Math 252

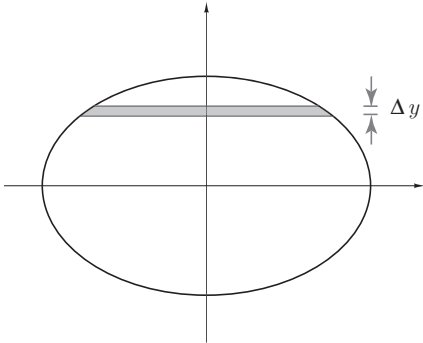Solids of Revolution   Name:_____

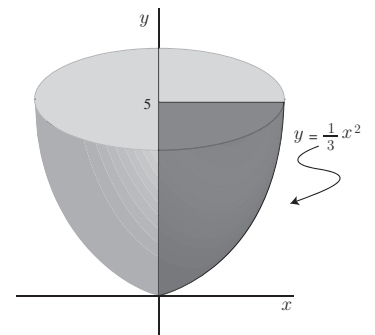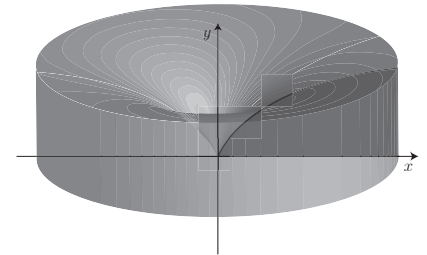| Show all relevant work! |

1. Use calculus to find the area of an ellipse with the formula $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} = 1$.

Δy

2. Find the volume of the solid generated by revolving the area bounded by $y = \frac{1}{3}x^2$ between $y = 0$, $y = 5$, and the y–axis about the y–axis.
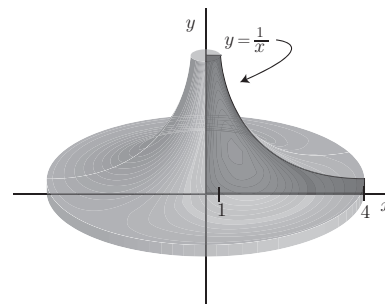
$y = \frac{1}{3}x^2$

3. Find the volume of the solid generated by revolving the area bounded by $y = \sqrt{x}$ between $x = 0$, $x = 4$, and the x–axis about the y–axis.
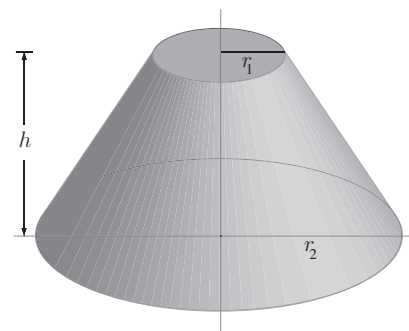
4. Repeat #3 for the volume of the solid generated by revolving the area bounded by $y = \sqrt{x}$ between $x = 0$, $x = 4$, and the x–axis about the axis $x = 4$.
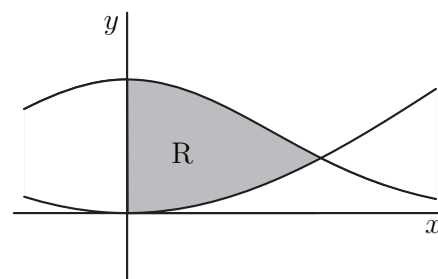
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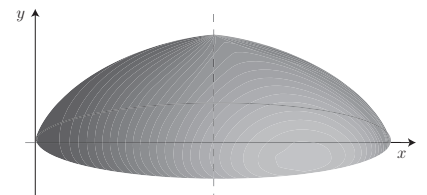
5. Find the volume of the solid shown to the right.

$y = \frac{1}{x}$

6. Derive the formula for the volume of a frustum where the base radii are r_1 and r_2 and the height is h. (idea: think of the side as a linear function).

r_1

h

r_2

7. The region R bounded by $f(x) = e^{-x^2}$ and $g(x) = 1 - \cos x$ is shown. Write the integral for the volume of the solid generated by revolving R about the x–axis.

R

8. An icecream cone has radius 2.5 cm at the top. If a scoop of icecream in the form of a sphere with radius 4cm is placed on top of the cone, what percentage of the icecream is outside the cone?