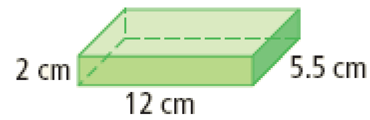
Chapter 7 Practice Test

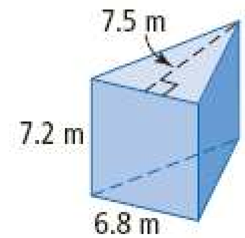
Chapter 7 Practice Test Page 278 Question 1

Answer: **C**



Volume of a right rectangular prism = (length × width) × height
$V = l \times w \times h$
$V = 12 \times 5.5 \times 2$
$V = 132$
The volume of the right rectangular prism is 132 cm^3.

Chapter 7 Practice Test Page 278 Question 2



Answer: **B**
Volume of a right triangular prism = (base × height ÷ 2) × height of prism
$V = (6.8 \times 7.5 \div 2) \times 7.2$
$V = 183.6$
The volume of the right triangular prism is 183.6 m^3.

Chapter 7 Practice Test Page 278 Question 3

Answer: **D**
Volume of a cube = (area of base) × height
$V = s \times s \times s$
$V = 8 \times 8 \times 8$
$V = 512$
The volume of the cube is 512 cm^3.

Chapter 7 Practice Test Page 278 Question 4

Answer: **C**
The diameter of the base is 7.5 cm. The radius is half the diameter: $r = 7.5 \div 2 = 3.75$
Volume of a cylinder = area of circular base × height of cylinder
$V = (\pi \times r^2) \times h$
$V = (3.14 \times 3.75^2) \times 24$
$V = 1059.75$
The volume of the cylinder is 1059.75 mm^3**.**

Chapter 7 Practice Test Page 278 Question 5

Answer: **B**
Find the volume of the right rectangular prism.
Volume of a right rectangular prism = (length × width) × height
$V = l \times w \times h$
$V = 30 \times 25 \times 12$
$V = 9000$
The volume of the trough is 9000 cm^3.

Find the volume of the cylindrical heater.
Volume of a cylinder = area of circular base × height of cylinder
$V = (\pi \times r^2) \times h$
$V = (3.14 \times 5^2) \times 12$
$V = 942$
The volume of the cylinder is 942 cm^3**.**

To find the maximum volume of water in the trough in winter, subtract the volume of the heater from the volume of the trough:
9000 – 942 = 8058
The maximum volume of water in the trough in winter is 8058 cm^3**.**

Chapter 7 Practice Test Page 278 Question 6

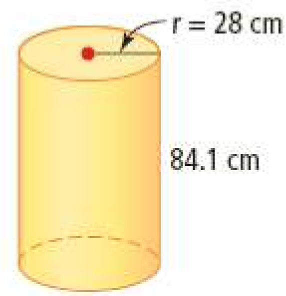
To find the height of a cylinder, divide the volume by the area of the base.
Height of cylinder = volume of cylinder ÷ area of circular base
$h = 140 \div 20$
$h = 7$
The height of the cylinder is 7 cm.

Chapter 7 Practice Test Page 278 Question 7

Volume of a right rectangular prism = (length × width) × height
$V = l \times w \times h$
$V = 3 \times 4 \times 6$
$V = 72$
The volume of the right rectangular prism is 72 cm^3.

Chapter 7 Practice Test Page 278 Question 8

Volume of a cylinder = area of circular base × height of cylinder
$V = (\pi \times r^2) \times h$
$V = (3.14 \times 28^2) \times 84.1$
$V = 207\ 034.0$
The volume of the cylinder to the nearest tenth of a cubic centimetre is 207 034.0 cm^3.



Chapter 7 Practice Test Page 278 Question 9

Find the volume of one of the rectangular prism–shaped boxes.
Volume of a right rectangular prism = (length × width) × height
$V = l \times w \times h$
$V = 29.5 \times 18 \times 9.5$
$V = 5044.5$
The volume of one of the boxes is 5044.5 cm^3.

To find the volume of 12 boxes, multiply 12 by the volume of one box:
$12 \times 5044.5 = 60\ 534$
Twelve of these boxes will take up 60 534 cm^3 of Ying's closet.

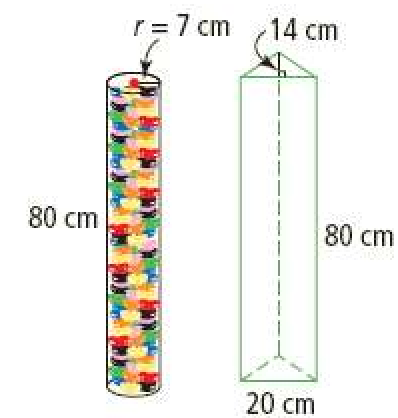
Chapter 7 Practice Test Page 278 Question 10

To determine the volume of apple juice Ian needs to clean up, find the volume of the cylindrical can.
The diameter of the cylinder base is 10 cm. The radius is half the diameter: $r = 10 \div 2 = 5$
Volume of a cylinder = area of circular base × height of cylinder
$V = (\pi \times r^2) \times h$
$V = (3.14 \times 5^2) \times 17.5$
$V = 1373.75$
Ian had to clean up 1373.75 cm^3 of apple juice.

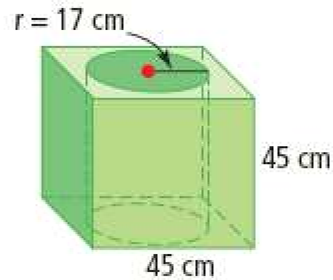
Chapter 7 Practice Test Page 278 Question 11

Find the volume of the cylindrical storage container.
Volume of a cylinder = area of circular base × height of cylinder
$V = (\pi \times r^2) \times h$
$V = (3.14 \times 7^2) \times 80$
$V = 12\ 308.8$
The cylindrical storage container holds 12 308.8 cm^3.

Find the volume of the right triangular prism–shaped storage container.
Volume of a right triangular prism = (base × height ÷ 2) × height of prism
$V = (20 \times 14 \div 2) \times 80$
$V = 11\ 200$
The triangular prism–shaped container holds 11 200 cm^3.
The cylindrical storage container is larger because it has a larger volume.



Chapter 7 Practice Test Page 279 Question 12



Find the volume of the cube.
Volume of a cube = (area of base) × height
$V = s \times s \times s$
$V = 45 \times 45 \times 45$
$V = 91\ 125$
The volume of the cube is 91 125 cm^3.

Find the volume of the cylindrical hole.
Volume of a cylinder = area of circular base × height of cylinder
$V = (\pi \times r^2) \times h$
$V = (3.14 \times 17^2) \times 45$
$V = 40\ 835.7$
The volume of the cylindrical hole is 40 835.7 cm^3.

To find the volume of a cube with a cylindrical hole in it, subtract the volume of the cylinder from the volume of the cube:
91 125 – 40 835.7 = 50 289.3
The volume of the cube with the hole in it is 50 289.3 cm^3.

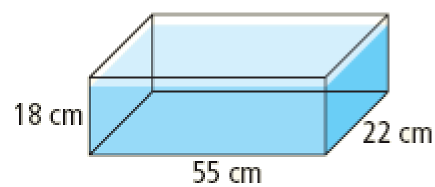
Chapter 7 Practice Test Page 279 Question 13

Find the volume of the rectangular prism–shaped bin.
Volume of a right rectangular prism = (length × width) × height
$V = l \times w \times h$
$V = 2.5 \times 2 \times 2$
$V = 10$
The volume of garbage bin is 10 m^3.

Find the volume of a cylindrical garbage can.
The diameter of the cylinder base is 0.75 cm. The radius is half the diameter:
$r = 0.75 \div 2 = 0.375$
Volume of a cylinder = area of circular base × height of cylinder
$V = (\pi \times r^2) \times h$
$V = (3.14 \times 0.375^2) \times 1.2$
$V = 0.53$
The volume of a cylindrical garbage can is 0.53 m^3.

To determine how many garbage cans will fill the bin, divide the volume of the bin by the volume of a garbage can:
$10 \div 0.53 = 18.87$
To the nearest full can, 19 cylindrical garbage cans can be emptied into the bin before it is full.

Chapter 7 Practice Test Page 279 Question 14



a) Volume of a right rectangular prism = (length × width) × height
$V = l \times w \times h$
$V = 55 \times 22 \times 18$
$V = 21\ 780$
The volume of the aquarium tank is 21 780 cm^3.
To convert this amount to litres, divide 21 780 by 1000: 21 780 ÷ 1000 = 21.78
The aquarium tank will hold 21.78 L when filled to the top.

b) To find the new height, subtract 5.4 from 18: 18 – 5.4 = 12.6
The new height is 12.6 cm.
Volume of a right rectangular prism = (length × width) × height
$V = l \times w \times h$
$V = 55 \times 22 \times 12.6$
$V = 15\ 246$
The volume of the water in the aquarium tank is 15 246 cm^3.
To convert this amount to litres, divide 15 246 by 1000: 15246 ÷ 1000 = 15.246
A total of 15.246 L of water are in the tank.

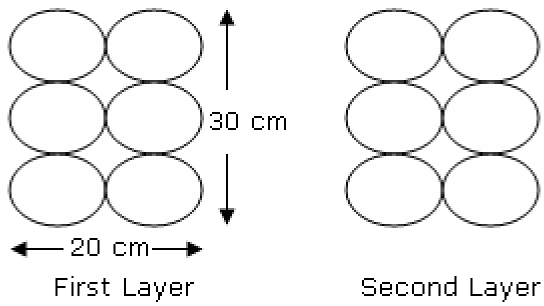
Chapter 7 Practice Test Page 279 Question 15

a) The shape of the patio is a right rectangular prism.
Volume of a right rectangular prism = (length × width) × height
$V = l \times w \times h$
$V = 6 \times 6 \times 0.15$
$V = 5.4$
Yuri needs 5.4 m^3 of concrete.

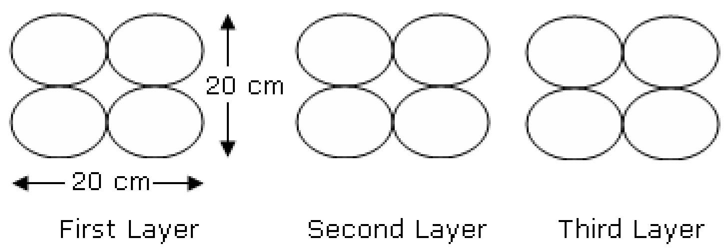
b) To find the cost of the concrete, multiply the volume by $110.00:
$5.4 \times 110.00 = 594$
Yuri has to pay $594.00 before tax.

Chapter 7 Practice Test Page 279 Question 16

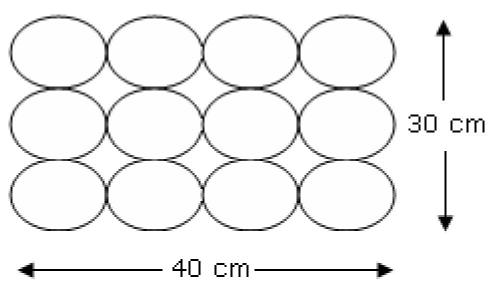
Answers may vary. Example:
a) Placing the jars in two layers, the dimensions could be 20 cm by 30 cm by 50 cm. See diagram below:



Another arrangement with three layers of jars is 20 cm by 20 cm by 75 cm. See diagram below:



Placing one layer of jars in a box, the dimensions would be 40 cm by 30 cm by 25 cm. See diagram below:



b)

Box Number	Length (cm)	Width (cm)	Height (cm)	Volume (cm^3)
1	20	30	50	30 000
2	20	20	75	30 000
3	40	30	25	30 000

Volume of a right rectangular prism = (length × width) × height
$V = l \times w \times h$

Box 1:
$V = 20 \times 30 \times 50$
$V = 30\ 000$
The volume of Box 1 is 30 000 cm^3.

Box 2:
$V = 20 \times 20 \times 75$
$V = 30\ 000$
The volume of Box 2 is 30 000 cm^3.

Box 3:
$V = 40 \times 30 \times 25$
$V = 30\ 000$
The volume of Box 3 is 30 000 cm^3.

c) Find the volume of one of the cylindrical jars.
Volume of a cylinder = area of circular base × height of cylinder
$V = (\pi \times r^2) \times h$
$V = (3.14 \times 5^2) \times 25$
$V = 1962.5$
The volume of one of the cylindrical jars is 1962.5 cm^3.

To find the volume of 12 jars, multiply the volume by 12: 1962.5 × 12 = 23 550
The volume of 12 jars is 23 550 cm^3.

To determine the amount of empty space in each box, subtract the volume of the 12 jars from the volume of the box:
30 000 – 23 550 = 6450
The volume of empty space in the box is 6450 cm^3.

d) Find the surface area of each box.
To find the surface area of a right rectangular prism, use the following formula:
Surface area of right rectangular prism = (2 × length × width) + (2 × width × height) + (2 × length × height)
Box 1:
$SA = (2 \times 20 \times 30) + (2 \times 30 \times 50) + (2 \times 20 \times 50)$
$SA = 1200 + 3000 + 2000$
$SA = 6200$
The surface area of Box 1 is 6200 cm^2.

Box 2:
$SA = (2 \times l \times w) + (2 \times w \times h) + (2 \times l \times h)$
$SA = (2 \times 20 \times 20) + (2 \times 20 \times 75) + (2 \times 20 \times 75)$
$SA = 800 + 3000 + 3000$
$SA = 6800$
The surface area of Box 2 is 6800 cm^2.

Box 3:
$SA = (2 \times l \times w) + (2 \times w \times h) + (2 \times l \times h)$
$SA = (2 \times 40 \times 30) + (2 \times 30 \times 25) + (2 \times 40 \times 25)$
$SA = 2400 + 1500 + 2000$
$SA = 5900$
The surface area of Box 3 is 5900 cm^2.

The box with the smallest surface area would cost the least. Therefore, Box 3, with dimensions of 40 cm by 30 cm by 25 cm, would be the most cost effective.