1. Find a quadratic approximation for each of the following:

   (a) $e^{3x} + x^2$ at $x = 0$

   (b) $\frac{\sin(5x)}{2}$ at $x = 0$

   (c) $x^3 + 2x - 1$ at $x = 1$

2. Find power series for the following:

(a) e^{3x} at $x = 0$

(b) $\sin(2x)$ at $x = 0$

(c) $\cos(x) - \sin(x)$ at $x = \pi$

(d) A function whose n-th derivative at $x = 2$ is $f^{(n)}(2) = \frac{(-1)^n}{n^2}$.

3. Using a quartic polynomial at $x = 1$, approximate $\ln(2)$.

   (The actual value is $\ln(2) = .693147\ldots$)