1. Find \( \frac{dy}{dx} \) using implicit differentiation
   
   (a) \( \sin(xy) = x + y \)
   
   (b) \( \cos(y^2) + x = e^y \)
   
   (c) \( y = \frac{x+1}{y-1} \)

2. Find the slope at the given point.
   
   (a) \( \sqrt[3]{x} + \sqrt[4]{y^4} = 2; (1,1) \)
   
   (b) \( (x+y)^{2/3} = y; (4,4) \)

3. Find the equations of each tangent line for \( x = 1 \) for the following curve
   
   \( x + y^3 - y = 1 \)

4. (a) At what point does \( x + y^3 - y = 1 \) have a vertical tangent line? (b) Does it have any horizontal tangent lines?

5. If you slice a sphere the small piece is a spherical cap. Its volume is given by
   
   \[ V = \frac{1}{3} \pi h^2 (3r - h) \]

   where \( r \) is the radius of the sphere and \( h \) is the cap thickness.

   (a) Find \( \frac{dr}{dh} \) for a spherical cap of volume \( \frac{5\pi}{3} \).
   
   (b) Evaluate the derivative \( \frac{dr}{dh} \) when \( r = 2 \) and \( h = 1 \).