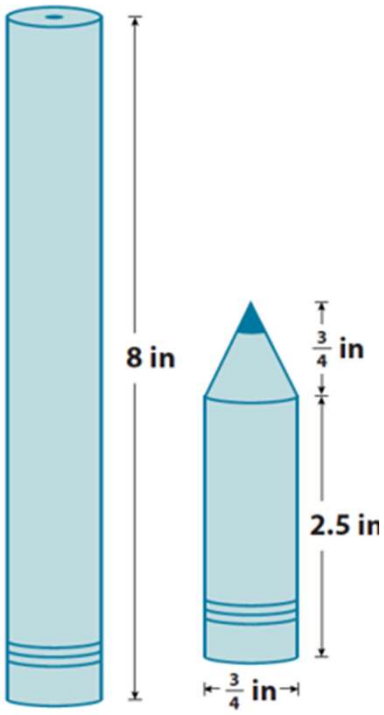
Volume of Composite Solids

Andrew bought a new pencil like the one shown below on the left. He used the pencil every day in his math class for a week, and now his pencil looks like the one shown below on the right. How much of the pencil, in terms of volume, did he use?



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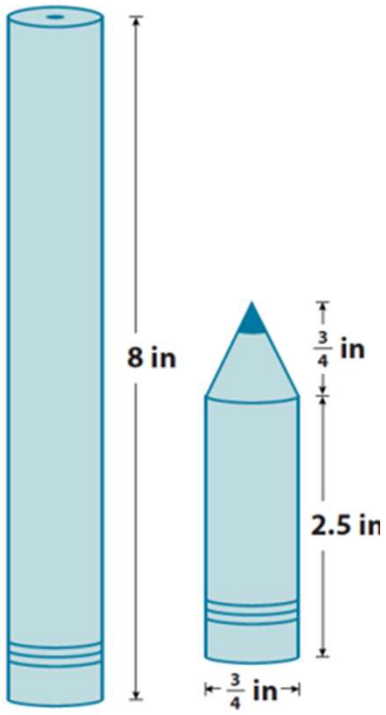

$$V = \pi(0.375)^2(8)$$
$$V = 1.125\pi$$

Volume of the pencil at the beginning of the week was $1.125\pi\ in^3$.

$$V = \pi(0.375)^2(2.5)$$
$$V \approx 0.3515\pi$$

The volume of the cylindrical part of the pencil is approximately $0.3515\pi\ in^3$.

$$V = \frac{1}{3}\pi(0.375)^2(0.75)$$
$$V \approx \frac{0.1054}{3}\pi$$
$$V \approx 0.0351\pi$$

The volume of the cone part of the pencil is approximately $0.0351\pi\ in^3$.

$0.3515\pi + 0.0351\pi = (0.3515 + 0.0351)\pi = 0.3866\pi$

The total volume of the pencil after a week is approximately $0.3866\pi\ in^3$.

$1.125\pi - 0.3866\pi = (1.125 - 0.3866)\pi = 0.7384\pi$

In one week, Andrew used approximately $0.7384\pi\ in^3$ *of the pencil's total volume.*