

Answer on Question #46884 – Math – Analytic 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.

Standard form of equation for an ellipse with horizontal major axis:

$$\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1, \text{ where } a > b, (h, k) = (x, y) \text{ coordinates of center}$$

For given ellipse, center: (0, 0)

length of horizontal major axis = 10 = 2a → a = 5

length of minor axis = 4 = 2b → b = 2

Thus, equation for given ellipse:

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