Your grade is based on the process as well as the final result. Show all your steps clearly so you will be eligible for the most partial credit. You may use a calculator, but no notes, books, or other students. Good luck!

1.) (5 pts.) Rewrite \( f(x) = \sqrt{x^3} - \frac{1}{x^4} \) using exponents, and use this rewritten form to compute \( f'(x) \).

\[
\begin{align*}
\frac{d}{dx}(\sqrt{x^3}) &= \frac{3}{2} x^{\frac{3}{2}} \\
\frac{d}{dx}\left(-\frac{1}{x^4}\right) &= -4x^{-5}
\end{align*}
\]

\[
f'(x) = \frac{3}{2} x^{\frac{3}{2}} - 4x^{-5}
\]

2.) (5 pts.) Let \( f(x) = x^2 \). Carefully explain TWO (your choice) of the steps in the following evaluation of \( f'(3) \):

(a) \[ f'(3) = \lim_{h \to 0} \frac{f(3+h) - f(3)}{h} \]

(b) \[ = \lim_{h \to 0} \frac{(3+h)^2 - 9}{h} \]

(c) \[ = \lim_{h \to 0} \frac{6h + h^2}{h} \]

(d) \[ = \lim_{h \to 0} (6 + h) \]

(e) \[ = 6 \]

(a) Setting up, using limit definition of derivative

(b) Plugging in for \( f(3+h) \) and \( f(3) \), using \( f(x) = x^2 \)

(c) Simplifying numerator: multiply out and cancel

(d) Factor an \( h \) out from top, and cancel with denominator

(e) Find the limit: let \( h \to 0 \).