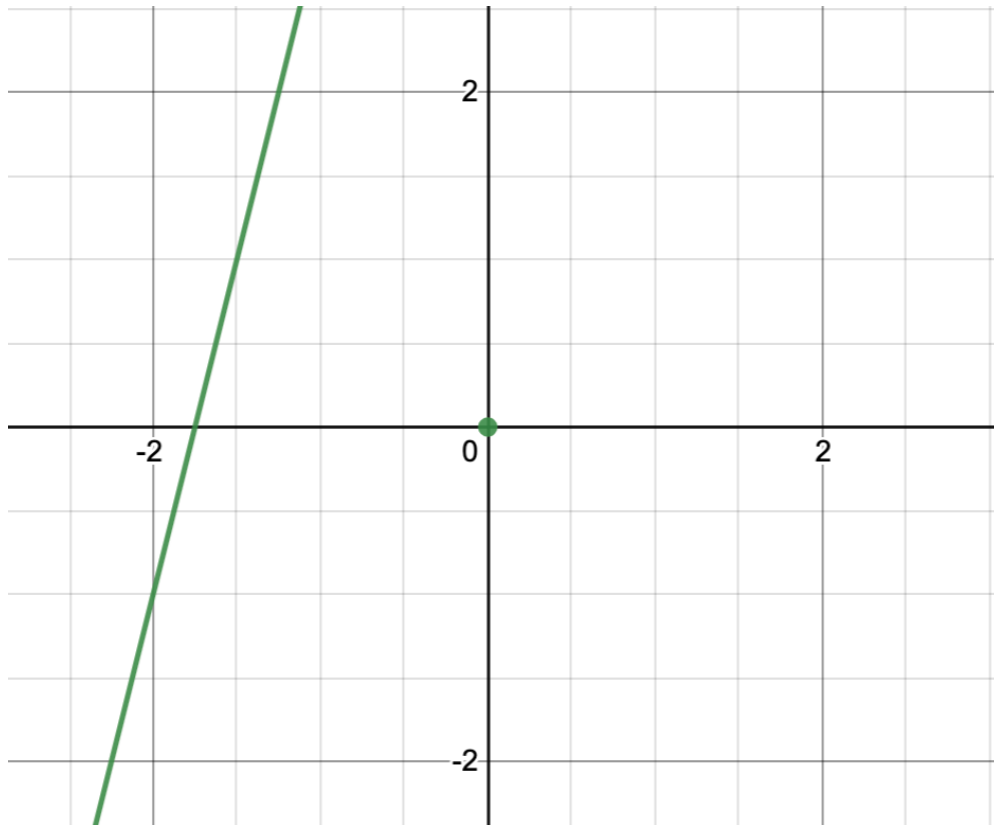


Optimization

Application of finding extreme values (Minimum or Maximum) for a function.

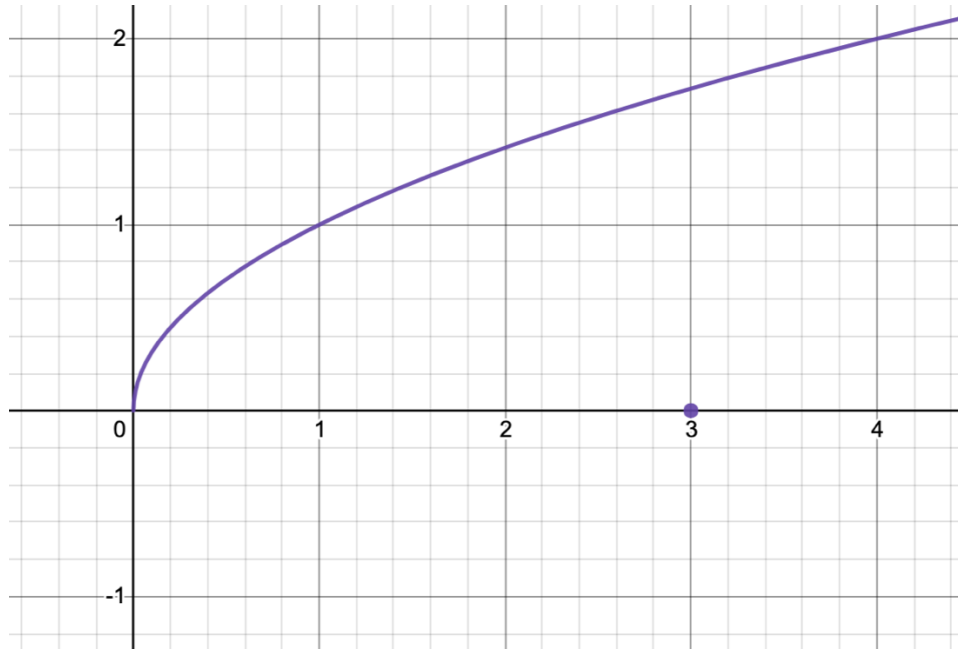
Example 1

Find a point on the line $y = 4x + 7$ that is closest to the origin $(0,0)$.



Example 2

Find the point on the curve $y = \sqrt{x}$ that is closest to $(3,0)$.



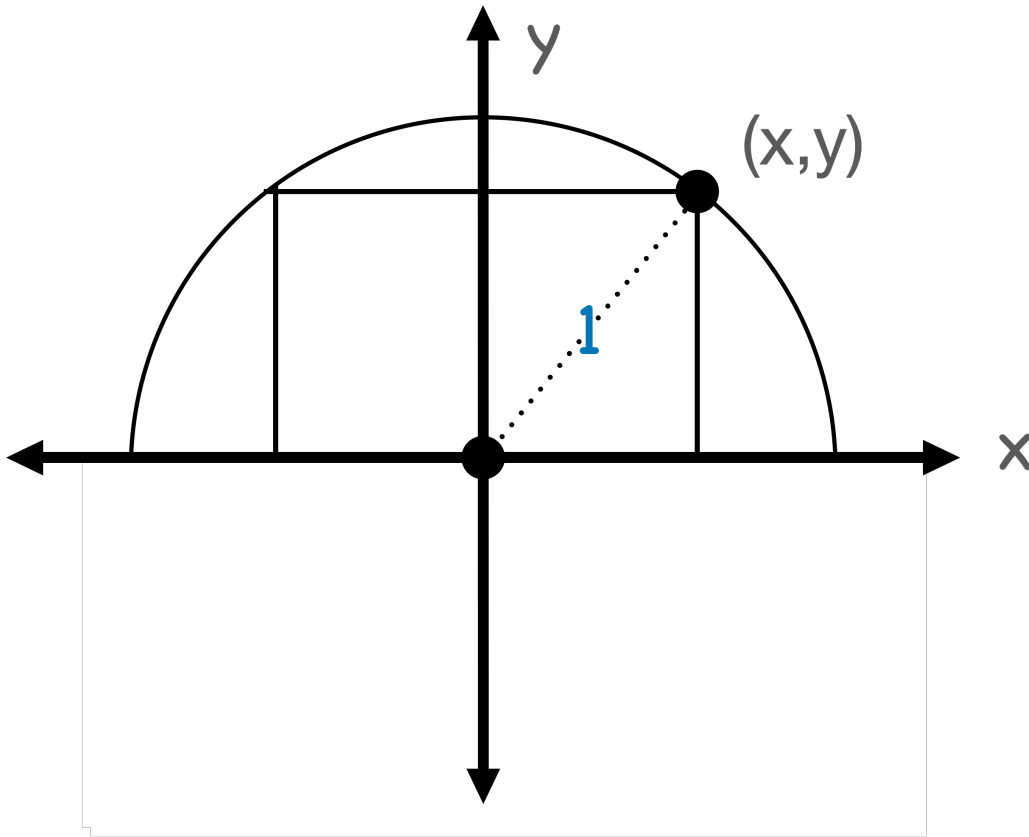
Example 3

A farmer has 500 feet of fence that enclose a rectangular area. What dimensions maximize the area?



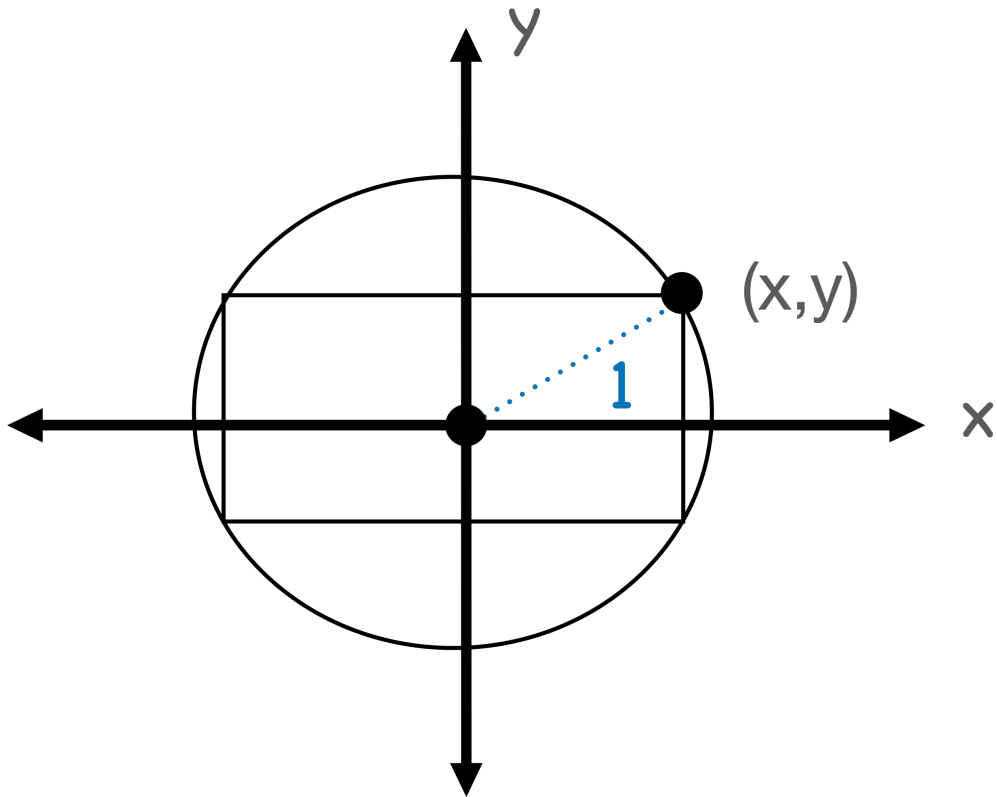
Example 4

Find the dimensions of the largest rectangle that can be inscribed in a semi-circle of radius 1.



Example 5

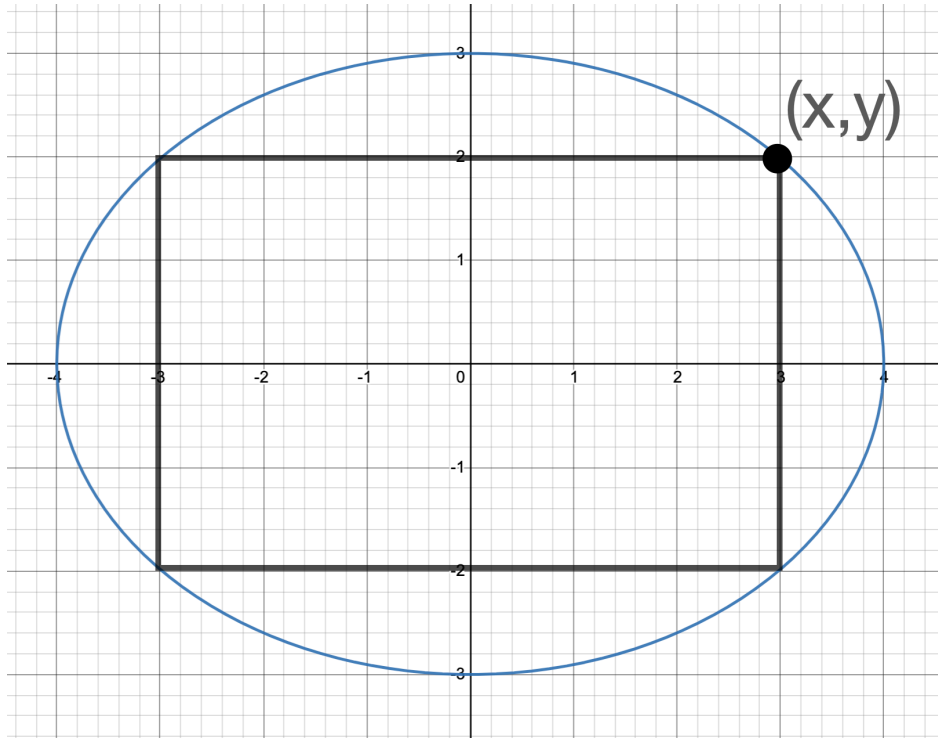
Find the dimensions of the largest rectangle that can be inscribed in a unit circle.



Example 6

Find the area of the largest rectangle that can be inscribed in the ellipse

$$\frac{x^2}{16} + \frac{y^2}{9} = 1$$



Example 7

A boat leaves a dock at 2:00 PM and travels due South at a speed of 20 km/h. Another boat has been heading due East at 15 km/h and reaches the same dock at 3:00 PM. At what time t where the two boats closest together?

