

Watch. Practice. Understand. | Lesson 309

Calculus 6 2 Part I Disk and Washer's Method

Watch the matching video: <https://www.youtube.com/watch?v=bZz71MQiKh0>

Practice focus: Disk and washer volumes

Original extra practice matched to the listed lesson topic.

Name: _____ Date: _____ Show your reasoning and check units.

01 Rotate the region under $y=x$ on $[0,2]$ about the x-axis. Find volume.

02 Rotate the region between $y=2$ and $y=x$ on $[0,2]$ about the x-axis.

03 Rotate the region under $y=\sqrt{x}$ on $[0,4]$ about the x-axis.

04 Why does a washer integrand use R^2-r^2 rather than $(R-r)^2$?

Worked answers | Lesson 309

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Practice focus: Disk and washer volumes

Original extra practice matched to the listed lesson topic.

- 01** Rotate the region under $y=x$ on $[0,2]$ about the x -axis. Find volume.

Disk radius x . $V=\pi \int_0^2 x^2 dx = 8\pi/3$.

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- 02** Rotate the region between $y=2$ and $y=x$ on $[0,2]$ about the x -axis.

Outer radius 2, inner x . $V=\pi \int_0^2 (4-x^2) dx = 16\pi/3$.

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- 03** Rotate the region under $y=\sqrt{x}$ on $[0,4]$ about the x -axis.

Disk radius $\sqrt{x}$, so $V=\pi \int_0^4 x dx = 8\pi$.

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- 04** Why does a washer integrand use R^2-r^2 rather than $(R-r)^2$?

Cross-sectional area is outer disk area minus inner disk area, $\pi R^2 - \pi r^2$. Squaring the radius difference is a different area.