

VOLUMES: BOOKS or PANCAKES?

VOLUMES: Books or Pancakes?

Find the volume of the solid generated by rotating the region bounded by the given curves about the specified axis or line.

1. $f(x) = 2x + 1, y = 0, x = 0, x = 4$ about the x-axis

$V = \pi \int_0^4 (2x + 1)^2 dx$ $V = 364\pi$

$V = \pi \int_0^4 (4x^2 + 4x + 1) dx$

$V = \pi \left[\frac{4}{3}x^3 + 2x^2 + x \right]_0^4$

2. $y = x^2, y = 8, x = 0$ about the y-axis

$V = \pi \int_0^8 \frac{1}{9}y^2 dy$ $V = 96\pi$

$V = \pi \left[\frac{1}{27}y^3 \right]_0^8$

3. $y = 9 - x^2, y = x^2, x = 0$ about the x-axis

$V = \pi \int_0^{\sqrt{4.5}} [(9 - x^2)^2 - (x^2)^2] dx$

$V = \pi \int_0^{\sqrt{4.5}} (81 - 18x^2) dx$

$V = \pi \left[81x - 6x^3 \right]_0^{\sqrt{4.5}}$

4. ...

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Practice

Infographic

FREEBIE!

Area and Volume
Vertical Axis

Area and Volume
Horizontal Axis

Area of T
 $A = \int (f(x)) dx$

Volume
about z-axis
 $V = \pi \int (f(x))^2 dx$

Right angle
 $V = \frac{1}{2} \int (f(x) - g(x))^2 dx$

Volume of ...
 $V = \frac{1}{2} \int (f(x) - g(x))^2 dx$



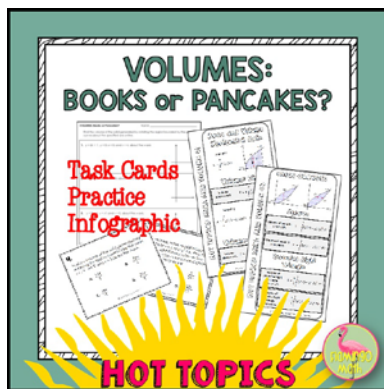
FLAMINGO MATH

Volumes: Books or Pancakes? Solids of Revolution is a required Calculus skill needed for success on the AP Calculus Exam®.

Here is a set of 4 HOT TOPIC INFOGRAPHICS:

- Students can use the infographic as a page in their Interactive Notebook.
- Copy on card stock and laminate to be used as a bookmark or reference card while working through your lesson.
- Students can create a collection of HOT TOPICS for review at the end of the course.

You will also find a practice set of 8 questions that can be used as a homework or quiz.



Do you need a full lesson on this topic? Be sure to check out my [Calculus products](#):

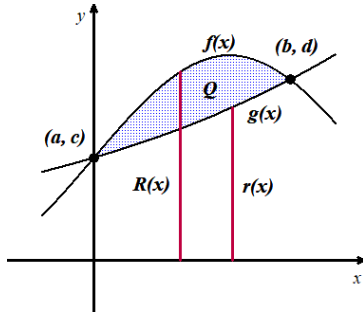
Read my blog post for:

[Volumes: Books or Pancakes?](#)



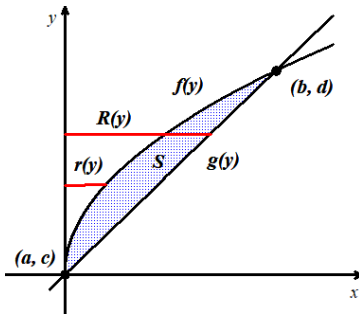
HOT TOPICS: AREA AND VOLUME

Area and Volume



Area of Q
$$A = \int_a^b [f(x) - g(x)] dx$$

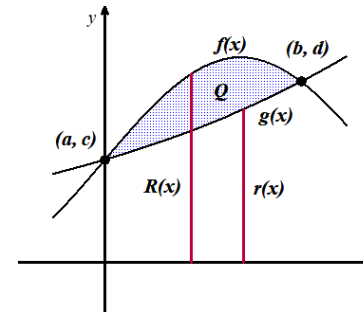
Volume about x-axis
$$V = \pi \int_a^b [(f(x))^2 - (g(x))^2] dx$$



Area of S
$$A = \int_c^d [g(y) - f(y)] dy$$

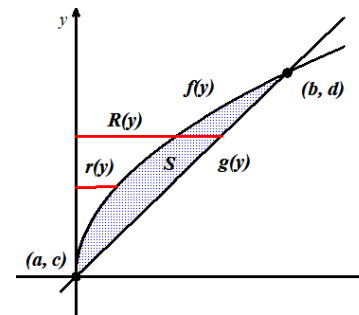
Volume about y-axis
$$V = \pi \int_c^d [(g(y))^2 - (f(y))^2] dy$$

Area and Volume



Area of Q
$$A = \int_a^b [f(x) - g(x)] dx$$

Volume about x-axis
$$V = \pi \int_a^b [(f(x))^2 - (g(x))^2] dx$$



Area of S
$$A = \int_c^d [g(y) - f(y)] dy$$

Volume about y-axis
$$V = \pi \int_c^d [(g(y))^2 - (f(y))^2] dy$$

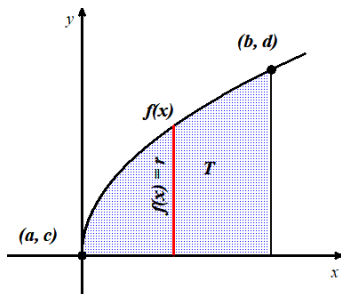
HOT TOPICS: AREA AND VOLUME

Directions: There are two HOT TOPICS per page. Print the HOT TOPIC on paper or card stock. Then, cut each one out individually. These can be used as a laminated bookmark, or as a notebook foldable.

Area and Volume Horizontal Axis

Area of T

$$A = \int_a^b [f(x)] dx$$



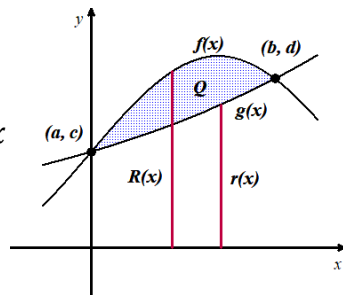
Volume: Disk

Volume
about x-axis

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

Area of Q

$$A = \int_a^b [f(x) - g(x)] dx$$



Volume: Washer

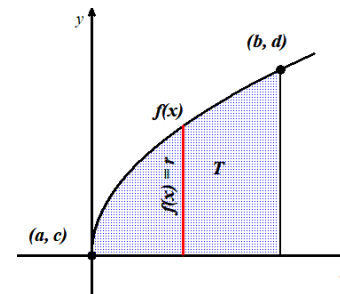
Volume
about x-axis

$$V = \pi \int_a^b [(f(x))^2 - (g(x))^2] dx$$

Area and Volume Horizontal Axis

Area of T

$$A = \int_a^b [f(x)] dx$$



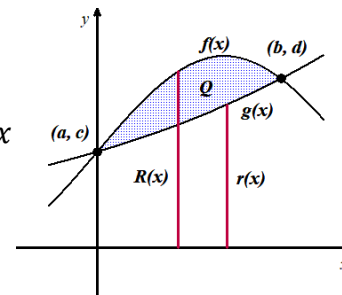
Volume: Disk

Volume
about x-axis

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

Area of Q

$$A = \int_a^b [f(x) - g(x)] dx$$



Volume: Washer

Volume
about x-axis

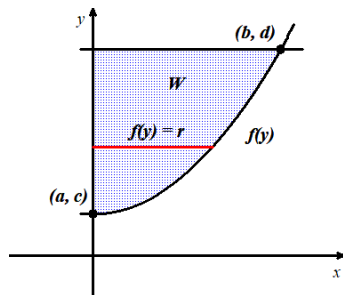
$$V = \pi \int_a^b [(f(x))^2 - (g(x))^2] dx$$

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Area and Volume Vertical Axis

Area of W

$$A = \int_c^d [f(y)] dy$$



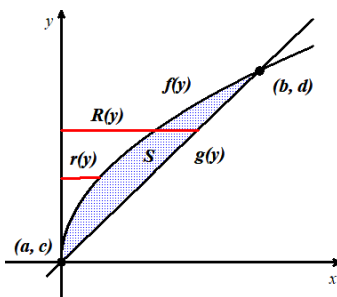
Volume: Disk

Volume
about y-axis

$$V = \pi \int_c^d [(f(y))^2] dx$$

Area of S

$$A = \int_c^d [g(y) - f(y)] dy$$



Volume: Washer

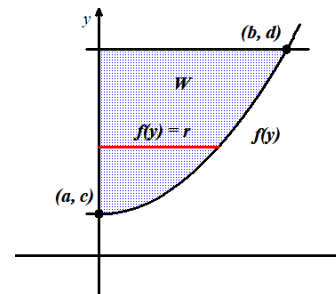
Volume
about y-axis

$$V = \pi \int_c^d [(g(y))^2 - (f(y))^2] dy$$

Area and Volume Vertical Axis

Area of W

$$A = \int_c^d [f(y)] dy$$



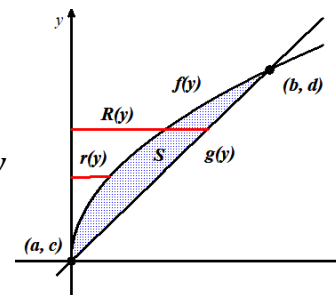
Volume: Disk

Volume
about y-axis

$$V = \pi \int_c^d [(f(y))^2] dx$$

Area of S

$$A = \int_c^d [g(y) - f(y)] dy$$



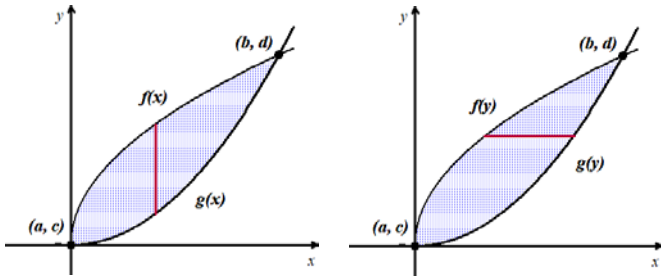
Volume: Washer

Volume
about y-axis

$$V = \pi \int_c^d [(g(y))^2 - (f(y))^2] dy$$

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CROSS-SECTIONS



Squares

Volume of squares
 ⊥ to x-axis $V = \int_a^b [f(x) - g(x)]^2 dx$

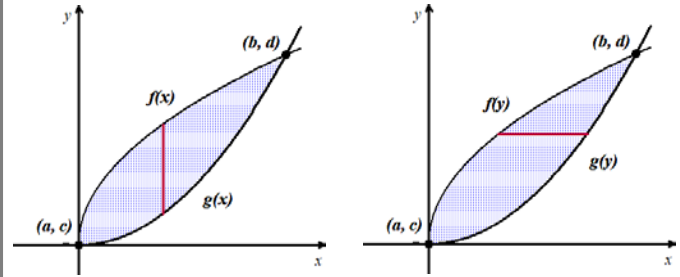
Volume of squares
 ⊥ to y-axis $V = \int_c^d [g(y) - f(y)]^2 dy$

Isosceles Right Triangle

Volume of
 Isosceles Right
 Triangle
 ⊥ to x-axis $V = \frac{1}{2} \int_a^b [f(x) - g(x)]^2 dx$

Volume of
 Isosceles Right
 Triangle
 ⊥ to y-axis $V = \frac{1}{2} \int_c^d [g(y) - f(y)]^2 dy$

CROSS-SECTIONS



Squares

Volume of squares
 ⊥ to x-axis $V = \int_a^b [f(x) - g(x)]^2 dx$

Volume of squares
 ⊥ to y-axis $V = \int_c^d [g(y) - f(y)]^2 dy$

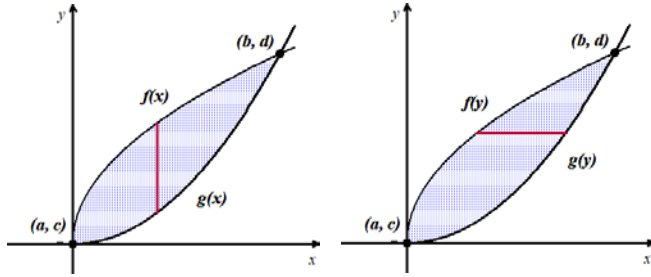
Isosceles Right Triangle

Volume of
 Isosceles Right
 Triangle
 ⊥ to x-axis $V = \frac{1}{2} \int_a^b [f(x) - g(x)]^2 dx$

Volume of
 Isosceles Right
 Triangle
 ⊥ to y-axis $V = \frac{1}{2} \int_c^d [g(y) - f(y)]^2 dy$

Directions: There are two HOT TOPICS per page. Print the HOT TOPIC on paper or card stock. Then, cut each one out individually. These can be used as a laminated bookmark, or as a notebook foldable.

CROSS-SECTIONS



Semi-Circles

Volume of
Semi-Circles
⊥ to x-axis

$$V = \frac{\pi}{8} \int_a^b [f(x) - g(x)]^2 dx$$

Volume of
Semi-Circles
⊥ to y-axis

$$V = \frac{\pi}{8} \int_c^d [g(y) - f(y)]^2 dy$$

Equilateral Triangle

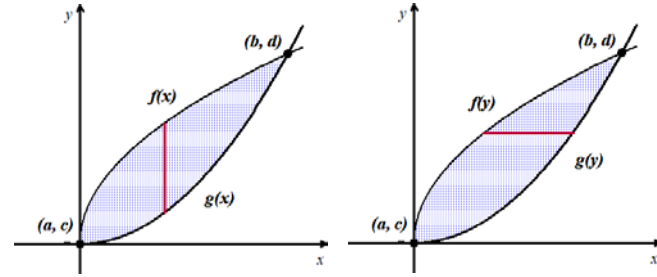
Volume of
Equilateral
Triangle
⊥ to x-axis

$$V = \frac{\sqrt{3}}{4} \int_a^b [f(x) - g(x)]^2 dx$$

Volume of
Equilateral
Triangle
⊥ to y-axis

$$V = \frac{\sqrt{3}}{4} \int_c^d [g(y) - f(y)]^2 dy$$

CROSS-SECTIONS



Semi-Circles

Volume of
Semi-Circles
⊥ to x-axis

$$V = \frac{\pi}{8} \int_a^b [f(x) - g(x)]^2 dx$$

Volume of
Semi-Circles
⊥ to y-axis

$$V = \frac{\pi}{8} \int_c^d [g(y) - f(y)]^2 dy$$

Equilateral Triangle

Volume of
Equilateral
Triangle
⊥ to x-axis

$$V = \frac{\sqrt{3}}{4} \int_a^b [f(x) - g(x)]^2 dx$$

Volume of
Equilateral
Triangle
⊥ to y-axis

$$V = \frac{\sqrt{3}}{4} \int_c^d [g(y) - f(y)]^2 dy$$

Directions: There are two HOT TOPICS per page. Print the HOT TOPIC on paper or card stock. Then, cut each one out individually. These can be used as a laminated bookmark, or as a notebook foldable.

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