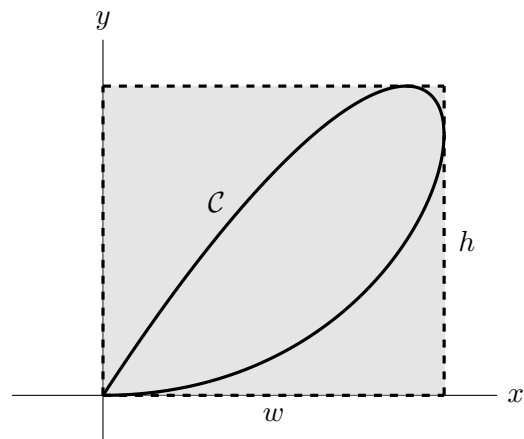


8. [8 points]

Let  $\mathcal{C}$  be the curve implicitly defined by the equation

$$x^3 - 3xy + y^2 = 0.$$

The portion of the curve  $\mathcal{C}$  that lies in the first quadrant is pictured to the right, not necessarily to scale, along with the smallest possible rectangle that contains it and has sides on the coordinate axes. This rectangle is shaded, and has side lengths  $w$  and  $h$ .



a. [4 points] Use implicit differentiation to find  $\frac{dy}{dx}$ .

**Answer:**  $\frac{dy}{dx} =$  \_\_\_\_\_

b. [4 points] Find  $w$  and  $h$ , the width and height of the shaded rectangle containing  $\mathcal{C}$ . *Show all your work.*

**Answer:**  $w =$  \_\_\_\_\_ and  $h =$  \_\_\_\_\_