4. Do WebAssign 8.1. Remember that the WebAssign will be reopened three days before Exam II for you to review the problems. You will be allowed to improve your score by a maximum of three points. Additional attempts on the problems will not be given.

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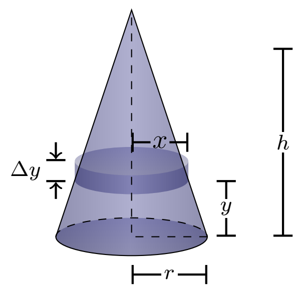
5. Find, by slicing, a formula for the volume of a cone of height h and base radius r. Note that r and h are fixed parameters, and x and y are variables.



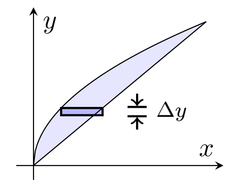
   (a) Each slice is *almost* a cylinder, and it's volume will be approximated as if it were a cylinder. Express the approximate volume of the slice shown in terms of x and Δy.

   (b) Since y will be the variable of integration, express the approximate volume of the slice shown in terms of variables y and Δy (and parameters h and r).

   (c) Use a Riemann sum to express the total volume of all the slices.

   (d) Take the limit as $\Delta y \to 0$ to change the Riemann sum into a definite integral (with correct limits) and then evaluate it.

6. Use *horizontal* slices to calculate the area between the curves $y = x$ and $y = \sqrt{x}$.



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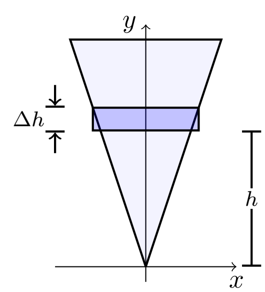
7. The corners of the triangle lie on the points (0,0), (1,3) and (-1,3). Use the slice shown to write a expressions for the approximate area of each slice, and a Riemann sum and the a definite integral representing the total area of the region. Evaluate the integral exactly.



Geometry

Section 8.2
Septbember 29, 2016

Name:
Math 129 - 01

Understand	Approximate the arc length of a curve by straight line segments, the hypotenuses of small triangles.
Apply	Use the Arc Length Formula to calculate the arc length of a curve.
Apply	Calculate the volume of a solid constructed by revolution.
Apply	Calculate the volume of a solid constructed by vertical stacks of squares, triangles, etc.
Synthesize	Use methods from 8.1 (summary at top of 8.2) to find areas and volumes of more difficult regions.

In this problem, we will investigate and highlight the differences between calculating the arc length of a curve and the area under the curve, both of which use integration. We will study the function $y = x^3$ between $x = 0$ and $x = 2$.

1. (a) Draw a picture to prove that the arc length of $y = x^3$ between $x = 0$ and $x = 2$ must be greater than 8.

   (b) Use the formula to calculate the arc length (feel free to evaluate the integral numerically).

   (c) If x and y both had units of meters, why is meters the correct units for the arc length?

2. (a) Draw a picture to prove that the area under the curve $y = x^3$ between $x = 0$ and $x = 2$ must be less than 8.

   (b) Calculate the area under the curve.

   (c) If x, y both had units of meters, why is meters^2 the correct units for the area under the curve?

Quiz (Leave this space blank)