

1. Let  $Y$  be a continuous random variable with cumulative distribution function (cdf) given

$$\text{by } F(y) = \begin{cases} 0, & y \leq 0 \\ \frac{y^2}{8}, & 0 < y < 2 \\ \frac{y}{4}, & 2 \leq y < 4 \\ 1, & y \geq 4 \end{cases}$$

a. (9 points) Use  $F(y)$  to evaluate the following probabilities:

(i)  $P(Y \leq 1)$

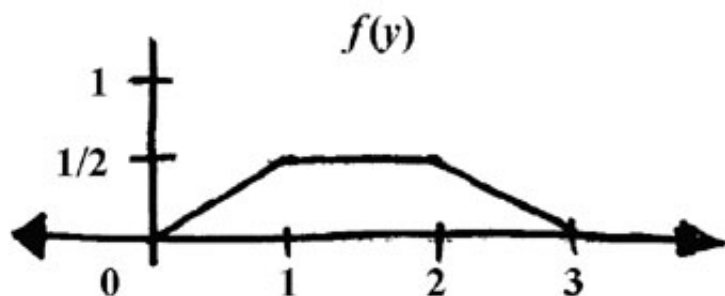
(ii)  $P(1 \leq Y \leq 3)$

(iii)  $P(Y > 2.4)$

b. (4 points) Find the density function (pdf),  $f(y)$ , of  $Y$ .

2. Let  $Y$  be a continuous random variable whose density function,  $f(y)$ , and the graph of  $f(y)$  are given below.

$$f(y) = \begin{cases} \frac{y}{2}, & 0 < y \leq 1 \\ \frac{1}{2}, & 1 < y \leq 2 \\ \frac{3-y}{2}, & 2 < y \leq 3 \\ 0, & \text{elsewhere} \end{cases}$$



- (3 points) Shade the region in the graph of the density function whose area is  $P\left(\frac{1}{2} \leq Y \leq \frac{3}{2}\right)$ .
- (4 points) Evaluate  $E(Y)$ .