

Unit 6 Day 5: Volume Formula of A Cylinder

Focus Question: What is the volume formula for a cylinder?

A. Use the cylinder at the right.

1. A cylinder does not meet the definition of a prism (because its base is not a polygon, but it behaves like one when it comes to volume. What was the formula for the volume of any prism?

$V = Bh$

2. What is the shape of the base? What is the formula for its area?

circle $A = \pi r^2$

3. Using your answers to part 1 and 2, find the formula for volume of a cylinder.

$V = Bh$
 $V = (\pi r^2)h$

$V_{cylinder} = \pi r^2 h$
 *memorize

4. What is the exact volume of the cylinder above?

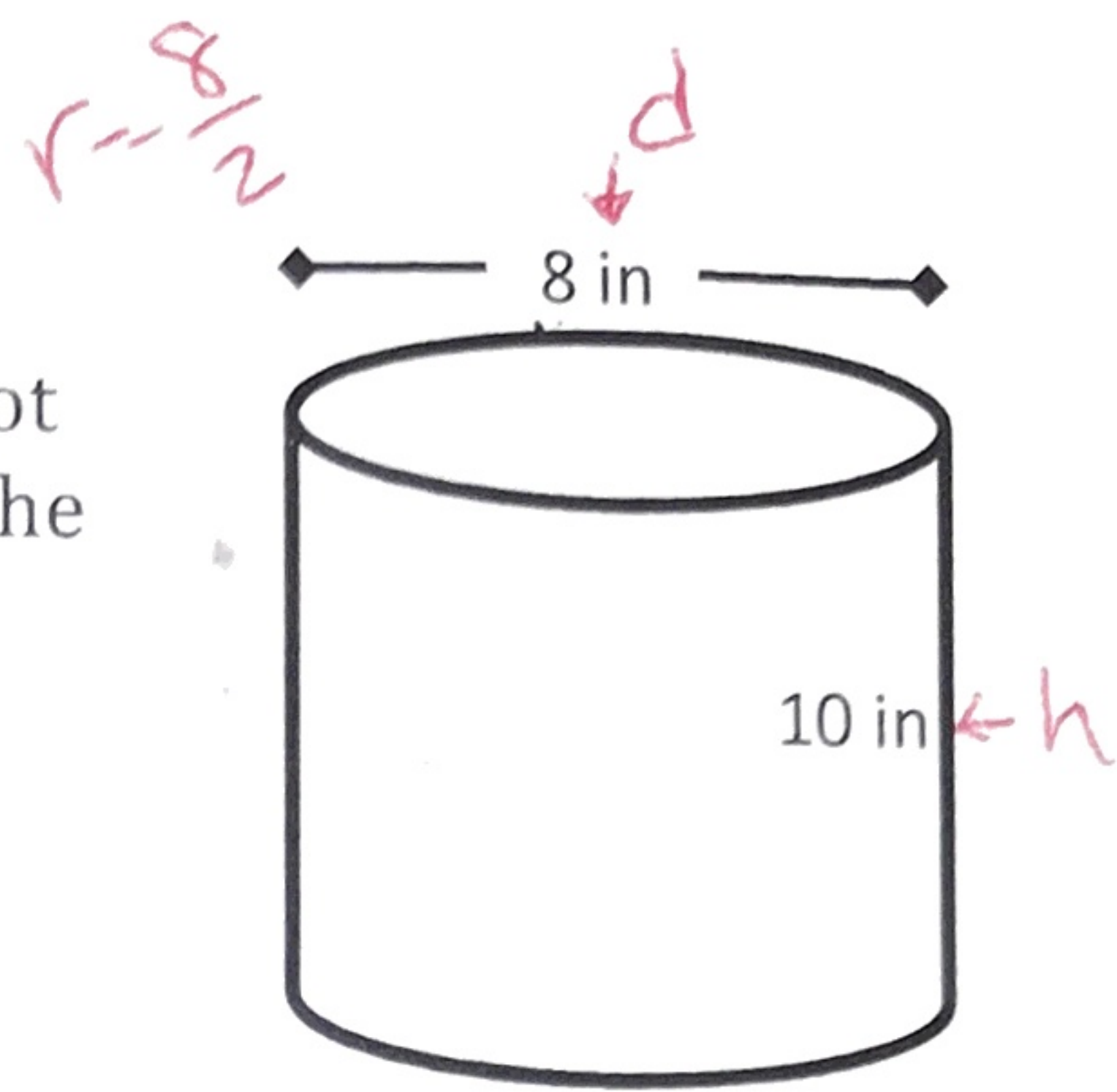
$V_{cy} = \pi r^2 h$
 $V_{cy} = \pi (4)^2 10$

$V_{cy} = 160\pi \text{ in}^3$

5. What is the approximate volume of the cylinder?

(tenths)

$V_{cy} \approx 502.7 \text{ in}^3$



B. Explain how you know that each problem is asking you to find the volume or missing dimension of each cylinder below. Give exact and approximate answers unless indicated otherwise.

1. A can of paint is 15 cm high and has a diameter of 13.6 cm. How much paint is in 4 cans? *(thousandths) r = 13.6/2*

$V_{cy} = \pi r^2 h \cdot 4$
 $V_{cy} = \pi (6.8)^2 \cdot 15 \cdot 4$
 $V_{cy} = 2774.4\pi \text{ cm}^3$

$\approx 8716.035 \text{ cm}^3$

2. A cylindrical plant container has a capacity of 1200 cubic inches of dirt. If the diameter of the container is 12 inches, what is the height? *hold: Volume! r = 12/2*

$V_{cy} = \pi r^2 h$
 $1200 = \pi (6)^2 h$
 $\frac{1200}{36\pi} = \frac{36\pi \cdot h}{36\pi}$

$h = \frac{1200}{36\pi} \div \frac{12}{12}$

$h = \frac{100}{(3\pi)} \text{ in} \approx 10.610 \text{ in}$

3. A can of soda holds 500 cubic centimeters and had a height of 15 centimeters. What is its approximate radius?

$V_{cy} = \pi r^2 h$
 $\frac{500}{15\pi} = \frac{\pi r^2 \cdot 15}{15\pi}$

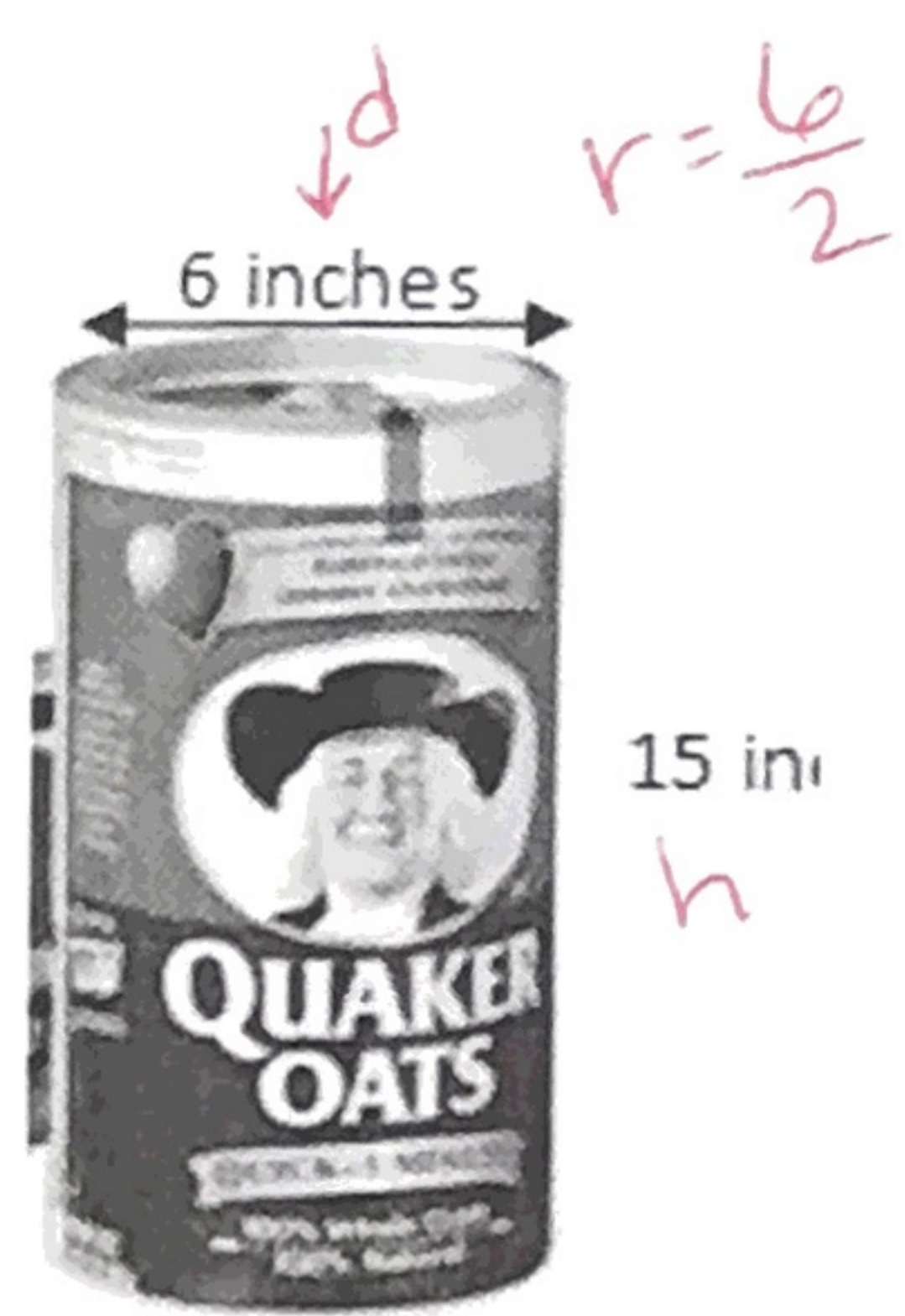
$r \approx 3.257 \text{ cm}$

$\sqrt{10.610} \approx \sqrt{r^2}$

4. Ashley's oatmeal container is $\frac{3}{4}$ full. How much of the container is air?

$V_{cy} = \frac{\pi r^2 h}{4}$

$(1 - \frac{3}{4})$



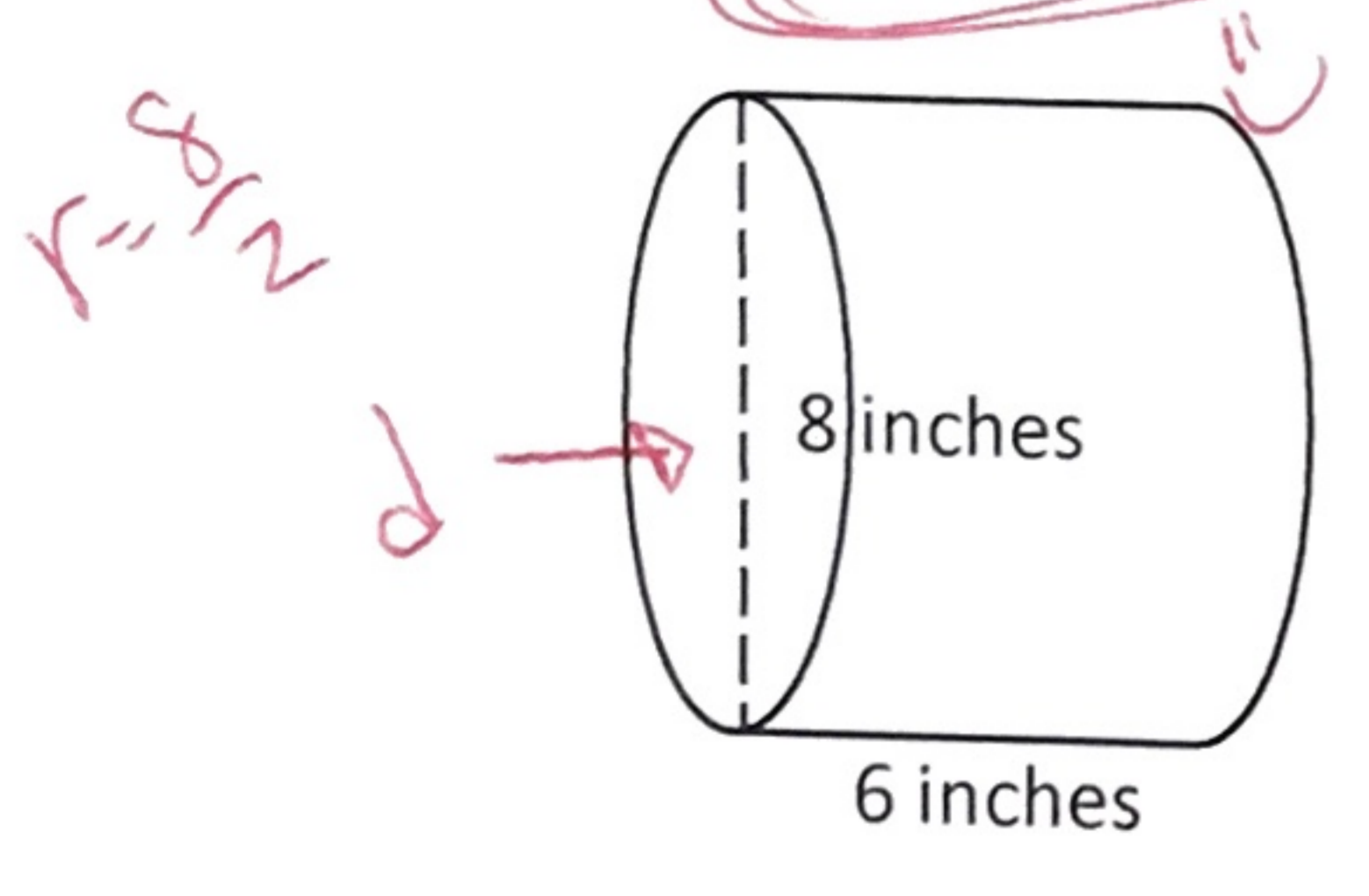
$V_{cy} = \frac{\pi(3)^2 \cdot 15}{4}$

$V_{cy} = \frac{135\pi}{4} \text{ in}^3$

$V_{cy} = 33.75\pi \text{ in}^3$

$\approx 106.029 \text{ in}^3$

5. Find the volume of the structure below if a single cylinder as the following dimensions:



$V_{cy} = \pi r^2 h \cdot 6$

$V_{cy} = \pi(4)^2(6) \cdot 6$

$V_{cy} = 576\pi \text{ in}^3$

$\approx 1809.557 \text{ in}^3$