1. Let $f(x) = \cos(x^2) - x \sin(x)$
   1.1 Find $f'(x)$ by hand.
   1.2 Verify your answer by using Maple to graph $y = f(x)$ and $y = f'(x)$ on the same set of axes on the interval $[-3, 3]$.
   1.3 Also verify your answer by using Maple to differentiate $f(x)$.

2. Repeat Problem 1 with $g(x) = \ln\left(x^2 + 5\right) + \dfrac{x^3 - 7x}{x^4 + 11}$

3. Find the maximum and minimum values of

$$h(x) = e^x - \frac{x^2}{20}$$

   on the interval $[-3..2]$.

4. Repeat Problem 3 with $j(x) = x^{21} - 5x + 3\tan\left(x^2\right)$ on the interval $[-1.15, 1]$.