(a) Find the third-order Taylor polynomial $P_3(x)$ for the function $f(x) = \sqrt[3]{x}$ based at $x_0 = 1$. Use your result to approximate the value $\sqrt[3]{2}$.

(b) Determine whether the following improper integral converges. If it does, find its value.

$$\int_0^1 \frac{dx}{(x - 1)^{2/3}}$$