## RULES

$\frac{d}{dx}(x^n) = nx^{n-1}$

$\frac{d}{dx}(cx) = c$

$\frac{d}{dx}(c) = 0$

$\frac{d}{dx}(e^x) = e^x$

$\frac{d}{dx}(\sin x) = \cos x$

$\frac{d}{dx}(\cos x) = -\sin x$

1. $f(x) = \sqrt[3]{x}$

$= x^{\frac{1}{3}}$

$f'(x) = \frac{1}{3}x^{\frac{1}{3}-1}$

$= \frac{1}{3}x^{-\frac{2}{3}}$

$= \boxed{\frac{1}{3x^{2/3}}}$

2. $f(x) = 5x^3 - 7x^2 + 4x - 1$

$f'(x) = 5 \cdot 3x^{3-1} - 7 \cdot 2x^{2-1} + 4 + 0$

$= \boxed{15x^2 - 14x + 4}$

3. $f(x) = \frac{1}{5}e^x + 4\cos x$

$f'(x) = \frac{1}{5}e^x + 4(-\sin x)$

$= \boxed{\frac{1}{5}e^x - 4\sin x}$

4. $f(x) = \frac{2}{5x^3}$

$= \frac{2x^{-3}}{5}$

$= \frac{2}{5}x^{-3}$

$f'(x) = \frac{2}{5}(-3)x^{-3-1}$

$= -\frac{6}{5}x^{-4}$

$= \boxed{\frac{-6}{5x^4}}$

5. $f(x) = \frac{\sqrt[5]{x}}{x^2}$

$= \frac{x^{\frac{1}{5}}}{x^2}$

$= x^{\frac{1}{5}-2}$

$= x^{-\frac{9}{5}}$

$f'(x) = -\frac{9}{5}x^{-\frac{9}{5}-1}$

$\rightarrow f'(x) = -\frac{9}{5}x^{-\frac{14}{5}}$

$= \boxed{\frac{-9}{5x^{14/5}}}$