

Watch. Practice. Understand. | Lesson 313

Learning Calculus Finding Area in Between Two Curves and Volume of A Solid In Less Th...

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

Practice focus: Area between curves

Original extra practice matched to the listed lesson topic.

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

01 Find area between $y=x$ and $y=x^2$ on $[0,1]$.

02 Find area enclosed by $y=4-x^2$ and $y=0$.

03 Find area between $y=x$ and $y=-x$ on $[-1,1]$.

04 Find intersections and enclosed area of $y=x^2$ and $y=2x+3$.

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Practice focus: Disk and washer volumes

Original extra practice matched to the listed lesson topic.

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

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

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

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

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

Worked answers | Lesson 313

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01 Find area between $y=x$ and $y=x^2$ on $[0,1]$.

Upper minus lower: $\int_0^1 (x-x^2) dx = 1/2 - 1/3 = 1/6$.

02 Find area enclosed by $y=4-x^2$ and $y=0$.

Intersections $x=\pm 2$. $\int_{-2}^2 (4-x^2) dx = 32/3$.

03 Find area between $y=x$ and $y=-x$ on $[-1,1]$.

Upper curve switches at 0. $\int_{-1}^1 2|x| dx = 2$.

04 Find intersections and enclosed area of $y=x^2$ and $y=2x+3$.

Intersections $x=-1,3$. $\int_{-1}^3 (2x+3-x^2) dx = 32/3$.

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Practice focus: Disk and washer volumes

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

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

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

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

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

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

08 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.