1. Find the derivative of each function and verify by graphing both on the same set of axes

   (a) $f(x) = \sqrt{x} + 3x - x^3 + 2$

   (b) $f(x) = \dfrac{1}{x^2} - x^4$

   (c) $f(x) = \dfrac{1}{\sqrt[3]{x}} + x$

   (d) $f(x) = 3\sin(x) + e^x$

   (e) $f(x) = \ln(x) - 2\cos(x)$

2. Let $g(x) = x^5 - 4x^3 + x^2 + 3x$
   Find $g'(x)$ and $g''(x)$ and verify by graphing all three on the same set of axes

3. Let $f(x) = 3x^2 + x - 5$. Find a function $F(x)$ whose derivative is equal to $f(x)$ and verify by graphing both functions on the same set of axes.

Why is $\frac{d}{dx}\ln(x) = \frac{1}{x}$?

(Details in Echo360 video)