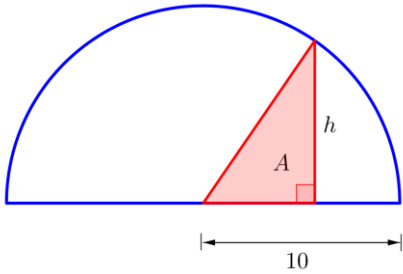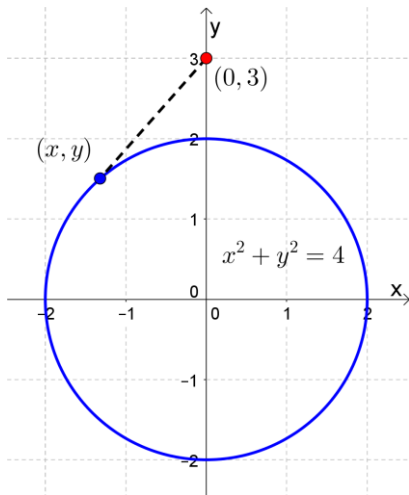**Due date:** _____ **Name:** _____

Tools for Modeling (Part 3)

Notes

ex: A right triangle is inscribed in a semicircle of radius 10. Find a function in one variable that models the area A of the triangle in terms of its height h.


ex: 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.

ex: A right circular cylinder is inscribed in a cone with height h and base radius r. Find a single-variable function that models the surface area of the cylinder.
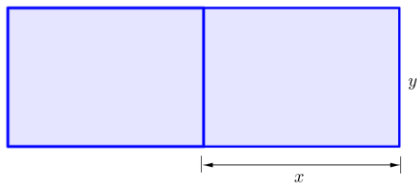
1. A rectangle is inscribed in a semicircle of radius 5. Find a function that models the area A of the rectangle in terms of its height y.

2. 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.
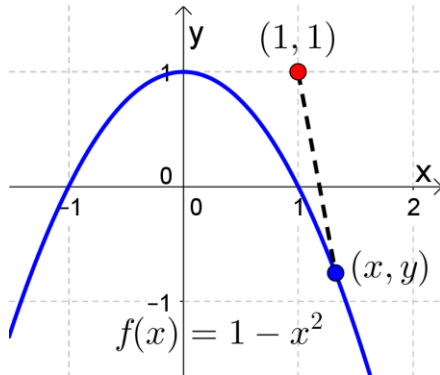
3. A right circular cylinder is inscribed in a cone with height 4 cm and base radius 3 cm. Find a single-variable function that models the volume of the cylinder.

4. 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.)


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.

Practice at home
6. 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.

7. Find a single-variable function that models the area of a rectangle inscribed in a circle of radius 3.

8. 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.
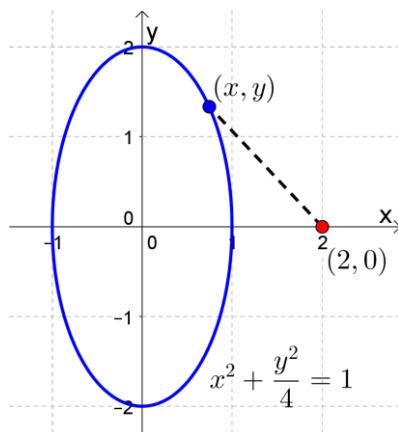
9. Find the distance from the point $(-2,0)$ to the polynomial $f(x) = x^3 - x$ as a function of x only. Be sure to simplify your function.
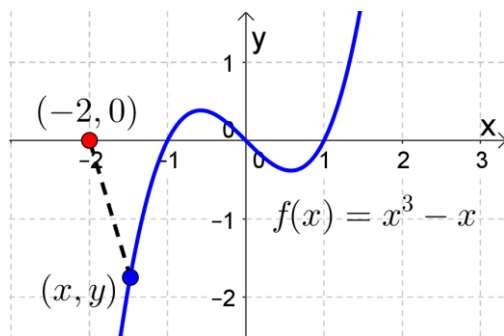
10. Given that a right circular cylinder is 300 cm^3, find a single-variable function that models the surface area of the cylinder.

11. A right circular cylinder is inscribed in a cone with height h and base radius r. Find a single-variable function that models the volume of the cylinder.

12. A rectangular plot of land is going to be divided into three adjacent, equal-sized playgrounds (see diagram). If the total number of feet of fencing is 200, find the area enclosed by all three playgrounds as a function of x. (Note: there is only one fence between each pair of playgrounds, not two.)

13. You buy a 500-square-foot, rectangular piece of property with one side against a straight highway. You'd like to protect your property with fencing.   Most of the fencing costs $4 per foot, but the fencing next to the road must be sturdier and costs $6 per foot. Find a function in one variable that models the cost of fencing the property.