2.1 [a] Random variable $Y = g(X) = X^3$ is (increasingly) monotone in the domain $\mathcal{X} = \{x : 0 \leq x \leq 1\}$. As $g^{-1}(y) = y^{1/3}$, then

$$f_Y(y) = f_X(g^{-1}(y)) \cdot \left| \frac{d}{dy} g^{-1}(y) \right| = 42 \cdot y^{5/3}(1 - y^{1/3})(\frac{1}{3} y^{-2/3})$$