Math 128 : Calculus 2 for the Sciences **Winter 2016**

Lecture 10: January 25, 2016

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10.1 Volumes of Washers and Discs

Example 10.1 *Find the volume obtained by rotating the region bounded by* $y = x^2 + 4, y = 2x^2$ *about* $y = 0$

The two curves intersect at $x = \pm 2$*, so rotating the rectangles of width dx about* $y = 0$ *will result in a washer like object with a certain volume*
by taking the sum of all the washers from x = -2 to x = 2 , we get

$$V = \int_{-2}^{2} (\pi(x^2+4)^2 - \pi(2x)^2)dx$$

$$= \frac{1024\pi}{15}$$

In general : When using disks/washers

$$V = \int_a^b A(x) or V = \int_a^b A(y)$$

where A(x)/A(y) is the cross sectional area of the solid.

10.2 Volumes of Cylindrical Shells

In general : the volume of a solid obtained by rotating the region under y = f(x) about y axis for x = a to x = b

$$V = \int_a^b 2\pi f(x)dx$$

End of Lecture Notes
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