

4. [7 points] Some of Flora's friends are hurt while the intruders are building the settlement. Flora and Nile are trying their best to heal them. Suppose  $p(x)$  is the probability density function for the number of weeks,  $x$ , it takes for everyone to recover after intruders appear.

$$p(x) = \begin{cases} c & \text{if } 0 < x \leq 1, \\ 2c & \text{if } 1 < x \leq 3, \\ 0 & \text{else.} \end{cases}$$

- a. [2 points] Find  $c$ .
- b. [5 points] Let  $W(x)$  be the cumulative distribution function for  $p(x)$ . Showing your work, give a piece-wise defined formula for  $W(x)$  in the form given below.

$$W(x) = \begin{cases} \underline{\hspace{2cm}} & \text{if } x \leq 0, \\ \underline{\hspace{2cm}} & \text{if } 0 < x \leq 1, \\ \underline{\hspace{2cm}} & \text{if } 1 < x \leq 3, \\ \underline{\hspace{2cm}} & \text{if } x > 3. \end{cases}$$

5. [12 points] Another function  $f(t)$  given by

$$f(t) = \begin{cases} \frac{t}{6} & \text{if } 0 < t \leq 2, \\ \frac{1}{3} & \text{if } 2 < t \leq 4, \\ 0 & \text{else.} \end{cases}$$

is the probability density function for the number of months  $t$  that it will take the intruders to build the settlement.

- a. [3 points] Find the probability that it will take the intruders between 1 and 2 months to build the settlement.
- b. [5 points] Find the mean number of months it will take the intruders to build the settlement.
- c. [4 points] Find the median number of months it will take the intruders to build the settlement.