

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 $[-4, 4]$.

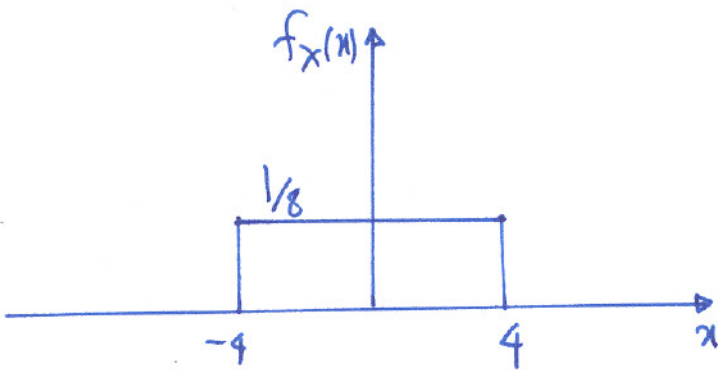
1. Find the cdf for the random variable X .

2. Find the following probabilities:

• $P[|X-2| < 2]$

• $P[X > 3]$

1. The cdf of X :



* If $x < -4$, $F_X(x) = 0$

* If $x \geq 4$, $F_X(x) = 1$

* If $-4 < x < 4$

$$\begin{aligned} F_X(x) &= \int_{-4}^x f_X(\epsilon) d\epsilon \\ &= \frac{1}{8} \int_{-4}^x d\epsilon \\ &= \frac{x+4}{8} \end{aligned}$$

$$F_X(x) = \begin{cases} 0, & x < -4 \\ \frac{x+4}{8}, & -4 \leq x < 4 \\ 1, & x \geq 4 \end{cases}$$

2. The probabilities:

$$\begin{aligned} \bullet P[|X-2| < 2] &= P[0 < X < 4] \\ &= F_X(4) - F_X(0) \\ &= 1 - \frac{1}{2} \\ &= \frac{1}{2} \end{aligned}$$

$$\begin{aligned} \bullet P[X > 3] &= 1 - P[X \leq 3] \\ &= 1 - F_X(3) \\ &= 1 - \frac{7}{8} \\ &= \frac{1}{8} \end{aligned}$$