Math 123  Homework #2

Instructions:
a. Compute the requested derivatives – but don’t bother simplifying
b. Work alone
c. Feel free to check your answer with any technology (e.g. calculator), but you must show your work to receive credit

1. If \( f(x) = 3x^4 + 5x^3 - 2x + 3 \), then find \( f'(x) \).

\[
f'(x) = 12x^3 + 15x^2 - 2
\]

2. If \( g(x) = (x^2 + 4x + 5)\sqrt{6x^2 + 5x + 2} \), then find \( g'(x) \).

\[
g'(x) = (2x + 4)\sqrt{6x^2 + 5x + 2} + (x^2 + 4x + 5) \frac{1}{2} (6x^2 + 5x + 2)^{-\frac{1}{2}} (12x + 5)
\]

3. If \( h(x) = \frac{\sin x}{\sqrt{x^3 + x^2 + 1}} \), then find \( h'(x) \).

\[
h'(x) = \left[ (\cos x) \sqrt{x^3 + x^2 + 1} - 5\sin x \frac{1}{2} (x^3 + x^2 + 1)^{-\frac{1}{2}} \right] \frac{1}{x^3 + x^2 + 1}
\]