Explicit Differentiation Practice

For each of the functions below find their respective derivatives.

1. Review: $\sqrt{x^3-5}$ $(x^3-1)^{100}$ e^{3x^2-x}

2. Notice that we can use the product, quotient, and chain rule together in the same problem. The trick is to use the notation to *guide* you. Find the derivative of the following functions:

   $\sin^5(x)\sqrt{x^3-5}$

3. The chain rule can also be used in conjunction with itself. That is, we can use the chain rule to work on a derivative, but when trying to find the "inside function", we may need to use the chain rule *again*.

   $\sin^2(x^3)$

Implicit Differentiation Practice

1. Assume that y is a function of x. Find $\frac{dy}{dx}$ in the following:

   (a) $x^3 + y^3 = 8$

   (b) $y = x^2y^3 + x^3y^2$

   (c) $y = \sin(2x + 5y)$

   (d) $e^{xy} = e^{3x} - e^{4y}$