

**Question**

The cdf of a continuous r.v.  $Y$  is given by

$$F(y) = \begin{cases} 0, & \text{for } y < 0, \\ 2\frac{y^2}{\theta}, & \text{for } 0 \leq y \leq \frac{\theta}{2}, \\ 1 - \frac{2(\theta-y)^2}{\theta^2}, & \text{for } \frac{\theta}{2} \leq y \leq \theta, \\ 1, & \text{for } y > \theta, \end{cases}$$

where  $\theta$  is a positive constant. Find the pdf of  $Y$ , and sketch the cdf and the pdf of  $Y$ .

**Answer**

From the relationship between pdf and cdf

$$f(y) = \frac{dF(y)}{dy} = \begin{cases} 0, & y < 0 \\ \frac{4y}{\theta^2}, & 0 \leq y \leq \frac{\theta}{2} \\ \frac{4(\theta-y)}{\theta^2}, & \frac{\theta}{2} \leq y \leq \theta \\ 0, & \theta < y \end{cases}$$