1. Compute the derivatives of the following expressions with respect to x:

   (a) $\dfrac{x}{1-x}$

   (b) $3x - x^8\cos(x)$

   (c) $\dfrac{\sin(2\pi x)}{5} + 1$

   (d) $-2\cos(4x)\sin(x)$

   (e) $\cos(x^3 - 2)$

2. Find the following antiderivatives.

   (a) $\displaystyle\int 3x^5\sqrt{x^6 - 2}\,dx$

   (b) $\displaystyle\int 1500t(5t^2 + 4)^{99}\,dt$

   (c) $\displaystyle\int 1500t(5t + 4)^{99}\,dt$

   (d) $\displaystyle\int 18x\cos(3x + 4)\,dx$

   (e) $\displaystyle\int \frac{x^2(2x^3 + 5)^{12} - 4}{7}\,dx$