

Watch. Practice. Understand. | Lesson 312

Calculus 6.3 Part III Cylindrical Shell Method

Watch the matching video: <https://www.youtube.com/watch?v=40rHELvb6r8>

Practice focus: Cylindrical shells

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 y -axis using shells.

02 Rotate the region under $y=4-x^2$ on $[0,2]$ about the y -axis.

03 Rotate the region between $y=x$ and $y=x^2$ on $[0,1]$ about the y -axis.

04 For vertical shells rotated about $x=-1$, what is the shell radius for $x \geq 0$?

Worked answers | Lesson 312

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Practice focus: Cylindrical shells

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

Radius x , height x : $V=2\pi \int_0^2 x^2 dx = 16\pi/3$.

02 Rotate the region under $y=4-x^2$ on $[0,2]$ about the y -axis.

$V=2\pi \int_0^2 x(4-x^2) dx = 8\pi$.

03 Rotate the region between $y=x$ and $y=x^2$ on $[0,1]$ about the y -axis.

Shell height $x-x^2$, radius x : $V=2\pi \int_0^1 (x^2-x^3) dx = \pi/6$.

04 For vertical shells rotated about $x=-1$, what is the shell radius for $x \geq 0$?

Distance from x to the axis is $x-(-1)=x+1$; radius is not merely x .