} \frac{2\sqrt{y}}{3} & y \in (0, 1), \\ \frac{\sqrt{y}+1}{3} & y \in [1, 4), \\ 0 & y \leq 0, \\ 1 & y \geq 4. \end{cases}$$