2. X has p.d.f $f_X(x) = \begin{cases} 2x, & 0<x<1 \\ 0, & \text{otherwise.} \end{cases}$

a) find the p.d.f. of $Y = \sqrt{X}$.

b) " " " " " $W = \frac{1}{X+1}$

a) $F_Y(y) = P\{\sqrt{X} \le y\} = P\{X \le y^2\}$.

$= F_X(y^2) = \begin{cases} 0, & y \le 0. \\ y^4, & 0<y<1 \\ 1, & y \ge 1 \end{cases}$ $y > 0.$

3. X has p.d.f.

$f_X(x) = \frac{24}{x^4}, \quad x > 2$

$Y = \frac{1}{X^2}$

$P\left(\frac{1}{X^2} \le y\right) = P\left(x \le -\frac{1}{\sqrt{y}} \text{ and } x \ge \frac{1}{\sqrt{y}}\right) \quad y>0$

$= 1 - F_X\left(\frac{1}{\sqrt{y}}\right) + F_X\left(-\frac{1}{\sqrt{y}}\right)$