

# Ch9 Review Volumes of Prisms

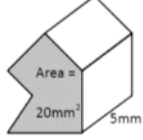
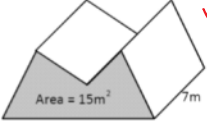
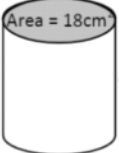
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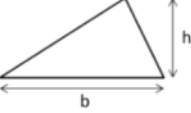
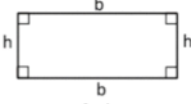
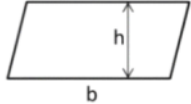

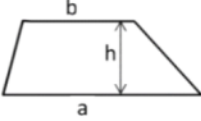
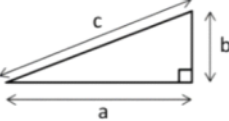
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## Math 8 Chapter 9 Review: Volumes of Prisms

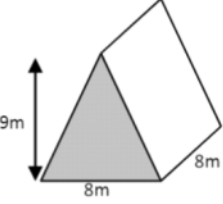
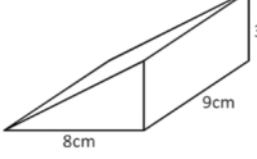
1. Find the volume of each of the following Prisms. Show your work with the space provided:

 <p>Area = 20mm<sup>2</sup> 5mm</p> <p>Vol = (20mm<sup>2</sup>) × 5mm = 100 mm<sup>3</sup></p>	 <p>Area = 15m<sup>2</sup> 7m</p> <p>Vol = (15m<sup>2</sup>) × 7m = 105 m<sup>3</sup></p>	 <p>Area = 18cm<sup>2</sup> 9cm</p> <p>Vol = (18cm<sup>2</sup>) × 9cm = 162 cm<sup>3</sup></p>
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2. Name each shape and write the formula for the area of the shape:

 <p>Name of Shape <u>Triangle</u></p> <p>Formula for Area: <u>A = (base × height) / 2</u></p>	 <p>Name of Shape <u>RECTANGLE</u></p> <p>Formula for Area: <u>AREA = base × height</u></p>	 <p>Name of Shape <u>PARALLELOGRAM</u></p> <p>Formula for Area: <u>A = base × height</u></p>
 <p>Name of Shape <u>CIRCLE</u></p> <p>Formula for Area: <u>A = π × r × r</u> <u>= π × r<sup>2</sup></u></p> <p><u>d/2 = r</u></p>	 <p>Name of Shape <u>TRAPEZOID</u></p> <p>Formula for Area: <u>A = ((a+b)/2) × height</u></p>	 <p>Name of Shape <u>RIGHT TRIANGLE</u></p> <p>Formula for Area: <u>A = a × b / 2</u></p>

3. Calculate the volume of each prism by first calculating the area of the base. Show all your work with the space provided:

 <p>9m 8m 8m</p> <p>THE BASE OF THIS PRISM IS THE TRIANGLE IN FRONT B = 8m h = 9m</p> <p>Area of the Base = <math>\frac{8m \times 9m}{2}</math> = 36m<sup>2</sup></p> <p>Vol = (36m<sup>2</sup>) × 8m = 288 m<sup>3</sup></p>	 <p>3cm 8cm 9cm</p> <p>① THE BASE OF THE PRISM IS THE TRIANGLE ② THE HEIGHT OF THE PRISM IS 9cm.</p> <p>Area of the Base = <math>\frac{8cm \times 3cm}{2}</math> = 12cm<sup>2</sup></p> <p>Vol = 12cm<sup>2</sup> × 9cm = 108cm<sup>3</sup></p>
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Area of the Base =  $\frac{7\text{cm} \times 4\text{cm}}{2}$   
 $= 14\text{cm}^2$

Vol =  $(14\text{cm}^2)(12\text{cm})$   $\frac{14 \times 12}{2}$   
 $= 168\text{cm}^3 //$

① THE BASE OF THE CYLINDER IS THE CIRCLE IN THE BOTTOM

Radius = 8. Height = 10

Area of the Base =  $\pi \times 8^2$   
 $= 64\pi \text{ units}^2$   
 $= 201.0619 \text{ units}^2$

Vol =  $64\pi \times 10$   
 $= 640\pi \text{ units}^3$   
 $= 2010.619 \text{ units}^3$

IN THIS CYLINDER, THE RADIUS IS MISSING. WE HAVE THE DIAMETER OF THE CIRCLE.

$R = \frac{\text{DIAMETER}}{2}$   
 $= \frac{5.2}{2} = 2.6\text{m}$

Area of the Base =  $\pi \times 2.6 \times 2.6$   
 $= 6.76\pi \text{ m}^2$   
 $= 21.237 \text{ m}^2$

Vol =  $6.76\pi \times 4.3\text{m}$   
 $= 29.068\pi \text{ m}^3$   $\leftarrow$  You can keep your answer as  $29.068\pi \text{ m}^3$   
 $= 91.3198 \text{ m}^3 //$

① THE BASE OF THE PRISM IS A TRAPEZOID

Area of the Base =  $\left(\frac{5+7}{2}\right) \times 4\text{cm}$   
 $= 24\text{cm}^2 //$

Vol =  $24\text{cm}^2 \times 6\text{cm}$   
 $= 144\text{cm}^3 //$

① THE BASE OF THE PRISM IS THE PARALLELOGRAM IN FRONT.

Area of the Base =  $(2\text{mm}) \times (12\text{mm})$   
 $= 24\text{mm}^2$

Vol =  $(24\text{mm}^2) \times (6\text{mm})$   
 $= 144\text{mm}^3 //$

① THE BASE OF THIS PRISM IS A TRAPEZOID

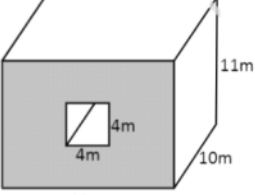
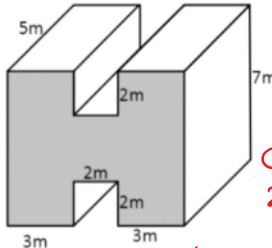
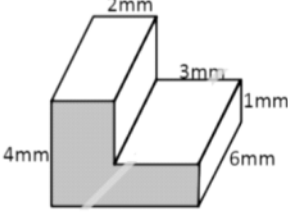
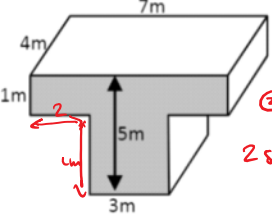
② NOTE: THE '12cm' IS NOT NEEDED

Area of the Base =  $\left(\frac{8+12}{2}\right) \times 9$   
 $= 90\text{cm}^2$

Vol =  $(90\text{cm}^2) \times (13\text{cm})$   
 $= 1170\text{cm}^3 //$

① THE BASE IN FRONT IS

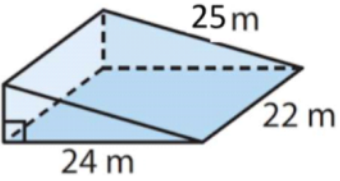
② FIRST STEP IS TO

 <p>① THE BASE IN FRONT IS A LARGE RECTANGLE SUBTRACT A SMALL RECTANGLE.</p> <p>Area of the Base = <math>(12)(11) - (4)(4)</math>  <math>= 132 - 16</math>  <math>= 116 \text{ m}^2</math></p> <p>Vol = <math>(116 \text{ m}^2) \times 10 \text{ m}</math>  <math>= 1160 \text{ m}^3</math></p>	 <p>① FIRST STEP IS TO FIND THE AREA OF THE "H" IN FRONT.</p> <p>② BIG RECTANGLE SUBTR. 2 SMALL SQUARES.</p> <p>Area of the Base = <math>(7 \text{ m})(8 \text{ m}) - 2(2) - (2)(2)</math>  <math>= 56 - 4 - 4 = 48 \text{ m}^2</math></p> <p>Vol = <math>48 \text{ m}^2 \times 5 \text{ m}</math>  <math>= 240 \text{ m}^3</math></p>
 <p>① FIND THE AREA OF "L" IN FRONT.</p> <p>② BIG RECTANGLE SUBTR. SMALL RECTANGLE.</p> <p>Area of the Base = <math>(4 \text{ mm})(5 \text{ mm}) - (3 \text{ mm})(3 \text{ mm})</math>  <math>= 20 \text{ mm}^2 - 9 \text{ mm}^2</math>  <math>= 11 \text{ mm}^2</math></p> <p>Vol = <math>(11 \text{ mm}^2) \times 6 \text{ mm}</math>  <math>= 66 \text{ mm}^3</math></p>	 <p>① FIND THE AREA OF THE "T".</p> <p>② BIG RECT <math>\rightarrow 7 \text{ m} \times 5 \text{ m}</math>      2 small rect <math>\rightarrow 2 \times 4</math>.</p> <p>Area of the Base = <math>(7 \times 5) - (2 \times 4) - (2 \times 4)</math>  <math>= 35 - 8 - 8</math>  <math>= 35 - 16 = 19 \text{ m}^2</math></p> <p>Vol = <math>19 \text{ m}^2 \times 4 \text{ m}</math>  <math>= 76 \text{ m}^3</math></p>


4. In your own words, explain how to find the volume of a prism.

- ① FIRST IDENTIFY THE BASE OF THE PRISM. THE BASE IS THE SIDE THAT IS CONGRUENT OF BOTH ENDS.
- ② GET THE AREA OF THE BASE
- ③ MULTIPLY THE (AREA OF THE BASE) WITH THE HEIGHT.

5. In the diagram below, the height of the triangle is given. Explain how you would find the volume of the prism



① USE THE NOT PYTHAGOREAN THM TO GET THE HEIGHT OF THE TRIANGLE.



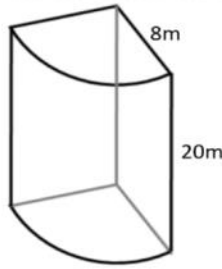
$H^2 + 24^2 = 25^2$   
 $H^2 + 576 = 625$   
 $H^2 = 625 - 576$   
 $H^2 = 49$   
 $H = 7$

THE HEIGHT OF THE TRIANGLE IS 7 m.

② AREA OF TRIANGLE  
 $A = \frac{7 \times 24}{2}$   
 $= 84 \text{ m}^2$

③ MULTIPLY THE AREA OF THE TRIANGLE BY THE HEIGHT OF THE PRISM.  
 - HEIGHT OF PRISM = 22 m  
 Vol =  $84 \text{ m}^2 \times 22 \text{ m}$   
 $= 1848 \text{ m}^3$

6. Find the volume of the solid. Show all your work and steps:



① This solid is a cylinder divided by 4

$$\textcircled{2} V_{\text{ol}} = \frac{\pi \times 8 \times 8 \times 20}{4}$$

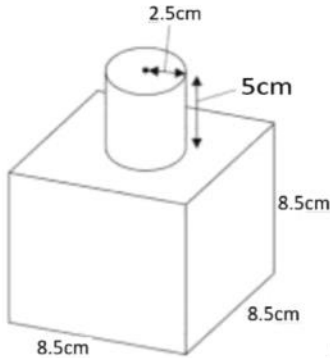
$$= \frac{1280\pi}{4} \text{ m}^3$$

$$= 320\pi \text{ m}^3$$

$$= 1005.31 \text{ m}^3$$

← AGAIN, KEEPING YOUR ANSWER IN TERMS OF  $\pi$  IS O.K.

7. Find the volume of the 3D solid. Show all your work and steps



① There are two solids here. A cylinder & a box.

② Cylinder  $\rightarrow R=2.5\text{cm}$   
 $h=5\text{cm}$

$$V = \pi (2.5) \times (2.5) \times 5\text{cm}$$

$$= 31.25\pi \text{ cm}^3$$

$$= 98.17469 \text{ cm}^3$$

③ Vol of Box

$$V = 8.5 \times 8.5 \times 8.5$$

$$= 614.125 \text{ cm}^3$$

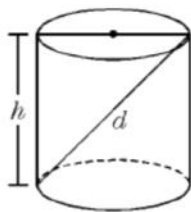
④ Total =  $614.125 \text{ cm}^3 + 31.25\pi$

$$= 614.125 + 98.17469$$

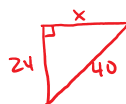
$$= 712.2997 \text{ cm}^3$$

8. The radius of the following cylinder is unknown. Explain how you would find the volume of the following solid:

$h = 24\text{cm}$ ,  $d = 40\text{cm}$



① First step is to find the diameter by using the Pythagorean Thm.



$$x^2 + 24^2 = 40^2$$

$$x^2 + 576 = 1600$$

$$x^2 = 1024$$

$$x = 32\text{cm}$$

Diameter = 32cm

② Radius =  $32 \div 2$   
 $= 16\text{cm}$

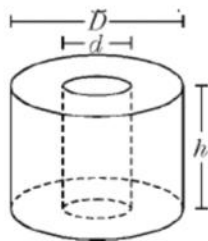
③ Vol =  $\pi \times 16 \times 16 \times 24$

$$= 6144\pi \text{ cm}^3$$

$$= 19,301.93 \text{ cm}^3$$

9. The following cylinder has a hole cut out in the middle. What is the volume of the remaining solid:

$D = 24\text{cm}$ ,  $d = 6\text{cm}$ ,  $h = 18\text{cm}$



① The volume of the remaining solid is the big cylinder subtract the small cylinder

② Big cylinder

$$D = 24\text{cm} \rightarrow r = 12\text{cm}$$

$$V = \pi \times 12 \times 12 \times 18$$

$$= \pi \times 2592 \text{ cm}^3$$

$$= 8143 \text{ cm}^3$$

③ Small cylinder

$$D = 6\text{cm} \rightarrow r = 3\text{cm}$$

$$V = \pi \times 3 \times 3 \times 18$$

$$= 162\pi \text{ cm}^3$$

$$= 508.94 \text{ cm}^3$$

④ Volume = Big cylinder - Small cylinder

$$= 2592\pi - 162\pi$$

$$= 2430\pi \text{ cm}^3$$

$$= 7634.06 \text{ cm}^3$$