Answer on Question #45105 – Math – Analytical Geometry

An elliptical riding path is to be built on a rectangular piece of property as shown below.

The rectangular piece of property measures 10 mi by 4 mi. Find an equation for the ellipse if the path is to touch the center of the property line on all 4 sides.
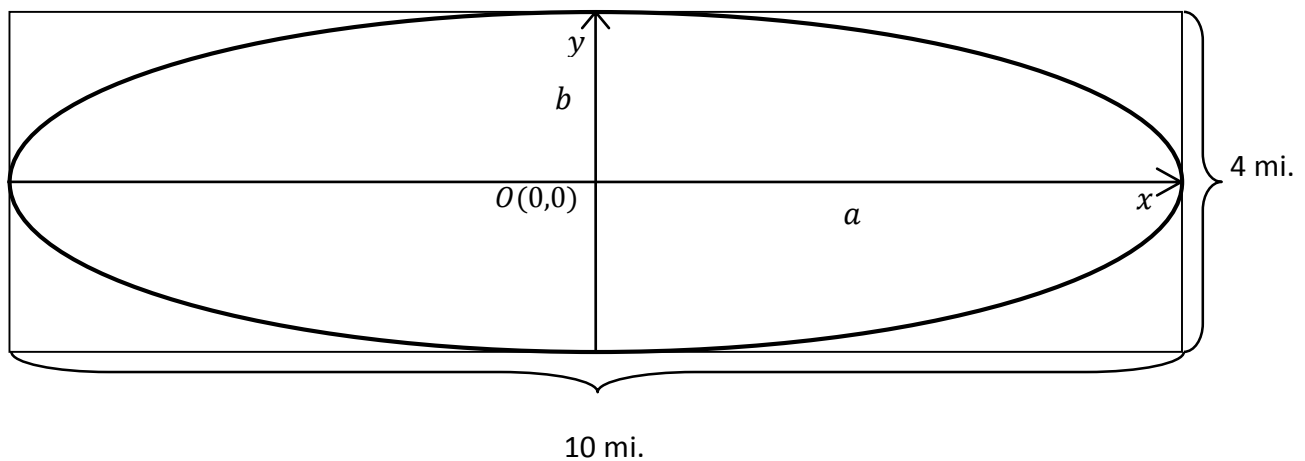
Solution:

General Equation of an Ellipse: an ellipse can be defined as the locus of all points that satisfy the equation:

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

where x, y are the coordinates of any point on the ellipse, $(a, 0)$, $(-a, 0)$ and $(0, b)$, $(0, -b)$ are the vertices on the x and y axes respectively. Here $10 = 2a$, $4 = 2b$, hence $a = 5$, $b = 2$.

In our case:

10 mi.

$$\frac{x^2}{5^2} + \frac{y^2}{2^2} = 1$$

Answer: equation of the ellipse is

$$\frac{x^2}{25} + \frac{y^2}{4} = 1$$