

MATH141(0332/0342) Calculus II Fall 2009

Worksheet 2, Section 6.3-6.4

Name: _____

1. (2 points) a, b are positives. \mathbf{R} is the region in the x - y plane where

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} \leq 1.$$

Find the area of \mathbf{R} .

2. (2 points) Find the volume of the solid \mathbf{V} obtained by revolving the region \mathbf{R} about the x -axis.

3. (3 points) Given $a = b$, find the length of the border of \mathbf{R} .

4. (4 points) Given $a = b$, find the area of the surface of \mathbf{V} .

5. (5 points) A tank of water is in the shape of an inverted cone (point down) with height 10 feet and radius 3 feet. It is filled to the top with water. Find the work necessary to pump all but 2 feet of water to a point 7 feet above the top of the tank. You may assume water weighs 62 pounds per cubic foot.

6. (4 points) A spring with force constant 24N/m is compressed from a length .4m greater than its equilibrium length to a length .6 less than its equilibrium length. Set up and evaluate the integral for the work done in compressing the spring.