

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

Lesson 313 | Calculus AB | Area between curves • Disk and washer volumes

<https://www.youtube.com/watch?v=EMjrHVEjxA>

Original practice aligned to the saved video title.

Name: _____ Date: _____ Show your reasoning.

01

Find the area between $y=24x$ and $y=x^2$ from $x=0$ to their other intersection.

02

Rotate the region between $y=8$ and $y=7$, for $0 \leq x \leq 2$, about the x -axis. Set up a washer integral and find the volume.

03

Find the area between $y=19x$ and $y=x^2$ from $x=0$ to their other intersection.

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04

Rotate the region between $y=11$ and $y=8$, for $0 \leq x \leq 4$, about the x -axis. Set up a washer integral and find the volume.

05

Find the area between $y=21x$ and $y=x^2$ from $x=0$ to their other intersection.

06

Rotate the region between $y=3$ and $y=1$, for $0 \leq x \leq 4$, about the x -axis. Set up a washer integral and find the volume.

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01

Find the area between $y=24x$ and $y=x^2$ from $x=0$ to their other intersection.

Intersections solve $x(x-24)=0$, so $x=0,24$. Line is above parabola there.

$$A = \int_{[0,24]} (24x - x^2) dx = [24x^2/2 - x^3/3]_0^{24} = 2304.$$

02

Rotate the region between $y=8$ and $y=7$, for $0 \leq x \leq 2$, about the x -axis. Set up a washer integral and find the volume.

$$\text{Outer radius } 8, \text{ inner radius } 7. V = \pi \int_{[0,2]} (64 - 49) dx = 30\pi \text{ cubic units.}$$

03

Find the area between $y=19x$ and $y=x^2$ from $x=0$ to their other intersection.

Intersections solve $x(x-19)=0$, so $x=0,19$. Line is above parabola there.

$$A = \int_{[0,19]} (19x - x^2) dx = [19x^2/2 - x^3/3]_0^{19} = 6859/6.$$

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04

Rotate the region between $y=11$ and $y=8$, for $0 \leq x \leq 4$, about the x-axis. Set up a washer integral and find the volume.

Outer radius 11, inner radius 8. $V = \pi \int_0^4 (121 - 64) dx = 228\pi$ cubic units.

05

Find the area between $y=21x$ and $y=x^2$ from $x=0$ to their other intersection.

Intersections solve $x(x-21)=0$, so $x=0, 21$. Line is above parabola there.

$A = \int_0^{21} (21x - x^2) dx = [21x^2/2 - x^3/3]_0^{21} = 3087/2$.

06

Rotate the region between $y=3$ and $y=1$, for $0 \leq x \leq 4$, about the x-axis. Set up a washer integral and find the volume.

Outer radius 3, inner radius 1. $V = \pi \int_0^4 (9 - 1) dx = 32\pi$ cubic units.