

1. Find dy/dx by implicit differentiation.

$$y \cos x = x^2 + y^2$$

2. Consider the equation

$$\sqrt{x} + \sqrt{y} = 1 \tag{*}$$

(a) Find y' by implicit differentiation.

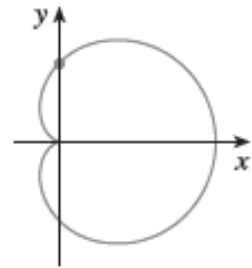
(b) Solve (*) explicitly for y and differentiate to get y' in terms of x .

(c) Check that your solutions in (a) and (b) are consistent.

3. (A §3.4 question.) For what values of r does the function $y = e^{rt}$ satisfy the differential equation $y'' - 4y' + y = 0$?

4. For the “cardioid” shown, with the equation and point given, find an equation of the tangent line.

$$x^2 + y^2 = (2x^2 + 2y^2 - x)^2, \quad \left(0, \frac{1}{2}\right)$$



5. If $xy + e^y = e$, find the value of y'' at the point where $x = 0$.