1. Find the derivatives of the following functions. Remember that you can verify your answers by graphing.

   (a) $f(x) = x \ln(x) - x$

   (b) $f(x) = \dfrac{\tan(x)}{3e^x}$

   (c) $f(x) = \sec(x)$ Remember that $\sec(x) = \dfrac{1}{\cos(x)}$

   (d) $f(x) = e^x \sin(x)(x^2 + 1)$

   (e) $f(x) = \dfrac{x \ln(x)}{\cos(x)}$

2. Suppose $y = 3x + 2$ is the line tangent to the graph of $y = f(x)$ at $x = 1$ and that $h(x) = (3x^2 - \ln(x))f(x)$. Find $h'(1)$.

3. An open box is made by cutting squares of side w inches from the four corners of a sheet of cardboard that is 24 inches by 32 inches and then folding up the sides. Find the value of w that will maximize the volume of the box.