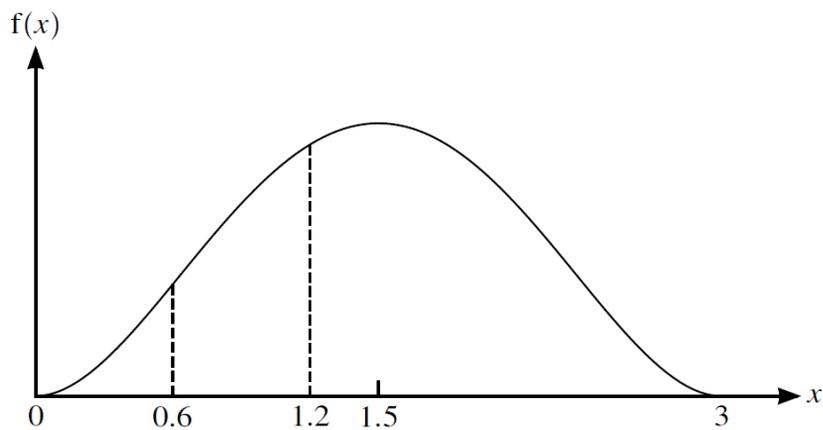


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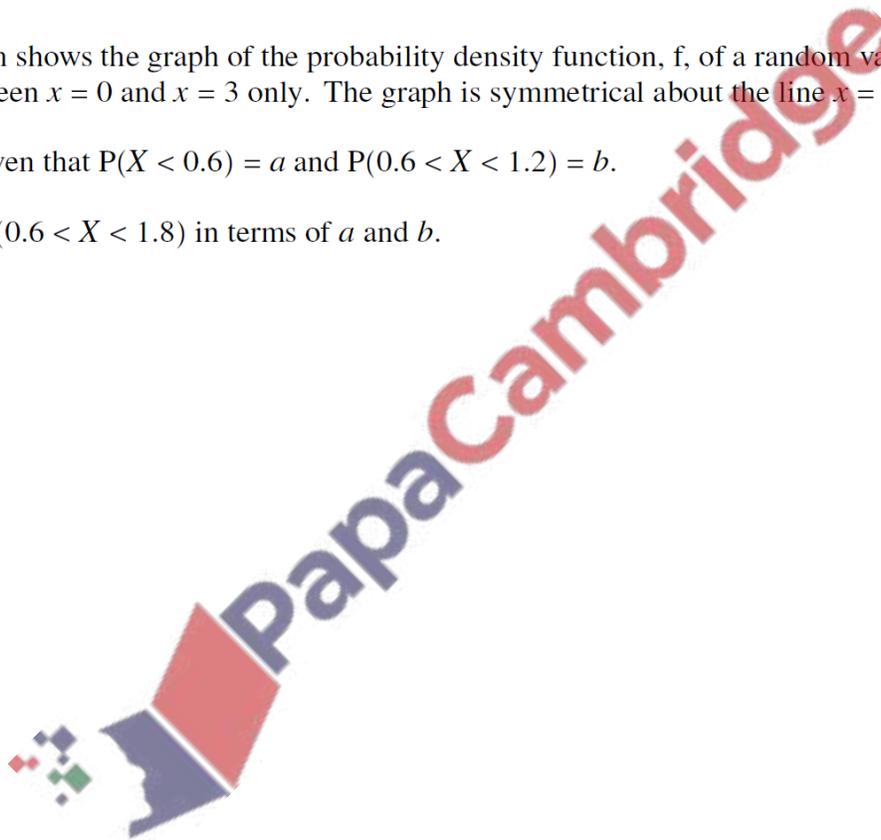


The diagram shows the graph of the probability density function,  $f$ , of a random variable  $X$  that takes values between  $x = 0$  and  $x = 3$  only. The graph is symmetrical about the line  $x = 1.5$ .

(a) It is given that  $P(X < 0.6) = a$  and  $P(0.6 < X < 1.2) = b$ .

Find  $P(0.6 < X < 1.8)$  in terms of  $a$  and  $b$ .

[2]



(b) It is now given that the equation of the probability density function of  $X$  is

$$f(x) = \begin{cases} kx^2(3-x)^2 & 0 \leq x \leq 3, \\ 0 & \text{otherwise,} \end{cases}$$

where  $k$  is a constant.

(i) Show that  $k = \frac{10}{81}$ .

[3]

(ii) Find  $\text{Var}(X)$ .

[3]

