We know $f(x) \times f^{-1}(x) = 1$

$$\lim_{x \to \infty} \frac{\frac{f(8x) \times f^{-1}(8x)}{f(8x)} - \frac{f(x) \times f^{-1}(x)}{f(x)}}{x^{1/3}}$$

[multiply & divide by $f(8x)$ & $f(x)$]

$$\Rightarrow \lim_{x \to \infty} \frac{\frac{1}{f(8x)} - \frac{1}{f(x)}}{x^{\frac{1}{3}}} = \lim_{x \to \infty} \frac{1}{f(8x) \times x^{1/3}} - \frac{1}{f(x)\, x^{1/3}}$$

$$\Rightarrow \lim_{x \to \infty} \frac{1}{(8^4 x^3 + 24x)\, x^{1/3}} - \frac{1}{(8x^3 + 3x)\, x^{1/3}}$$

$$\Rightarrow \lim_{x \to \infty} \frac{1}{8^4 x^{10/3} + 24 x^{4/3}} - \frac{1}{8x^{10/3} + 3x^{4/3}}$$

$$\Rightarrow \lim_{x \to \infty} \frac{8x^{10/3} + 3x^{4/3} - 8^4 x^{10/3} - 24x^{4/3}}{(8^4 x^{10/3} + 24x^{4/3})(8x^{10/3} + 3x^{4/3})}$$

$$\Rightarrow \lim_{x \to \infty} \frac{x^{10/3}(8 - 8^4) + x^{4/3}(3 - 24)}{8^5 x^{20/3} + 3 \times 8^4 x^{14/3} + 24 \cdot 8\, x^{14/3} + 24 \times 3 \times x^{8/3}}$$

$$\Rightarrow \lim_{x \to \infty} \frac{-4088\, x^{10/3} - 21x^{4/3}}{8^5 x^{20/3} + x^{14/3}(3 \cdot 8^4 + 24 \cdot 8) + 24 \cdot 3 x^{8/3}}$$

$\left(\frac{\infty}{\infty}\right)$ form use l'hopital rule