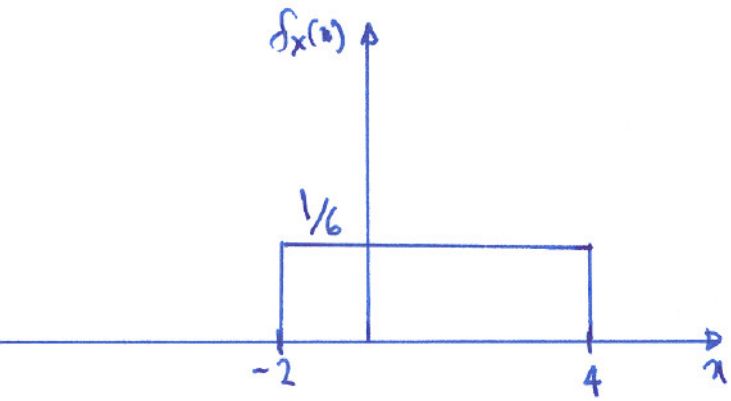
KING FAHD UNIVERSITY OF PETROLEUM AND MINERALS
ELECTRICAL ENGINEERING DEPARTMENT
EE 315
Quiz #3

Name: Solution
ID#: _____
Section No: _____

Q1: Let X be a uniform random variable in the interval [-2, 4].

1. Find the cdf for the random variable X.
2. Find the following probabilities:
   - $P[|X| \geq \frac{1}{4}]$
   - $P[X=3]$

1- The cdf of X:



* If $x < -2$, $F_X(x) = 0$
* If $x \geq 4$, $F_X(x) = 1$
* If $-2 \leq x < 4$

$$F_X(x) = \int_{-2}^{x} f_X(\varepsilon)\, d\varepsilon$$
$$= \frac{1}{6}\int_{-2}^{x} d\varepsilon$$
$$= \frac{x+2}{6}$$

$$F_X(x) = \begin{cases} 0, & x < -2 \\ \frac{x+2}{6}, & -2 \leq x < 4 \\ 1, & x \geq 4 \end{cases}$$

2- The probabilities:

- $P[|x| \geq \frac{1}{4}] = 1 - P[\frac{1}{4} < x < \frac{1}{4}]$
$$= 1 - [F_X(\tfrac{1}{4}) - F_X(-\tfrac{1}{4})]$$
$$= \frac{11}{12}$$

- $P[X=3] = 0$ Since $F_X(x)$ is continuous at $x=3$.