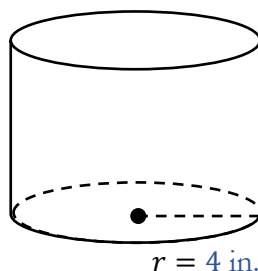


What happens to the volume of a cylinder with radius 4 in. and height 3 in. when you scale the height?

$$V = 48\pi \text{ in.}^3$$



Damien's "Double the Height" Method

If I double the height, I have a new height of 6 in.

Let me calculate the volume with the new height.

Doubling the height causes the new volume to be two times the original!



$$V = \pi r^2 h$$

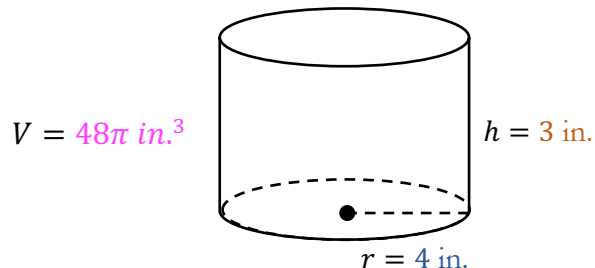
$$V = \pi(4)^2(6)$$

$$V = 96\pi \text{ in.}^3$$

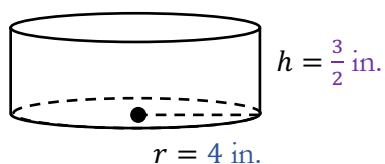
$$\frac{96\pi}{48\pi} = 2$$



What happens to the volume of a cylinder with radius 4 in. and height 3 in. when you scale the height?



Sydney's "Halve the Height" Method



$$V = \pi r^2 h$$

$$V = \pi (4)^2 \left(\frac{3}{2}\right)$$

$$V = 24\pi \text{ in.}^3$$

$$\frac{24\pi}{48\pi} = \frac{1}{2}$$

If I halve the height, I have a new height of $3/2$ in.

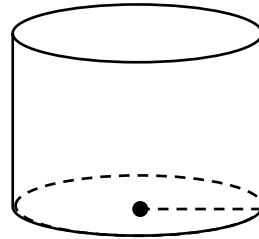
Let me calculate the volume with the new height.

Halving the height makes the new volume $\frac{1}{2}$ the original volume!



What happens to the volume of a cylinder with radius 4 in. and height 3 in. when you scale the height?

$$V = 48\pi \text{ in.}^3$$

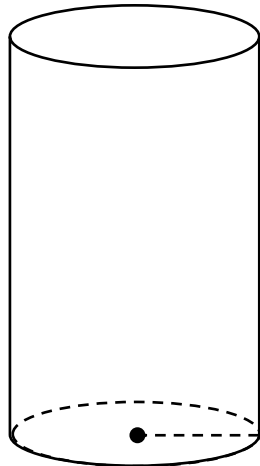


$$h = 3 \text{ in.}$$

$$r = 4 \text{ in.}$$

Damien's "Double the Height" Method

If I double the height, I have a new height of 6 in.



$$h = 6 \text{ in.}$$

$$r = 4 \text{ in.}$$

$$V = \pi r^2 h$$

$$V = \pi(4)^2(6)$$

$$V = 96\pi \text{ in.}^3$$

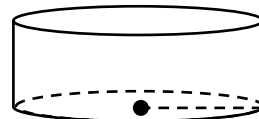
$$\frac{96\pi}{48\pi} = 2$$

Let me calculate the volume with the new height.

Doubling the height causes the new volume to be two times the original!

Sydney's "Halve the Height" Method

If I halve the height, I have a new height of $\frac{3}{2}$ in.



$$h = \frac{3}{2} \text{ in.}$$

$$r = 4 \text{ in.}$$

$$V = \pi r^2 h$$

$$V = \pi(4)^2\left(\frac{3}{2}\right)$$

$$V = 24\pi \text{ in.}^3$$

$$\frac{24\pi}{48\pi} = \frac{1}{2}$$

Let me calculate the volume with the new height.

Halving the height makes the new volume $\frac{1}{2}$ the original volume!



V.4: *Scaling the Height*

1) What are the similarities and differences between Damien and Sydney's methods?

Similarities	Differences

2) When you scale the radius of a cylinder by some number, the volume changes by that number squared. Why is that NOT true when you scale the height?

3) Explain what would happen to the volume of a figure if we multiplied the height by any number, x . Is this always true for any figure?

4) If a figure has a height of 9 in. and a volume of 18 in.^3 , what would the new volume be if the height were scaled to 3 in. ?

What happens to the volume of a cylinder with a radius of 3 in. when you double the height?

Damien's "D"

If I double the height, I have a new height of 6 in.

How cool! When I doubled the height, the volume doubled, and when Sydney halved the height, the volume halved. I wonder if this always works.

Let me calculate the volume with the new height.

Doubling the height causes the new volume to be two times the original volume.

$$\frac{96\pi}{48\pi} = 2$$

Let me calculate the volume with the new height.

Halving the height makes the new volume $\frac{1}{2}$ the original volume!

$$\frac{24\pi}{48\pi} = \frac{1}{2}$$

