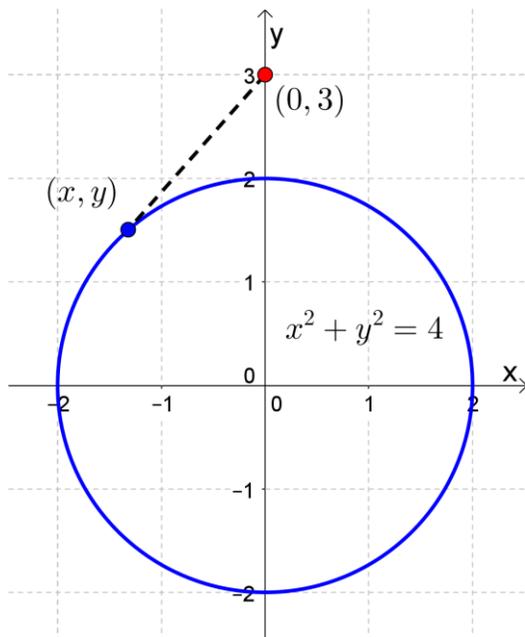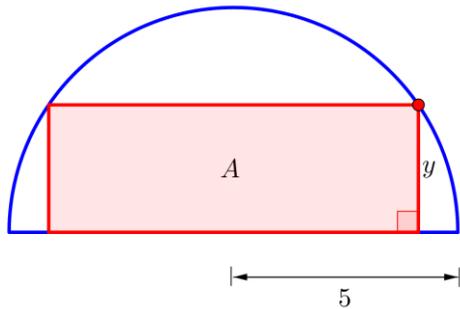1. Find the distance from the point $(0, 3)$ to the circle $x^2 + y^2 = 4$ as a function of y only. Be sure to simplify your function.


2. A rectangle is inscribed in a semicircle of radius 5. Find a function that models the area A of the rectangle in terms of its height y.

3. A rectangle is inscribed in a semicircle of radius 5. Find a function that models the perimeter of the rectangle in terms of its height y.
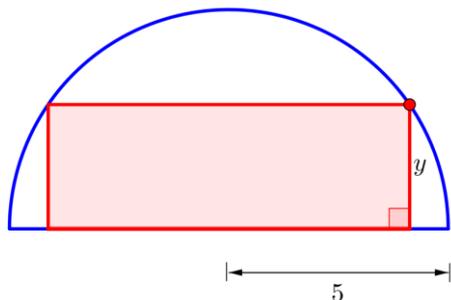

4. You want to fence a garden with one side against a straight road. The garden consists of a rectangular region and a semicircular region as shown below. Most of the fencing costs \$3 per foot, but the fencing next to the road must be sturdier and costs \$4 per foot. You want to have an area of 400 ft^2. Find a function in one variable that models the cost of fencing the garden.
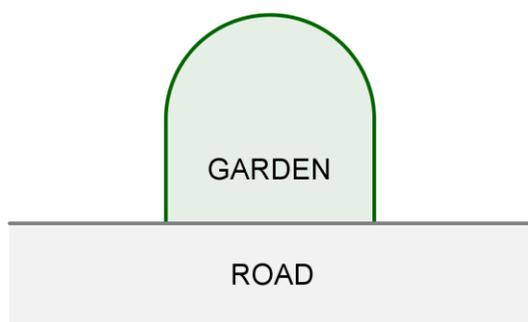
5. You buy a 5000-square-foot, rectangular piece of property with one side against a straight river. You'd like to protect your property with fencing, which costs $5 per foot. You don't need any fencing along the river, though. Find a function in one variable that models the cost of fencing your property.

6. A 10000-square-foot rectangular plot of land is going to be divided into two equal-sized, adjacent playgrounds (see diagram). Find the number of feet of fencing required as a function of x. (Note: there is only one fence between the playgrounds, not two.)
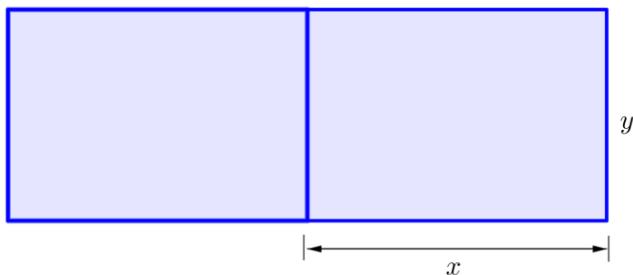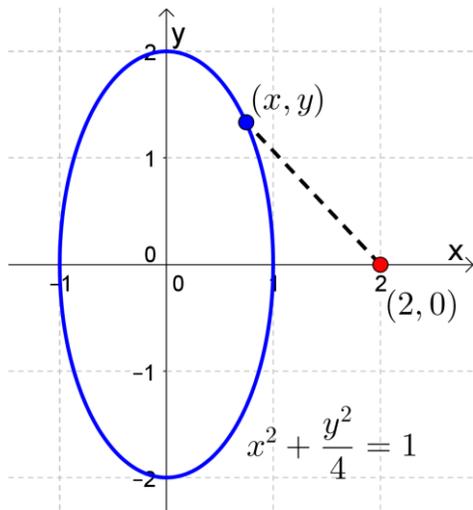
7. A rectangular plot of land is going to be divided into two equal-sized, adjacent playgrounds (see diagram). If the total number of feet of fencing is 100, find the area enclosed by both playgrounds as a function of x. (Note: there is only one fence between the playgrounds, not two.)

y

x
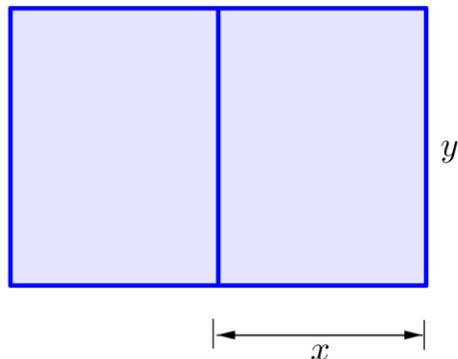
8. Find the distance from the point $(1, 1)$ to the parabola $f(x) = 1 - x^2$ as a function of x only. Be sure to simplify your function.

y $(1, 1)$

0

-1 0 1 2

X

(x, y)

$f(x) = 1 - x^2$
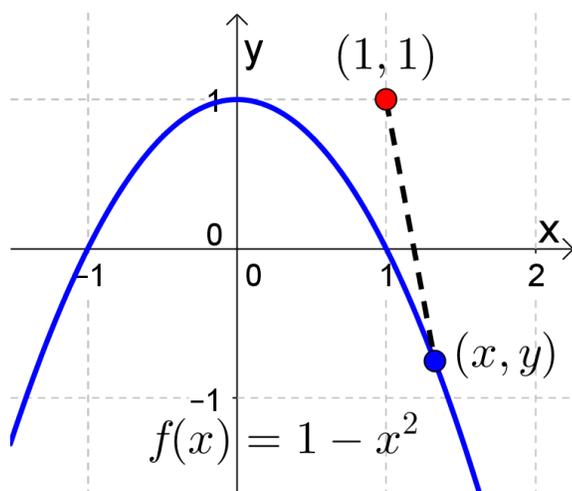
9. Find the distance from the point $(2,0)$ to the ellipse $x^2 + \frac{y^2}{4} = 1$ as a function of x only. Be sure to simplify your function.