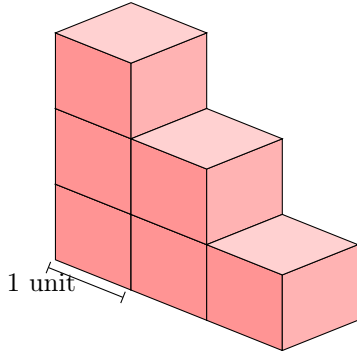


# VOLUME

## A WHAT IS VOLUME?

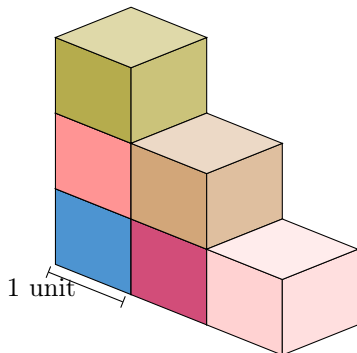
### A.1 FINDING VOLUME OF A SHAPE

**Ex 1:** What is the volume of the red figure?



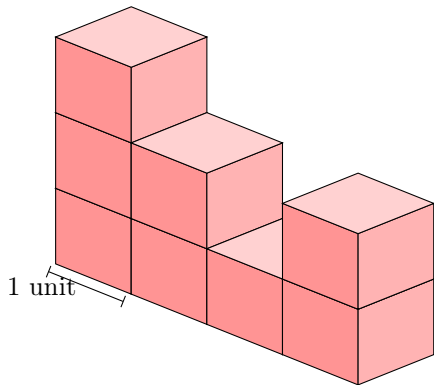
**6** cubic units

*Answer:* To find the volume, we count the number of unit cubes inside the shape.



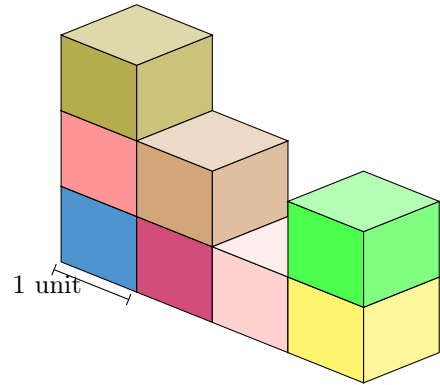
The volume is 6 cubic units.

**Ex 2:** What is the volume of the red figure?



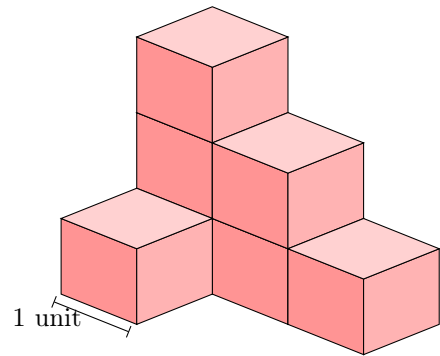
**8** cubic units

*Answer:* To find the volume, we count the number of unit cubes inside the shape.



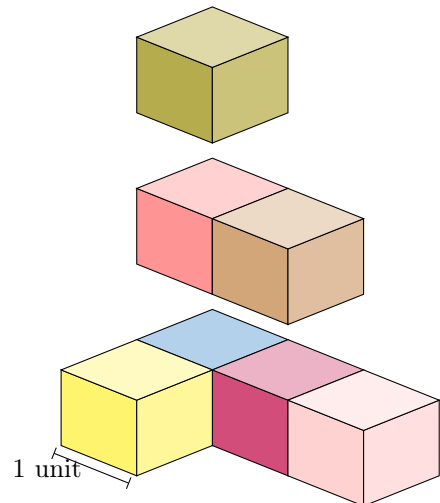
The volume is 8 cubic units.

**Ex 3:** What is the volume of the red figure?



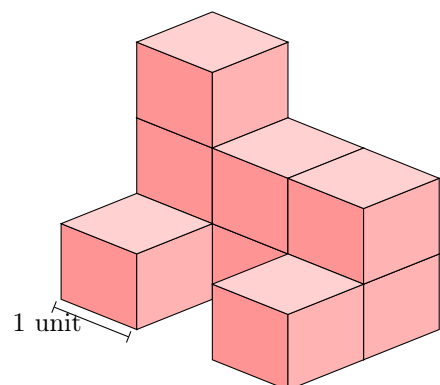
**7** cubic units

*Answer:* To find the volume, we count the number of unit cubes inside the shape.



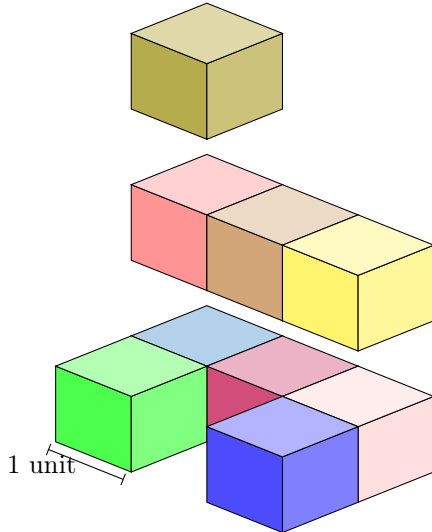
The volume is 7 cubic units.

**Ex 4:** What is the volume of the red figure?



9 cubic units

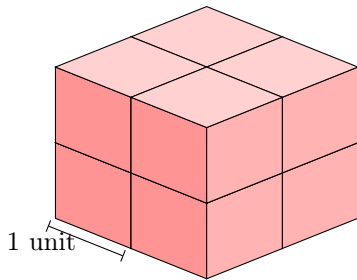
*Answer:* To find the volume, we count the number of unit cubes inside the shape.



The volume is 9 cubic units.

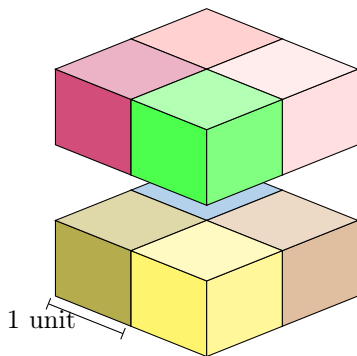
## A.2 FINDING VOLUME OF A RECTANGULAR CUBOID

**Ex 5:** What is the volume of the red figure?



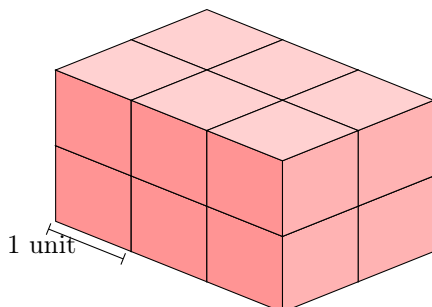
8 cubic units

*Answer:* To find the volume, we count the number of unit cubes inside the shape.



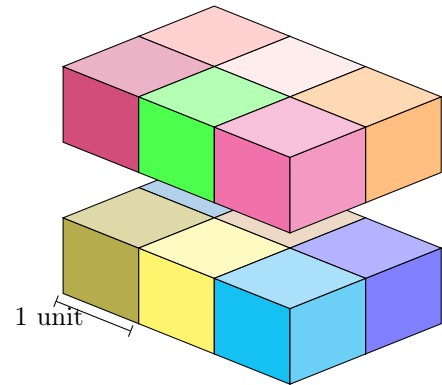
The volume is 8 cubic units.

**Ex 6:** What is the volume of the red figure?



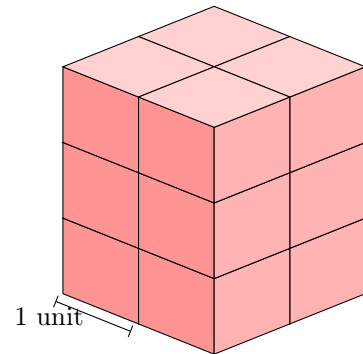
12 cubic units

*Answer:* To find the volume, we count the number of unit cubes inside the shape.



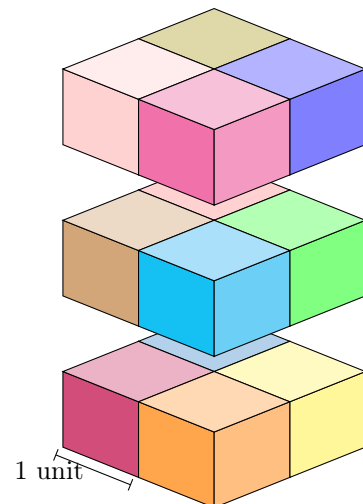
The volume is 12 cubic units.

**Ex 7:** What is the volume of the red figure?



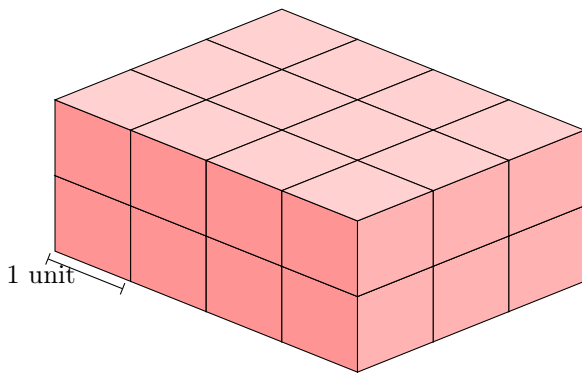
12 cubic units

*Answer:* To find the volume, we count the number of unit cubes inside the shape.



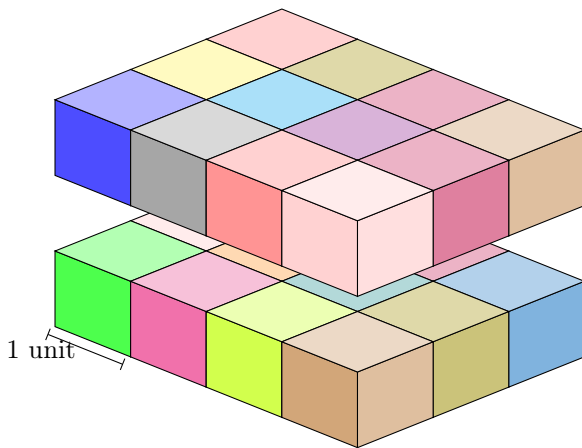
The volume is 12 cubic units.

**Ex 8:** What is the volume of the red figure?



**24** cubic units

*Answer:* To find the volume, we count the number of unit cubes inside the shape.



The volume is 24 cubic units.

## B UNITS OF VOLUME

### B.1 CHOOSING UNITS FOR VOLUME

**MCQ 9:** What unit will be used to measure the volume of your bedroom?

**Choose 1 answer:**

- ☐ Cubic centimeters
- ☒ Cubic meters

*Answer:* Cubic meters will be used to measure the volume of your bedroom because it's a larger unit.

**MCQ 10:** What unit will be used to measure the volume of a small toy block?

**Choose 1 answer:**

- ☒ Cubic centimeters
- ☐ Cubic meters

*Answer:* Cubic centimeters will be used to measure the volume of a small toy block because it's a smaller unit.

**MCQ 11:** What unit will be used to measure the volume of a book?

**Choose 1 answer:**

- ☒ Cubic centimeters
- ☐ Cubic meters

*Answer:* Cubic centimeters will be used to measure the volume of a book because it's a smaller unit.

**MCQ 12:** What unit will be used to measure the volume of a swimming pool?

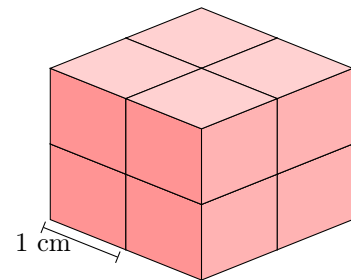
**Choose 1 answer:**

- ☐ Cubic centimeters
- ☒ Cubic meters

*Answer:* Cubic meters will be used to measure the volume of a swimming pool because it's a larger unit.

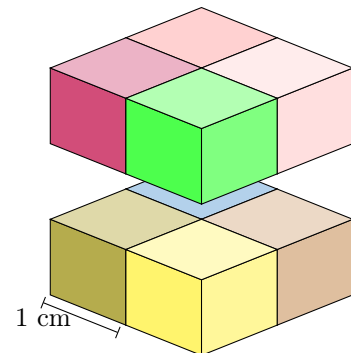
### B.2 FINDING VOLUME OF A RECTANGULAR CUBOID

**Ex 13:** What is the volume of the red figure?



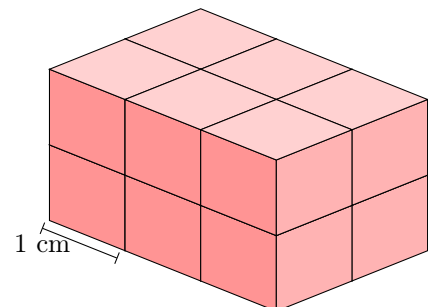
$$V = \boxed{8} \text{ cm}^3$$

*Answer:* To find the volume, we count the number of cubes inside the shape. Each cube is 1 cm by 1 cm by 1 cm, so each cube is 1 cm<sup>3</sup>.



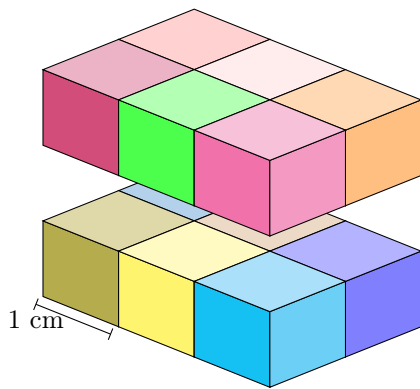
The volume is 4+4=8 cm<sup>3</sup>.

**Ex 14:** What is the volume of the red figure?



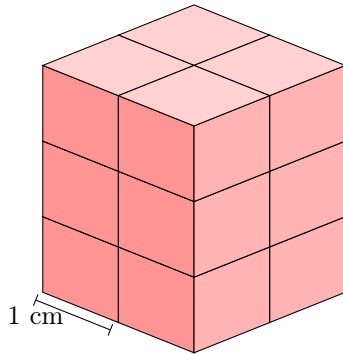
$$V = \boxed{12} \text{ cm}^3$$

*Answer:* To find the volume, we count the number of cubes inside the shape. Each cube is 1 cm by 1 cm by 1 cm, so each cube is 1 cm<sup>3</sup>.



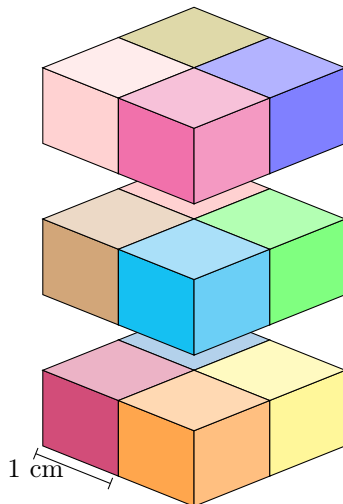
The volume is  $6+6=12 \text{ cm}^3$ .

**Ex 15:** What is the volume of the red figure?



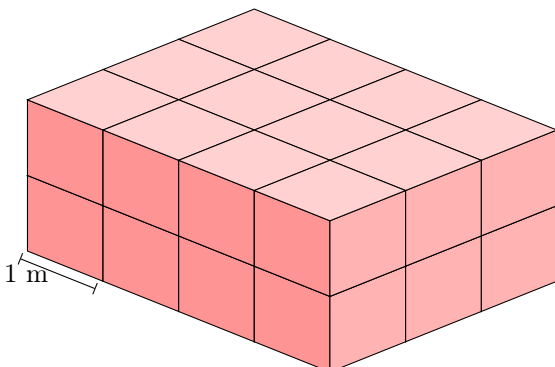
$$V = 12 \text{ cm}^3$$

*Answer:* To find the volume, we count the number of cubes inside the shape. Each cube is 1 cm by 1 cm by 1 cm, so each cube is  $1 \text{ cm}^3$ .



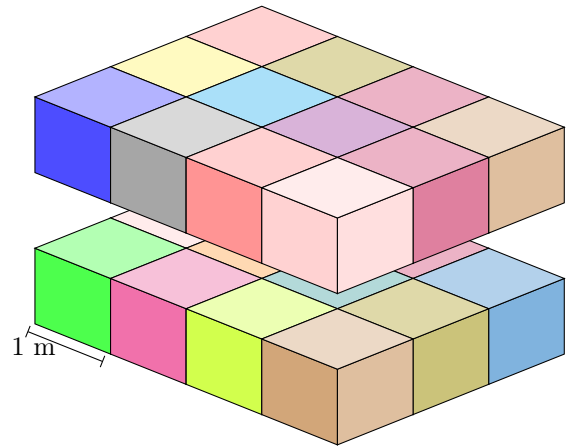
The volume is  $4+4+4=12 \text{ cm}^3$ .

**Ex 16:** What is the volume of the red figure?



$$V = 24 \text{ m}^3$$


*Answer:* To find the volume, we count the number of cubes inside the shape. Each cube is 1 m by 1 m by 1 m, so each cube is  $1 \text{ m}^3$ .

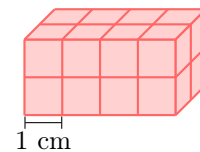


The volume is  $12+12=24 \text{ m}^3$ .

## C VOLUME OF A RECTANGULAR CUBOID

### C.1 FINDING THE VOLUMES OF RECTANGULAR CUBOIDS


**Ex 17:**  What is the volume of the red figure?

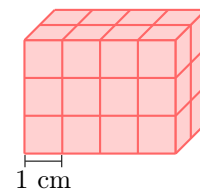


$$V = 16 \text{ cm}^3$$

*Answer:* Length = 4 cm, width = 2 cm and height = 2 cm.

$$\begin{aligned} V &= \text{length} \times \text{width} \times \text{height} \\ &= 4 \text{ cm} \times 2 \text{ cm} \times 2 \text{ cm} \\ &= 16 \text{ cm}^3 \end{aligned}$$


**Ex 18:**  What is the volume of the red figure?

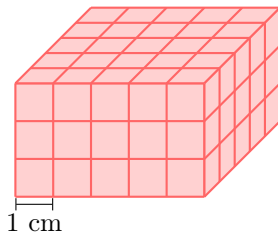


$$V = 24 \text{ cm}^3$$

*Answer:* Length = 4 cm, width = 3 cm and height = 2 cm.

$$\begin{aligned} V &= \text{length} \times \text{width} \times \text{height} \\ &= 4 \text{ cm} \times 3 \text{ cm} \times 2 \text{ cm} \\ &= 24 \text{ cm}^3 \end{aligned}$$


**Ex 19:**  What is the volume of the red figure?

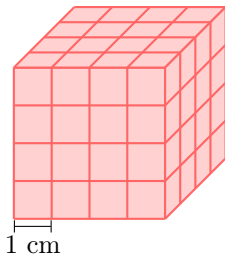


$$V = \boxed{75} \text{ cm}^3$$

*Answer:* Length = 5 cm, width = 3 cm and height = 5 cm.

$$\begin{aligned} V &= \text{length} \times \text{width} \times \text{height} \\ &= 5 \text{ cm} \times 3 \text{ cm} \times 5 \text{ cm} \\ &= 75 \text{ cm}^3 \end{aligned}$$


**Ex 20:**  What is the volume of the red figure?

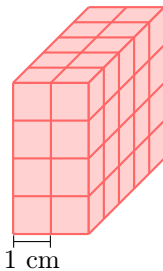


$$V = \boxed{64} \text{ cm}^3$$

*Answer:* Length = 4 cm, width = 4 cm and height = 4 cm.

$$\begin{aligned} V &= \text{length} \times \text{width} \times \text{height} \\ &= 4 \text{ cm} \times 4 \text{ cm} \times 4 \text{ cm} \\ &= 64 \text{ cm}^3 \end{aligned}$$


**Ex 21:**  What is the volume of the red figure?

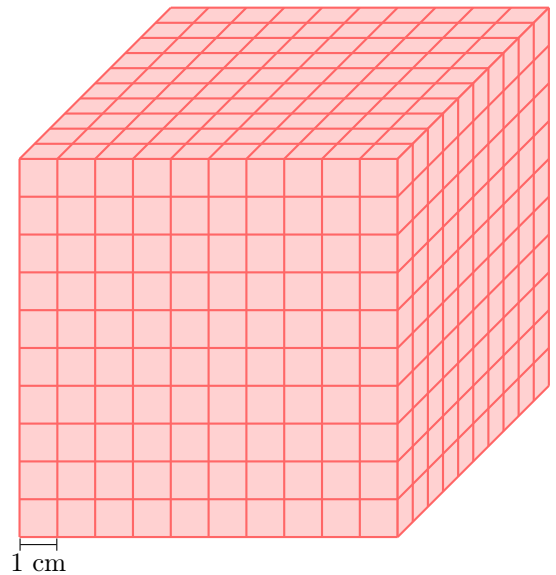


$$V = \boxed{40} \text{ cm}^3$$

*Answer:* Length = 2 cm, width = 4 cm and height = 5 cm.

$$\begin{aligned} V &= \text{length} \times \text{width} \times \text{height} \\ &= 2 \text{ cm} \times 4 \text{ cm} \times 5 \text{ cm} \\ &= 40 \text{ cm}^3 \end{aligned}$$

**Ex 22:**  What is the volume of the red figure?




$$V = \boxed{1000} \text{ cm}^3$$

*Answer:* Length = 10 cm, width = 10 cm and height = 10 cm.

$$\begin{aligned} V &= \text{length} \times \text{width} \times \text{height} \\ &= 10 \text{ cm} \times 10 \text{ cm} \times 10 \text{ cm} \\ &= 1000 \text{ cm}^3 \end{aligned}$$

## C.2 SOLVING PROBLEMS

**Ex 23:**  A rectangular swimming pool is 8 m long, 5 m wide, and 2 m deep. The water costs 10 dollars per cubic meter. What is the volume of the swimming pool?

$$V = \boxed{80} \text{ m}^3$$

What is the cost to fill the swimming pool with water?

$$\boxed{800} \text{ dollars}$$


*Answer:*

- The volume of the rectangular swimming pool is:

$$\begin{aligned} V &= \text{length} \times \text{width} \times \text{height} \\ &= 8 \text{ m} \times 5 \text{ m} \times 2 \text{ m} \\ &= 80 \text{ m}^3 \end{aligned}$$

- The cost to fill the swimming pool with water is calculated by:

$$\begin{aligned} \text{Cost} &= \text{Volume} \times \text{cost per m}^3 \\ &= 80 \text{ m}^3 \times 10 \text{ dollars per m}^3 \\ &= 800 \text{ dollars} \end{aligned}$$

**Ex 24:**  A container has a volume of 20 m<sup>3</sup>. A box is 2 m long, 1 m wide, and 0.5 m high. What is the volume of the box?

$$V = \boxed{1} \text{ m}^3$$

How many boxes can fit inside the container?

20 boxes


*Answer:*

- The volume of the box is:

$$\begin{aligned} V &= \text{length} \times \text{width} \times \text{height} \\ &= 2 \text{ m} \times 1 \text{ m} \times 0.5 \text{ m} \\ &= 1 \text{ m}^3 \end{aligned}$$

- The number of boxes that can fit inside the container is calculated by:

$$\begin{aligned} \text{Number of boxes} &= \text{Volume of container} \div \text{Volume of one box} \\ &= 20 \text{ m}^3 \div 1 \text{ m}^3 \\ &= 20 \text{ boxes} \end{aligned}$$

**Ex 25:**  A storage room has a volume of  $150 \text{ m}^3$ . A water tank is 5 m long, 2 m wide, and 3 m high. What is the volume of the water tank?

$$V = \text{30} \text{ m}^3$$

How many water tanks can fit inside the storage room?

5 water tanks


*Answer:*

- The volume of the water tank is:

$$\begin{aligned} V &= \text{length} \times \text{width} \times \text{height} \\ &= 5 \text{ m} \times 2 \text{ m} \times 3 \text{ m} \\ &= 30 \text{ m}^3 \end{aligned}$$

- The number of water tanks that can fit inside the storage room is calculated by:

$$\begin{aligned} \text{Number of water tanks} &= \text{Volume of room} \div \text{Volume of one tank} \\ &= 150 \text{ m}^3 \div 30 \text{ m}^3 \\ &= 5 \text{ water tanks} \end{aligned}$$

**Ex 26:**  A rectangular fish tank is 2 m long, 1 m wide, and 1 m deep. The water costs 15 dollars per cubic meter. What is the volume of the fish tank?

$$V = \text{2} \text{ m}^3$$

What is the cost to fill the fish tank with water?

30 dollars

*Answer:*

- The volume of the rectangular fish tank is:

$$\begin{aligned} V &= \text{length} \times \text{width} \times \text{height} \\ &= 2 \text{ m} \times 1 \text{ m} \times 1 \text{ m} \\ &= 2 \text{ m}^3 \end{aligned}$$

- The cost to fill the fish tank with water is calculated by:

$$\begin{aligned} \text{Cost} &= \text{Volume} \times \text{cost per m}^3 \\ &= 2 \text{ m}^3 \times 15 \text{ dollars per m}^3 \\ &= 30 \text{ dollars} \end{aligned}$$