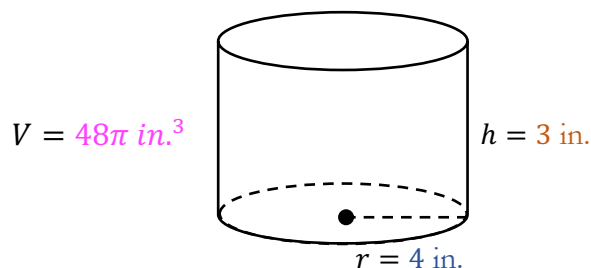
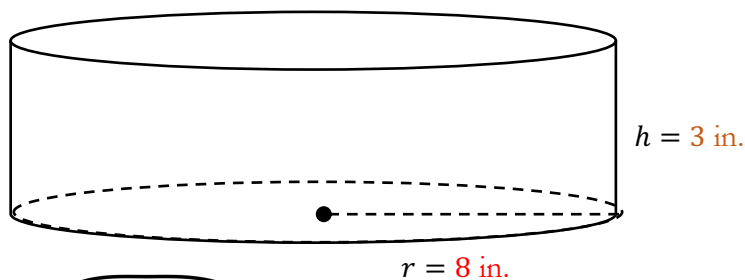


What happens to the volume of a cylinder with radius 4 in. and height 3 in. when you scale the radius?



Damien's "Double the Radius" Method



If I double the radius, I have a new radius of 8 in.

Let me calculate the volume with the new radius.

If I divide the new volume by the original, I see that doubling the radius causes the volume to be four times the original!

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

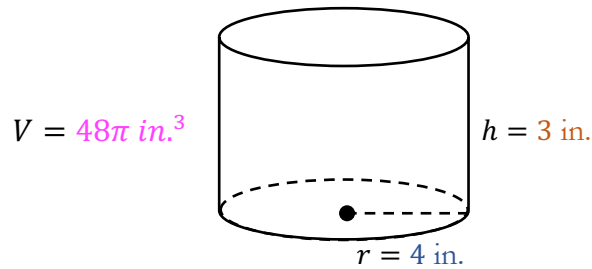
$$V = \pi (8)^2 (3)$$

$$V = 192\pi \text{ in.}^3$$

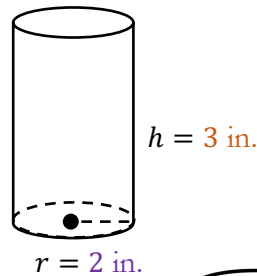
$$\frac{192\pi}{48\pi} = 4$$



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



Sydney's "Halve the Radius" Method



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

$$V = \pi (2)^2 (3)$$

$$V = 12\pi \text{ in.}^3$$

$$\frac{12\pi}{48\pi} = \frac{1}{4}$$

If I halve the height, I have a new radius of 2 in.

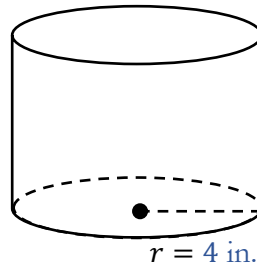
Let me calculate the volume with the new radius.

If I divide the new volume by the original, I see that halving the radius makes the volume $\frac{1}{4}$ the volume of the original!

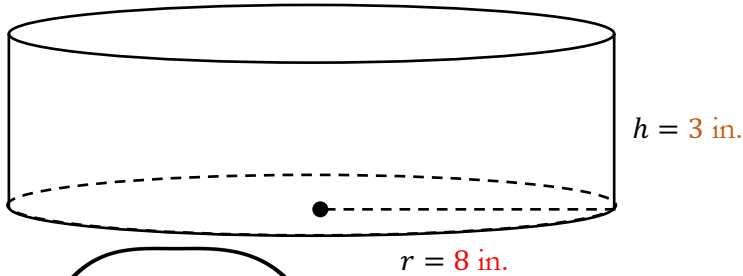


What happens to the volume of a cylinder with radius 4 in. and height 3 in. when you scale the radius?

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



Damien's "Double the Radius" Method



If I double the radius, I have a new radius of 8 in.

Let me calculate the volume with the new radius.

If I divide the new volume by the original, I see that doubling the radius causes the volume to be four times the original!

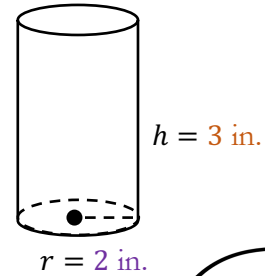
$$V = \pi r^2 h$$

$$V = \pi (8)^2 (3)$$

$$V = 192\pi \text{ in.}^3$$

$$\frac{192\pi}{48\pi} = 4$$

Sydney's "Halve the Radius" Method



If I halve the radius, I have a new radius of 2 in.

Let me calculate the volume with the new radius.

If I divide the new volume by the original, I see that halving the radius makes the volume $\frac{1}{4}$ the volume of the original!

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

$$V = \pi (2)^2 (3)$$

$$V = 12\pi \text{ in.}^3$$

$$\frac{12\pi}{48\pi} = \frac{1}{4}$$



V.3: *Scaling the Radius*

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

Similarities	Differences

2) Explain why multiplying the radius of a cylinder by 2 causes the volume to multiply by 4.

3) If the height of a cylinder stays the same, explain why the volume does NOT quadruple when the radius quadruples.

4) If a figure has a radius of 3 *in.* and a volume of 11 *in.*³, what would the new volume be if the radius were changed to 9 *in.*?

What happens to the volume if the radius is doubled and the height is 3 in.

This was interesting to see the differences between making the radius bigger and making it smaller. When Damien doubled the radius, the volume was 4 times the original, but when I halved the radius, the volume was only $\frac{1}{4}$ the original.

Method

If I halve the radius, I have a new radius of 2 in.

Let me calculate the volume with the new radius.

If I divide the new volume by the original, I see that halving the radius causes the volume to be $\frac{1}{4}$ the original.

Let me calculate the volume with the new radius.

If I divide the new volume by the original, I see that doubling the radius causes the volume to be four times the original!

$$\frac{192\pi}{48\pi} = 4$$

$$\frac{12\pi}{48\pi} = \frac{1}{4}$$

