

Section 8.2

Length, Area, and Volume



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Length

- The meter is used to measure things that we normally measure in yards and feet.
- Centimeters and millimeters are used to measure what we normally measure in inches.
 - A centimeter is a little less than a half of an inch.
 - A millimeter is about the thickness of a dime.

Example: The length of a pair of scissors would be measured in centimeters.



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Area

- Areas are always expressed in square units.

Example:

The length of a rectangular park is 82.5 m, and its width is 25.4 m. Find the area of the park.

Solution: Area = length \times width.

$$A = 82.5\text{m} \times 25.4\text{m}$$

$$A = 2095.5 \text{ m}^2$$



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Volume

- When a figure has three dimensions: length, width and height, the *volume* can be found.
- The volume of an item can be considered the space occupied by the item.
- Volume can be expressed in terms of liters or cubic meters.

Volume in Cubic Units		Volume in Liters
1 cm ³	=	1 mL
1 dm ³	=	1 L
1 m ³	=	1 kL



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Volume

- When the volume of a liquid is measured, the abbreviation cc is often used instead of cm^3 to represent cubic centimeters.

Example: An asthma patient must mix 0.25 cc of a bronchodilator with 2 cc of saline to use in an aerosol machine.

- How many milliliters of the bronchodilator will be administered?
- What is the total volume of drug and saline solution in milliliters?



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Volume (continued)

Solution:

- Since 1 cc is equal in volume to 1 milliliter, there will be 0.25 milliliters of the bronchodilator.
- The total volume is $0.25 + 2$ or 2.25 cc, which is equal to 2.25 mL.



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Example: Volume Application

A cylindrical shampoo bottle has a diameter of 6 cm and a height of 12 cm. What is the volume in milliliters?

Solution:

$$V = \pi r^2 h$$
$$V = 3.14 (3)^2 12$$
$$V = 339.12 \text{ cm}^3$$
$$V = 339.12 \text{ mL}$$



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