Probability and Statistics
Hints/Solutions to Assignment No. 4

1. The range of Y is 0 to 4. For $0 \le y \le 1$, there are two inverse images $\sqrt{y}$ and $-\sqrt{y}$. For $1 < y < 4$, there is one inverse image $\sqrt{y}$. Using these we get the density of Y as

$$f_Y(y) = \frac{2}{9} y^{-1/2}, \qquad 0 \le y \le 1,$$
$$= \frac{1}{9}(1 + y^{-1/2}), \quad 1 < y < 4,$$
$$= 0, \qquad \text{elsewhere.}$$

2. The argument is same as in Problem 1.
3. Here also Y is two- to-one function of X in the given domain.

Problem 4 to 8 are straightforward..

9. The density of Y is obtained as

$$f_Y(y) = \frac{1}{2}, \qquad 0 \le y \le 1,$$
$$= \frac{3-y}{4}, \quad 1 < y \le 3,$$
$$= 0, \qquad \text{elsewhere.}$$