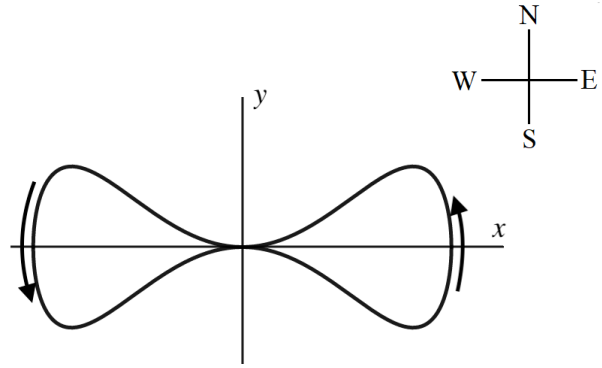**9.** [7 points]

You are on a hiking trip, following the path
modeled by the curve $\mathcal{B}$ defined by the equation

$$y^2 = x^4(1 - x^2).$$

Note that

$$\frac{dy}{dx} = \frac{x^3(2 - 3x^2)}{y}.$$

The graph of $\mathcal{B}$ is shown to the right. You begin your hike at $(0,0)$, then:

- travel East and around the loop on the right as shown by the arrow, returning to $(0,0)$, then
- travel West and around the loop on the left as shown by the arrow, returning to $(0,0)$.

a. [5 points] Using calculus, find the coordinates of all the other points (x, y) on your path (that is, other than $(0,0)$), where you travel directly East or directly West. Show your work.
Note that you can use the graph to determine how many points you are looking for.

Answer: travel East at _____

Answer: travel West at _____

b. [2 points] Using calculus, find the coordinates of all the points (x, y) on your path where you travel directly North or directly South. Note that, as shown by the graph, $(0,0)$ is not one of these points. Show your work.

Answer: travel North at _____

Answer: travel South at _____