5. K - szukana zm. losowa. Skoro k - obj. sześcianu o krawędzi X, to $K = X^3$, więc

$$F_K(t) = P(K \le t) = P(X^3 \le t) = P(X \le \sqrt[3]{t}) = F_X(\sqrt[3]{t})$$

$$f_K(t) = (F_K(t))' = (F_X(\sqrt[3]{t}))' = \frac{1}{3} t^{-\frac{2}{3}} F_X'(\sqrt[3]{t}) = \frac{1}{3\sqrt[3]{t^2}} f_X(\sqrt[3]{t}) =$$

$$= \begin{cases} 0 & t < 0 \\ \frac{1}{3\sqrt[3]{t}\, a} & 0 \le t \le a^3 \\ 0 & t > a^3 \end{cases}$$

6. $Y \sim U([0, a])$

$$F_X(t) = P(X \le t) = P(\pi Y^2 \le t) = P\left(Y^2 \le \frac{t}{\pi}\right) = P\left(-\sqrt{\frac{t}{\pi}} \le Y \le \sqrt{\frac{t}{\pi}}\right) = F_Y\left(\sqrt{\frac{t}{\pi}}\right) - F_Y\left(-\sqrt{\frac{t}{\pi}}\right)$$

$$f_X(t) = (F_X(t))' = \frac{1}{2\pi\sqrt{t}}\left(F_Y'\left(\sqrt{\frac{t}{\pi}}\right)\right) + \frac{1}{2\pi\sqrt{t}} F_Y'\left(-\sqrt{\frac{t}{\pi}}\right) = \frac{1}{2\pi\sqrt{t}}\left(f_Y\left(\sqrt{\frac{t}{\pi}}\right) + f_Y\left(-\sqrt{\frac{t}{\pi}}\right)\right) =$$

$$= \begin{cases} 0 & t < 0 \\ \frac{1}{2\pi\sqrt{t}} & 0 \le t < \pi a^2 \\ 0 & t > \pi a^2 \end{cases}$$