Functions of Random Variables:

Example 1.

Suppose X has density function

$$f(x) = \begin{cases} 4x^3 & , \ 0 \le x \le 1 \\ 0 & , \ \text{otherwise} \end{cases}$$

Find the density function for the random variable $Y = X^2$.

Example 2.

Suppose X has density function

$$f(x) = \begin{cases} 3(1-x)^2 & , \ 0 < x < 1 \\ 0 & , \ \text{otherwise} \end{cases}$$

Find the density function for the random variable
$Y = (1 - X)^3$

Example 3.

Suppose X is an exponential random variable with parameter $\lambda > 0$.

Find the density function for the random variable $Y = X^2$.