Written Homework

Your carefully written solutions to the following questions will be due at the beginning of class on **Tuesday, June 1**.

1. Find the area of the largest isosceles triangle that can be inscribed in the ellipse $x^2 + 4y^2 = 16$ with its vertical bisector along the y-axis (as shown in the figure at right).

2. A box with a square base and an open top must have a volume of 2 $m^3$. The sides of the box will be made from material that costs $1.50$ per square meter, while the base will be made from material that costs $2.75$ per square meter. Find the dimensions of the box that will minimize the total cost. Give answers in meters rounded to 3 decimal places.

3. A paper drinking cup is to be made by cutting a sector from a circular piece of paper and folding the paper up into the shape of a cone. The sector that is removed will be thrown away. If the paper cup must hold 27 $cm^3$ of water, determine the height $h$ and radius $r$ of the cone that will require the least paper to construct (including the discarded piece). Give answers rounded to 2 decimal places, and include units.