1. Compute the derivatives.

   (a) $y = \tan^3 x + \tan(x^3)$

   (b) $y = \sqrt{4 - 3\cos x}$

   (c) $y = \sin(\sqrt{\sin\theta + 1})$

   (d) $y = \dfrac{\cos(1+x)}{1+\cos x}$

   (e) $y = \sqrt{\cos 2x + \sin 4x}$

   (f) $y = \sec(\sqrt{t^2 - 9})$

2. The displacement of a particle on a vibrating string is given by the equation $s(t) = 10 + \frac{1}{4}\sin(10\pi t)$ where s is measured in centimeters and t in seconds. Find the velocity of the particle after t seconds.

3. Calculate the derivative of the sine function as a function of degrees rather than radians.

4. Imagine a sphere whose radius r increases at a rate of 3 cm/s. At what rate is the volume V of the sphere increasing when $r = 10$ cm?

5. Find an equation of the tangent line to the curve $y = 2/(1 + e^{-x})$ at the point $(0, 1)$.

6. Find all points on the graph of the function $f(x) = 2\sin x + \sin^2 x$ at which the tangent line is horizontal.

7. At what point on the curve $y = \sqrt{1 + 2x}$ is the tangent line perpendicular to the line $6x + 2y = 1$?

8. If $g(x) = \sqrt{f(x)}$, where the graph of f is shown, evaluate $g'(3)$.