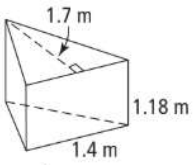
L4 Problem Solving with Volume Name: Date:

Ma8 U3T3: Volume

1)

An artist has 20 triangular prisms like the one shown. He decides to use them to build a giant triangular prism with a triangular base of length 5.6 m and height 6.8 m.



a) Does he have enough small prisms?

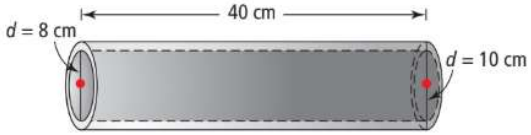
b) What is the volume of the new prism to the nearest hundredth of a metre?

2)

Two cylinders have the same volume. The first cylinder has a diameter of 10 cm and a height of 30 cm. The second cylinder has a diameter of 8 cm. What is the height of the second cylinder, to the nearest tenth of a centimetre?

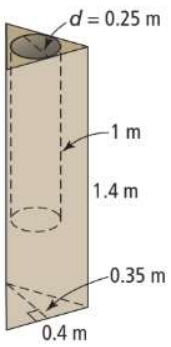
3)

A pipe has an outside diameter of 10 cm, an inside diameter of 8 cm, and a height of 40 cm. What is the capacity of the pipe, to the nearest tenth of a cubic centimetre?



4)

A clay planter has the shape of a right triangular prism as shown. Inside the planter is a cylindrical hole. Calculate the volume of clay needed to make the planter, to the nearest tenth of a cubic centimetre.



5)

Manuel's company uses shipping crates with dimensions 3 m × 3 m × 7 m. He has to ship 25 000 boxes with dimensions 10 cm × 10 cm × 20 cm. Calculate whether one crate will be enough.

6)

In the cafeteria at Prairietown School, the garbage can is filled up twice every lunch hour. The garbage can is a cylinder with a radius of 25 cm and a height of 95 cm.

a) Determine the volume of garbage produced each day in the cafeteria.

b) Determine the volume of garbage produced in a 5-day week.

c) The school's environment club wants to reduce the weekly garbage to below 470 000 cm^3 by encouraging students to recycle. To reach this goal, how many times should the garbage can be filled each lunch hour?

7)

Ted sells his homemade peanut butter for $1.60 a jar at the local Farmers' Market. The jar is 8 cm in diameter and 10 cm high. He decides he will also sell peanut butter in jars that are 16 cm in diameter and 20 cm high. What should he charge if he uses the same price per cubic centimetre?

8)

The end of a car tunnel has the shape of a semi-circle on top of a rectangle. The tunnel is exactly 4 km long.

a) Calculate the volume of air in the tunnel with no cars in it.

b) The air in a car tunnel must be exchanged frequently. If the exhaust system pumps the air out at a rate of 10 m^3 per second, how long does it take to replace the stale air with fresh air in the entire tunnel? Give your answer in hours and minutes.