4. Let $y = x^{1/6}$. Then we have

$$\begin{aligned}\lim_{x\to 64}\frac{x^{1/3}-4}{x^{1/2}-8} &= \lim_{y\to 2}\frac{y^2-4}{y^3-8}\\ &= \lim_{y\to 2}\frac{(y-2)(y+2)}{(y-2)(y^2+2y+4)}\\ &= \lim_{y\to 2}\frac{y+2}{y^2+2y+4} = \frac{4}{12} = \frac{1}{3}.\end{aligned}$$