Volumes by Slicing

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Announcements

1. Homework in MyOpenMath.
2. Quiz in Canvas.
3. Office hours: 10am - 11am.

Volumes by slicing

Another application of integration is in finding volumes if we know the cross sectional area of an object. As an example, let's look at a right circular cone with radius $r = 3$ units, and height $h = 10$ units.
If we take cross sections of this cylinder that are parallel to the circular base, we get a constant cross section (which is what???).
Let's use the "little slice" method to figure out the volume of this shape!

Volumes by slicing

Volumes by slicing

We can apply this same idea even when the cross sectional area is not constant, but is known. Let's use this idea to find the volume of a pyramid with a square base (of side length 4 units) and a height of 5 units.

Volumes by slicing

Volumes by slicing: Problem solving strategy

We've just illustrated the "little slice method" for volumes. To apply it in general, use the following strategy:

1. Examine the solid of interest and determine the shape of a _____ of the object with respect to a certain direction. (You should always draw pictures at this step!)
2. Determine a formula for the cross-sectional _____.
3. _____ the area over the appropriate interval to find the volume.

Example

You want to design a building with a floor that is an isosceles triangle with base 6 units and legs 5 units. The top of the building will be parabolas that connect the sides of equal length of the triangle, with heights that are equal to their widths. What is the total volume of this building?

Example

Example