4. [10 points]

    a. Let $\mathcal{C}$ be the curve given by the equation

$$y \cos(2x) = y^3 + b,$$

where b is a constant. The curve $\mathcal{C}$ passes through the point $(0, 2)$.

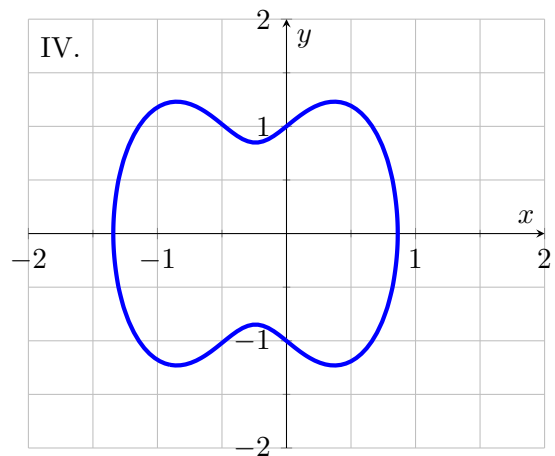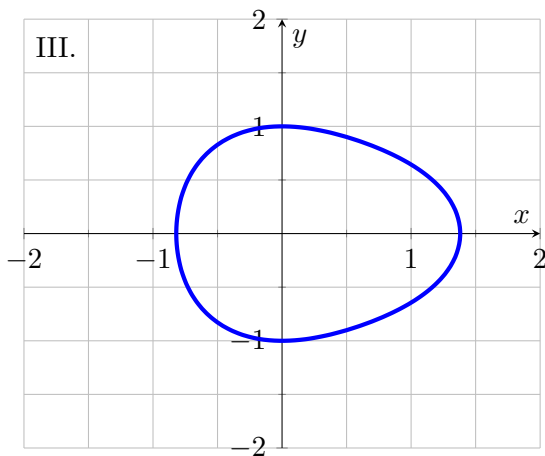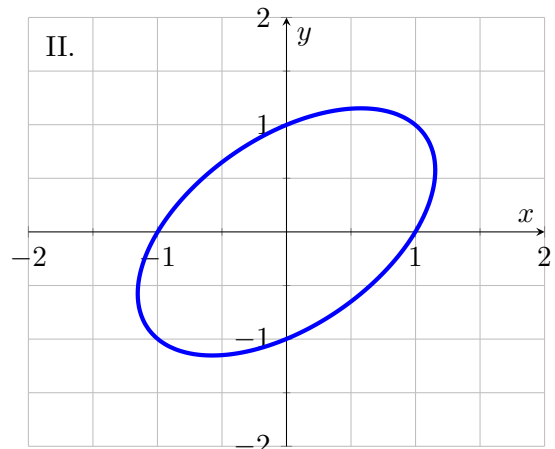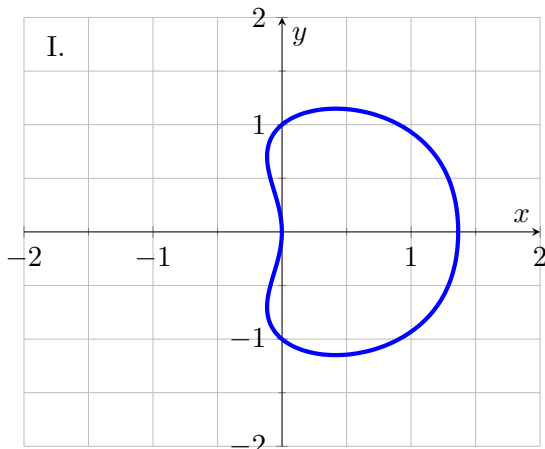   i. [2 points] Find b.

Answer: $b =$ _____

      ii. [5 points] For the curve $\mathcal{C}$, find a formula for $\frac{dy}{dx}$ in terms of x and y. To earn credit for this problem, you must compute this by hand and show every step of your work clearly.

Answer: $\dfrac{dy}{dx} =$ _____

b. [3 points] A different curve $\mathcal{R}$ passes through the point $(0, 1)$ and satisfies

$$\frac{dy}{dx} = \frac{2x - y}{x - 2y}.$$

One of the following graphs is the graph of $\mathcal{R}$. Which of the graphs is it? Write the numeral (I, II, III, or IV) of the graph you choose <u>on the answer line at the bottom of this page</u>.

I.

II.

III.

IV.

Answer: _____