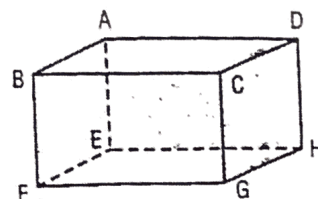


Lesson 44

1. Consider the prism on the right.

- a) Name all edges parallel to edge AB: FE, DC, GH
- b) Name the face parallel to the face ABFE: DCGH
- c) Name the faces perpendicular to the base EFGH:
ABFE, DCGH, BCFG, ADEH

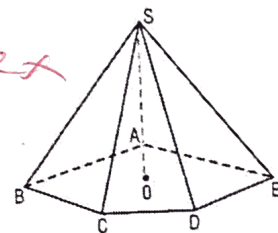


2. The pyramid on the right with apex S is lying on its base, the polygon ABCDE.

The segment SO, perpendicular to the base, is the height of the pyramid. The point O is at the foot of the height.

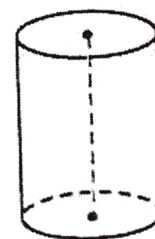
It is a right regular pyramid, because its base is a regular polygon, and the foot of the height O is the centre of the base.

- a) What is the common point to each of the lateral faces? S apex
- b) What is the shape of each lateral face? Trig Δ
- c) Are the lateral faces congruent? yes
- d) Are the lateral edges SA, SB, SD, and SE congruent? yes
- e) Are the edges representing the sides of the base ABCDE congruent? yes



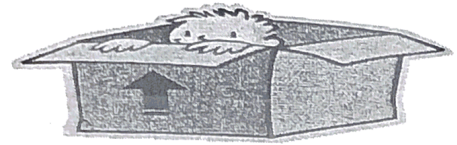
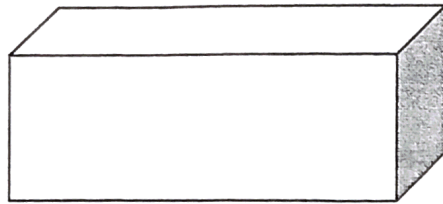
3. The cylinder on the right is lying on its lower base.

- a) 1. What is the shape of each base? circle
2. Are the bases congruent? yes
3. Are the bases parallel? yes
- b) What is the segment joining the centres of the bases called?
height
- c) Is the lateral surface curved or flat? flat □

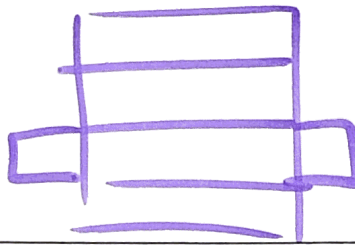


Lesson 46 (BEFORE)
Learning Activity - Area

Prism:



Draw the net:



Name all the shapes in the net. How many of each shape are there?

- Rect.
- Squares
- _____
- _____

Write the formula for the area of each shape:

$$A = s^2$$

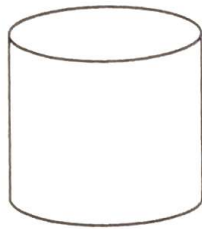
$$A = L \times W$$

What would be the formula for the total area (A_T) of this solid?

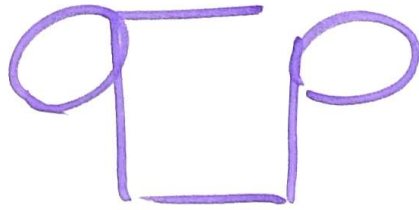
Formula:

$$A_T = 2(s^2) + 4(L \times W)$$

Cylinder:



Draw the net:



Name all the shapes in the net. How many of each shape are there?

- 2 circle
- 1 rect.
- _____
- _____

Write the formula for the area of each shape:

$$A = \pi r^2$$

$$A = L \times W$$

What would be the formula for the total area (A_T) of this solid?

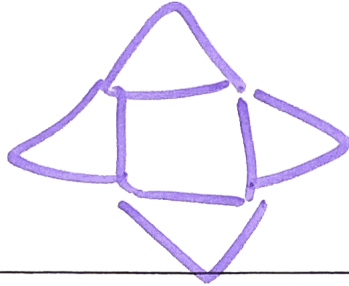
Formula:

$$A_T = 2(\pi r^2) + 4(L \times W)$$

Pyramid:



Draw the net:



Name all the shapes in the net. How many of each shape are there?

- square
- Triangles
- _____
- _____

Write the formula for the area of each shape:

$$\square A = S^2$$
$$A = \frac{b(h)}{2}$$

What would be the formula for the total area (A_T) of this solid?

Formula:

$$A_T = S^2 + 4 \left(\frac{b \times h}{2} \right)$$

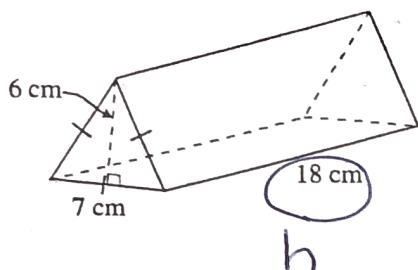
Name: Teacher's

Math Concentration ~ Solids review

L.46

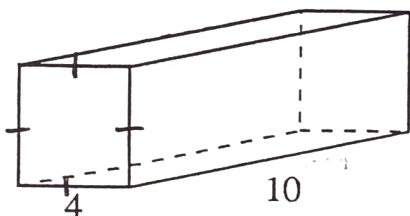
Prisms

Find the total surface area



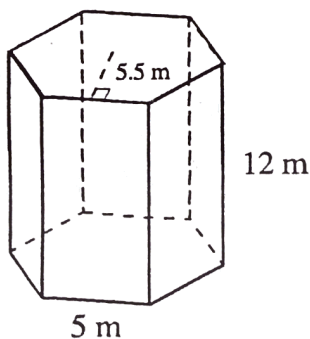
$$\begin{aligned}
 A_t &= A_L + A_b + A_b \\
 A_t &= P_b(h) + \frac{7(6)}{2} + \frac{7(6)}{2} \\
 A_t &= 21(18) + 21 + 21 \\
 A_t &= 378 + 21 + 21 \\
 A_t &= 420 \text{ cm}^2
 \end{aligned}$$

Find the total surface area



$$\begin{aligned}
 A_t &= A_L + A_b + A_b \\
 A_t &= P_b(h) + 4(4) + 4(4) \\
 A_t &= 16(10) + 16 + 16 \\
 A_t &= 160 + 16 + 16 \\
 A_t &= 192 \text{ cm}^2
 \end{aligned}$$

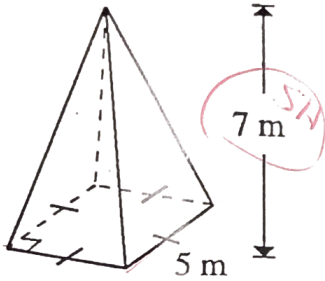
Find the total surface area



$$\begin{aligned}
 A_t &= A_L + A_b + A_b \\
 A_t &= P_b(h) + \frac{5a_n}{2} + \frac{5a_n}{2} \\
 A_t &= 30(12) + \frac{5(5.5)6}{2} + \frac{5(5.5)6}{2} \\
 A_t &= 360 + 82.5 + 82.5 \\
 A_t &= 525 \text{ cm}^2
 \end{aligned}$$

Pyramids

Find the total surface area.



$$A_t = A_L + A_b$$

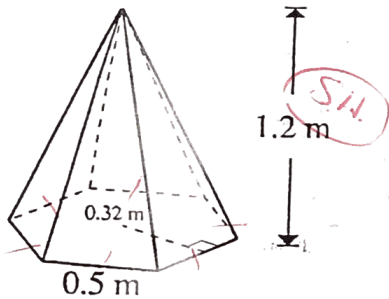
$$A_t = \frac{P_b (S.H.)}{2} + 5(5)$$

$$A_t = \frac{20(7)}{2} + 25$$

$$A_t = 70 + 25$$

$$A_t = 95 \text{ m}^2$$

Find the total surface area.



$$A_t = A_L + A_b$$

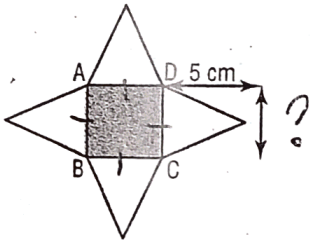
$$A_t = \frac{P_b (S.H.)}{2} + \frac{S a n}{2}$$

$$A_t = \frac{3(1.2)}{2} + \frac{(0.5)(.32)(6)}{2}$$

$$1.8 + .48$$

$$A_t = 2.28 \text{ m}^2$$

Find the side length of the square if lateral area is 49cm^2



"S"?

$$A_L = \frac{P_b (S.H.)}{2}$$

$$49 = \frac{4 \times (5)}{2}$$

$$49 = 10x$$

$$x = 4.9$$

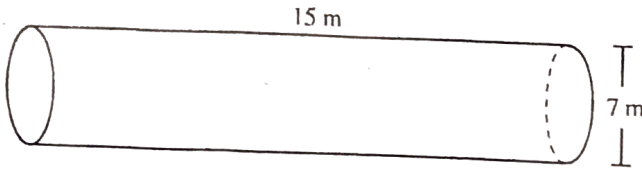
Side 4.9 cm

Name: _____

Math Concentration ~ Solids review

Cylinders

Find the lateral surface area of the cylinder pictured below.



$$\begin{array}{r}
 329.85 \\
 38.48 \\
 + 38.48 \\
 \hline
 406.81 \text{ m}^2
 \end{array}$$

$$A_L = P_b(h) + \pi r^2$$

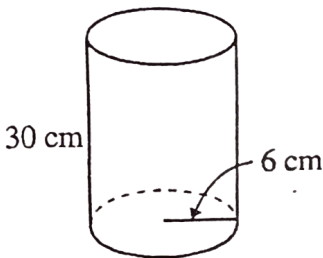
$$A_L = (2\pi r)(h)$$

$$A_L = (2\pi \cdot 7)(15)$$

$$A_L = 31.99(15)$$

$$A_L = 329.85 + 38.48 + 38.48$$

Find the total surface area.



$$A_T = A_L + A_b + A_b$$

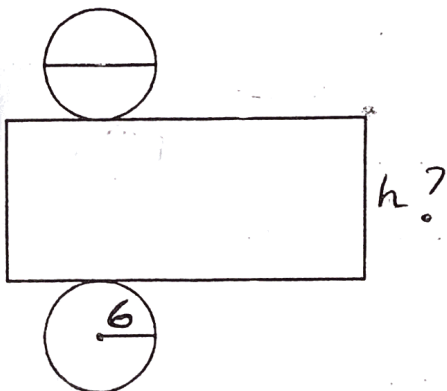
$$A_T = P_b(h) + \pi r^2 + \pi r^2$$

$$A_T = (2\pi \cdot 6)(30) + \pi \cdot 6^2 + \pi \cdot 6^2$$

$$A_T = 37.7(30) + 113.04 + 113.04$$

$$A_T = 1131.97 + 1130.97 = 1357.2 \text{ cm}^2$$

Find the height if lateral area is 452.4 cm²



h?

$$A_L = P_b(h)$$

$$A_L = 2\pi r(h)$$

$$452.4 = (2\pi \cdot 6)(h)$$

$$452.4 = 37.7h$$

$$\frac{452.4}{37.7} = h$$

$$h = 12$$

Name: Teacher's

1. A pentagonal right prism is 40 centimetres tall. Each side of the pentagon measures 8 centimetres and the apothem is 6 centimetres. What is the total surface area of this prism?



$h = 40$
 $s = 8$
 $a = 6$
 $n = 5$

$$A_t = A_L + A_b + A_b$$

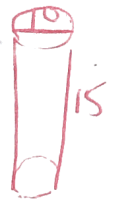
$$A_t = P_b(h) + \frac{San}{2} + \frac{San}{2}$$

$$A_t = 40(40) + \frac{8(6)(5)}{2} + 120$$

$$A_t = 1600 + 120 + 120$$

$$A_t = 1840 \text{ cm}^2$$

2. Find the total surface area of a cylinder whose bases are 10 centimetres in diameter and whose height is 15 centimetres.



$$A_t = A_L + A_b + A_b$$

$$A_t = P_b(h) + \pi r^2 + \pi r^2$$

$$A_t = \frac{\pi d}{2}(h) + \pi \left(\frac{d}{2}\right)^2 + \pi \left(\frac{d}{2}\right)^2$$

$$A_t = \frac{\pi(10)}{2}(15) + 78.54 + 78.54$$

$$A_t = \frac{\pi(10)}{2}(15) = 31.42(15) = 471.3 \text{ or } 471.24$$

628.32
628.38
cm²

3. The net of a pyramid is represented on the right. The base is a regular pentagon with a side length of 20 cm and a 13.8 cm apothem. The pyramid has a slant height of 12 cm. Calculate

- a) the area of the base. _____
- b) the lateral area. _____
- c) the total area. _____



a) $A_b = \frac{San}{2}$

b) $A_L = P_b(SH)$

c)

$$A_b = \frac{20(13.8)(5)}{2}$$

$$A_L = \frac{100(12)}{2}$$

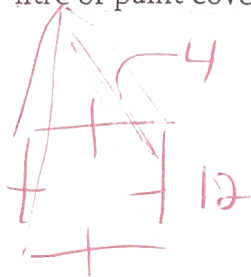
$$A_b = 690$$

$$A_L = 600$$

$$A_t = A_L + A_b = 600 + 690$$

$$A_t = 1290 \text{ cm}^2$$

- 4 The roof of a house has the shape of a pyramid with a square base whose side length is 12 m. The pyramid's slant height is 4 m. We repaint the roof with paint that costs \$18 per litre. If one litre of paint covers 3 m^2 , determine the total cost of the paint needed.



$$A_L = \frac{P_b (\text{S.H.})}{2}$$

$$A_L = \frac{[12(4)](4)}{2}$$

$$\frac{96}{3}$$

$$A_L = 96 \text{ m}^2$$

TOTAL ROOF

$$32 \text{ Liters}$$

$$\times 18$$

$$576 \$$$

- 5 A farmer has a cylindrical silo 15 metres high and radius 4 metres. How much paint would be required to paint the exterior of the silo if one litre of paint covers 10 square metres? (Not bottom or top)



$$A_L = P_b (h)$$

$$A_L = 2\pi r (15)$$

$$25.13 (15)$$

$$A_L = 376.95 \text{ m}^2$$

$$376.99$$

$$37.7 \text{ L}$$

$$38 \text{ Liters}$$

- 6 Mr. Fixit is building a laundry room in his basement. It will measure 4 metres by 5 metres by 2.5 metres. If he intends on painting the walls, ceiling and door with two coats of paint, and each litre of paint covers 70 m^2 , how many litres of paint should he buy?

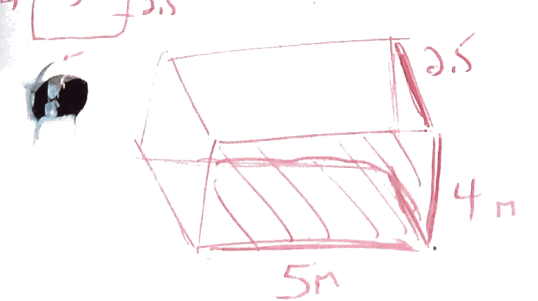
$$A_L = A_1 + A_2$$

$$A_L = P_b (h) + 20$$

$$A_L = 18(2.5)$$

$$A_L = 45 + 20$$

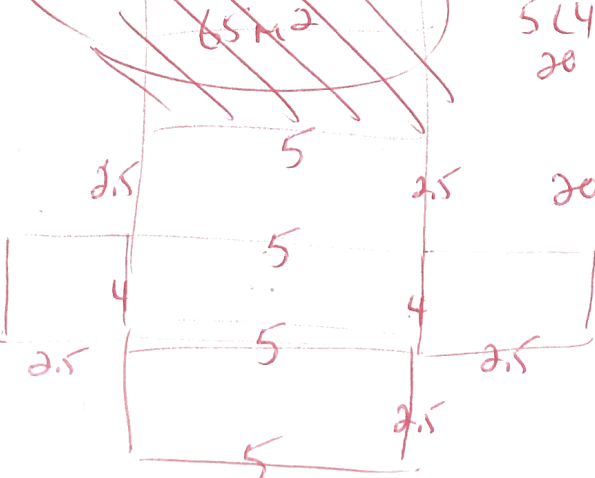
$$65 \text{ m}^2$$



$$A_L = P_b (h) + A_b$$

$$18(2.5) + 5(4)$$

$$65 \text{ m}^2$$



ceiling

walls

$$5(4)$$

$$20$$

$$+ 4(2.5) + 4(2.5)$$

$$5(2.5) + 5(2.5)$$

$$20 + 20 + 25$$

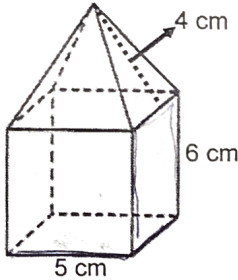
$$65 \text{ m}^2$$

$$65 \text{ m}^2$$

$$2 \text{ Liters}$$

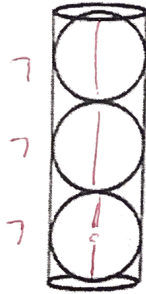
Decomposable Solids

Determine the total surface area of the following solid that is composed of a squared-base prism topped with a pyramid:



$$\begin{aligned}
 &A_L \text{ Pyr} + A_L \text{ Prism} + 1 A_b \\
 &\frac{P_b(\text{sh})}{2} + P_b(h) + \text{Side}^2 \\
 &\frac{20(4)}{2} + 20(6) + 5(5) \\
 &40 + 120 + 25 \quad \text{(185 cm}^2\text{)}
 \end{aligned}$$

Calculate the total surface area of the cylinder, given that the radius of each sphere is 3.5 cm.



$$\begin{aligned}
 A_t &= A_b + A_b + A_L \\
 A_t &= \pi r^2 + \pi r^2 + P_b(h) \\
 &\quad 2\pi r(h) \\
 A_t &= \pi 3.5^2 + \pi 3.5^2 + 2\pi 3.5(21) \\
 &38.48 + 38.48 + 461.81 \\
 &538.77 \text{ cm}^2 \quad \text{(538.75)}
 \end{aligned}$$

Missing Measure

The lateral area of a cylinder is approximately 446.11 mm². The radius of the cylinder is 71 mm. What is the height of the cylinder?

$$\begin{aligned}
 A_L &= P_b(h) \\
 A_L &= 2\pi r(h) \\
 446.11 &= 2\pi 71(h)
 \end{aligned}$$

$$\begin{aligned}
 446.11 &= h \\
 \frac{446.11}{446.11} &= \frac{446.11 h}{446.11} \\
 h &= 1 \text{ mm}
 \end{aligned}$$

The lateral area of a square-based pyramid is 14 260 m². Its slant height measures 31 m. What is the perimeter of the base?

$$\begin{aligned}
 A_L &= \frac{P_b(\text{sh})}{2} \\
 14\,260 &= \frac{P_b(31)}{2}
 \end{aligned}$$

$$P_b = 920 \text{ m long}$$