Additional Homework Problems

Find the derivatives of the following functions. Check your work using Wolfram Alpha. Don't forget that Wolfram Alpha may give a correct answer, even though it is written in a different form than what you have. Also, don't forget to add extra parentheses if necessary when typing in a function.

1. $h(x) = x^2(x - \sqrt{x})$
2. $h(x) = \sqrt[3]{4 - x^3}$
3. $h(x) = \dfrac{x^{-7}}{x^{-4}}$
4. $h(x) = \sin^2(x) + \cos^2(x)$
5. $h(x) = (1 + 2x^2)^{-5}$
6. $h(x) = \cos(x^2 + x)$
7. $h(x) = \dfrac{x^2 - 1}{x^2 + 1}$
8. $h(x) = \sqrt{1 - \sin^2(x)}$

Hints:

1. First multiply out, then use the power rule.
2. Use the Chain Rule, with $f(x) = x^{1/3}$ and $g(x) = 4 - x^3$.
3. Simplify first using rules of exponents.
4. Use the Chain Rule twice; $f(x) = x^2$ both times.
5. Use the Chain Rule, with $f(x) = x^{-5}$ and $g(x) = 1 + 2x^2$.
6. Use the Chain Rule, using $f(x) = \cos(x)$ and $g(x) = x^2 + x$.
7. Use the Quotient Rule. Be sure to simplify the numerator, as there will be some cancellation.
8. Use the Chain Rule, with $f(x) = x^{1/2}$ and $g(x) = 1 - \sin^2(x)$. Note: you can use the derivative of $\sin^2(x)$ you worked out in Problem 4.