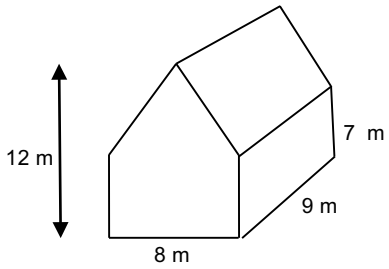
U9D9 **Review: Choosing the Correct Formula**

For each question, determine the shape(s) and formula(s) required to answer the question. Solving is not necessary.

1. What is the volume of this barn?

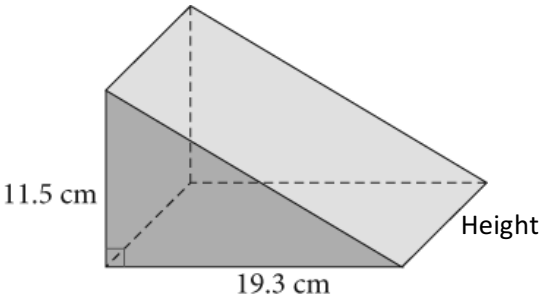


2. The exterior of the barn in question #1 is to be painted (including the tin roof). If one can of paint covers $37m^2$, how many cans need to be purchased to paint the barn?

3. Some hay bales are rectangular prisms. Others are cylindrical. A rectangular bale is 80 cm by 50 cm by 30 cm. A cylindrical bale has base diameter 150 cm and length 120 cm. Calculate the volume of each type of hay bale.

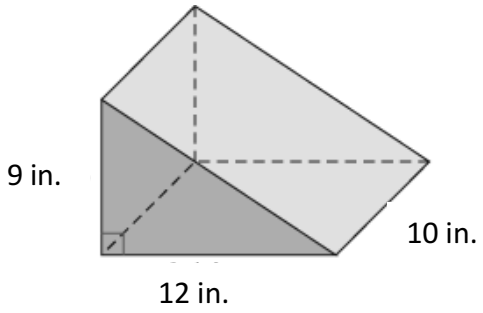
4. A can of soup has a diameter of **64 mm** and a height of **4 inches**. Determine the amount of aluminum needed to manufacture this can to the nearest **square cm**. Include a diagram.

5. The **volume** of this right triangular prism is 2219.5 cm^3. **Determine the height** of the prism to the nearest cm.

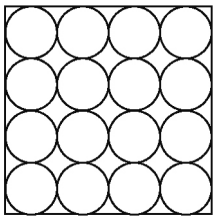


6. A conical paper cup at a water dispenser has a diameter of 5 cm and a height of 8 cm. How much paper, to the nearest square centimetre, is used to make the cup?

7. Calculate the **surface area** of this right triangular prism to the **nearest square inch**.



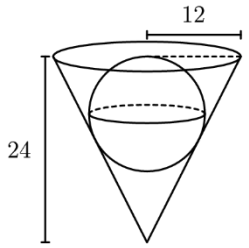
8. A standard bouncy ball has a diameter of 2.2 cm. Determine the surface area of a square-based prism box that could just hold 16 bouncy balls, arranged in four rows of four balls, one row deep as shown.



Note: this diagram is looking down on the box... it is a square-based prism

9. Sneferu's North Pyramid at Dahshur, Egypt is a square based pyramid. The side length of the square base is 220 m and its height is 105 m. Calculate the surface area of **the lateral faces** of this pyramid.

10. A sphere is with radius of 8 cm is placed inside of a cone that has a radius of 12 cm and a height of 24 cm. Calculate the volume of empty space inside of the cone.



OPTIMIZATION

EX. 1. Cereal is packaged in a square-based prism box. The box contains 5564 cm^3 of cereal.

a) What dimensions for the box require the least amount of cardboard? Round the dimensions to the nearest tenth of a centimetre.

b) Does cereal usually come in a box shaped like the one you found in part a)? Suggest reasons for this.

EX. 2. Dylan has a piece of plywood that measures 120 cm by 240 cm. He wants to construct a square-based prism box to hold his sports equipment in the garage. Dylan wants to maximize the volume of the box and to keep the waste of plywood to a minimum.

a) Determine the dimensions of the box with maximum volume, including a lid. Round to the nearest tenth of a centimetre if necessary.

b) What is the volume of the box?

EX. 3. Canned pineapple is an example of an ideal cylinder. The volume of a can of pineapple is 398 mL.

a) What are its dimensions in cm?

b) How much sheet metal is needed to make the can?

EX. 4. The All Grow fertilizer company plans to sell a cylindrical bargain jug of concentrated liquid fertilizer.

a) Find the dimensions of the jug that would have a maximum volume if the company plans to construct it out of 1884 cm^2 of plastic.

b) What volume of fertilizer will the cylindrical jug hold?

ANSWERS: (See web-site for full solutions)

1. 684 m^3 2. A = 393.256 m^2 11 cans of paint 3. V_{prism}=120 000 cm^3 $V_{cylinder}$=2 120 575 cm^3

4. 269 cm^2 5. 20 cm 6. 66 cm^2 7 468 in^2 8. 232.32 cm^2 9. 66 910 m^2

10. 1474 cm^3 Ex. 1a. 17.7 cm (cube) 1b. No. reasons vary

Ex. 2 69.2 cm cube, waste:68.16 cm^2 ,V= 331 374 cm^3 OR 60cm x 60cm x 90cm, no waste, V= 324 000 cm^3

Ex. 3 a. r = 4 cm, h = 8 cm b. 301.6 cm^2 Ex. 4 a. r = 10 cm, h = 20 cm b. 6283 mL

Review: Pages 472-473 # 1,3,4,6-12 Pages 518 – 519 # 2-4, 6-10
Extra Practice: Pages 470-471 #5-15 Pages 516-517 #6 – 16