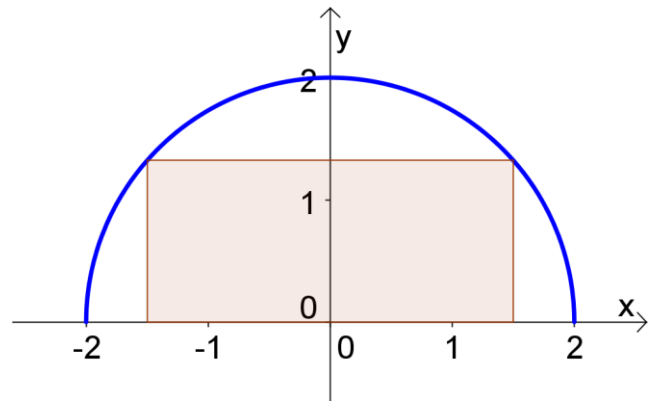


Due date: _____

Name: _____

1. A rectangle is to be inscribed in a semicircle of radius 2. What is the largest area the rectangle can have, and what are its dimensions?



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2. A rectangular plot of farmland will be bounded on one side by a river and on the other three sides by a fence. With 800 m of fencing at your disposal, what is the largest area you can enclose, and what are its dimensions?

3. Find the points on the parabola $y = 4 - x^2$ that are closest to the point $(0, 2)$.

4. Find the points on the parabola $x = y^2$ that are closest to the point $(1, 0)$.
5. An open box with a square base is going to be made. The sides of the box will cost \$4 per square foot, and the base will cost \$5 per square foot. What are the dimensions of the box with the largest volume that can be constructed for \$60? Be sure to write the units for your answer.

- Find the dimensions (base and height) of the isosceles triangle of largest area that can be inscribed in a circle of radius 5.

7. Find the largest possible volume of a cylinder that's inscribed in a sphere of radius 3.
8. A right circular cylinder is inscribed in a cone with height 3 cm and base radius 2 cm. Find the largest possible volume of such a cylinder. Be sure to write the units of your answer.

Q: Why should you stand in the corner when you're cold?

Optional exercises from the Stewart textbook if you'd like more practice:

4.7 (p.336) #3, 7, 15, 16 (answer: \$163.54), 17, 21-29 odd, 33-37 odd