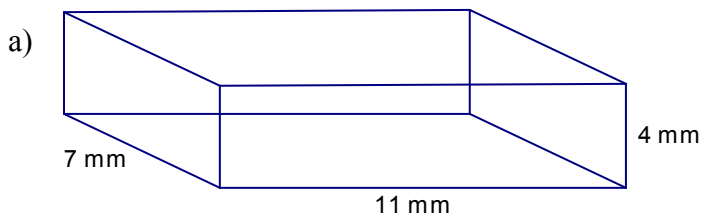


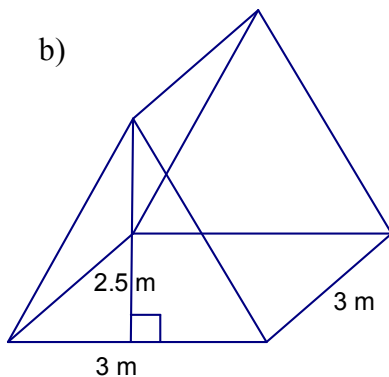
✚ homework check: FM10 p. 367 # 1 – 6 a, c, of each

✚ note: Surface Area of Prisms and Pyramids

The surface area of an object is the amount of material needed to make the three dimensional representation of the shape. Surface area is measured in square units. To find the surface area of any three dimensional object, we can find the individual area of each face and add them together to get the total. For example, find the surface of each of the following.



$$\begin{aligned}SA &= 2lw + 2lh + 2wh \\&= 2(11)(7) + 2(11)(4) + 2(7)(4) \\&= 154 + 88 + 56 \\&= 298\text{mm}^2\end{aligned}$$



$$c^2 = a^2 + b^2$$

$$c^2 = 1.5^2 + 2.5^2$$

$$c = \sqrt{8.5}$$

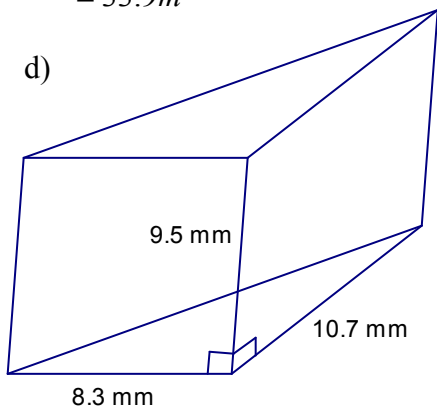
$$c = 2.9m$$

$$SA = 2\left(\frac{3(2.5)}{2}\right) + 3(3) + 2(3)(2.9)$$

$$= 7.5 + 9 + 17.4$$

$$= 33.9m^2$$

d)



$$8.3 \text{ mm}$$

$$c^2 = a^2 + b^2$$

$$c^2 = 8.3^2 + 10.7^2$$

$$c = \sqrt{183.38}$$

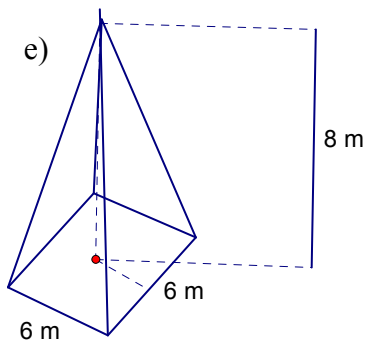
$$c = 13.5mm$$

$$SA = 2\left(\frac{8.3(10.7)}{2}\right) + 10.7(9.5) + 8.3(9.5) + 13.5(9.5)$$

$$= 88.81 + 101.65 + 78.85 + 128.25$$

$$= 397.56mm^2$$

e)



$$c^2 = a^2 + b^2$$

$$c^2 = 3^2 + 8^2$$

$$c = \sqrt{73}$$

$$c = 8.5m$$

$$SA = 6(6) + 4\left(\frac{6(8.5)}{2}\right)$$

$$= 36 + 102$$

$$= 138m^2$$

▣ **homework assignment: FM10 p. 376 #3 – 6, 11**

Key Concepts

- The surface area of an object is the total area of the surface of the object.
- Surface area is measured in square units.
- To find the surface area of a prism or pyramid, find the area of each face, then add the areas.

Discuss the Concepts

- D1.** Explain the difference between the height of a pyramid and its slant height.
- D2.** Suppose you know the side length of the base of a square-based pyramid and its height. Explain how you can find the slant height.

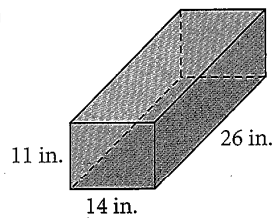
Practise the Concepts **A**

Where necessary, round your answers to one decimal place.

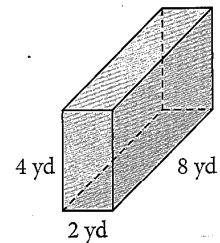
For help with question 1, refer to Example 1.

1. For each prism, draw and label a net, then find the surface area.

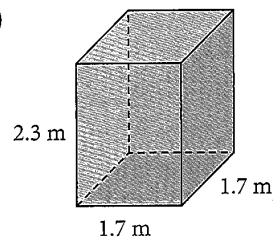
a)



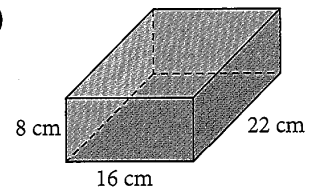
b)



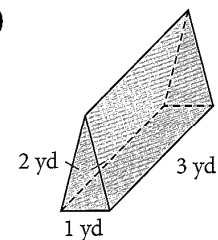
c)



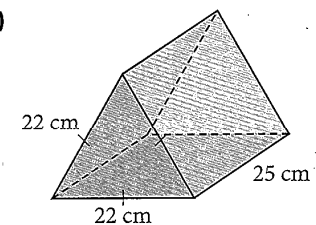
d)

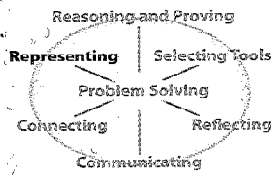


e)



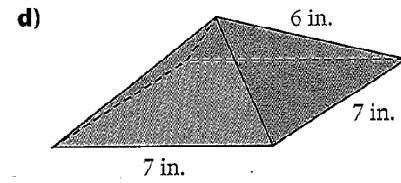
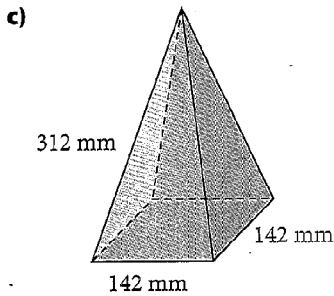
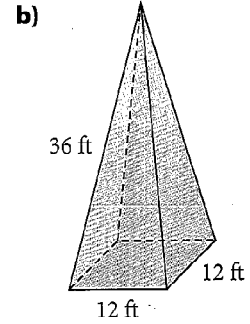
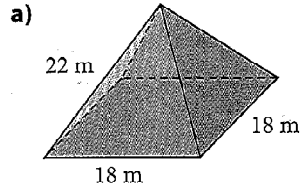
f)





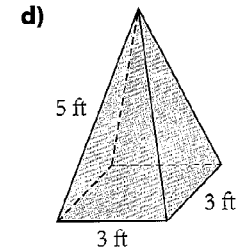
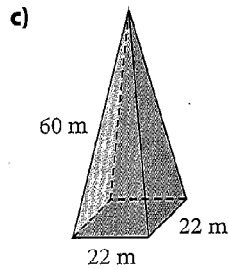
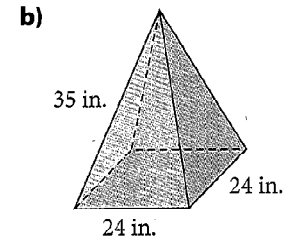
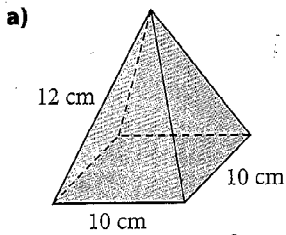
For help with question 2, refer to Example 2.

2. For each square-based pyramid, draw and label a net, then find the surface area.

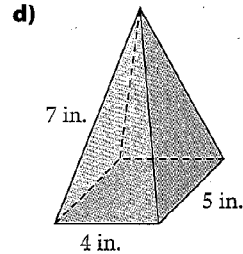
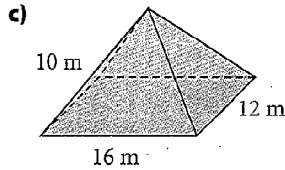
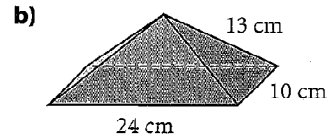
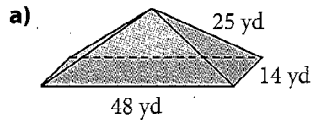


For help with questions 3 and 4, refer to Example 3.

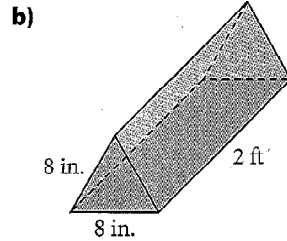
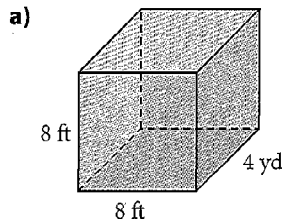
3. Find the surface area of each square-based pyramid.



4. Find the surface area of each rectangular-based pyramid.

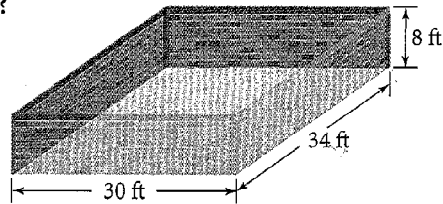


5. Find the surface area of each prism.

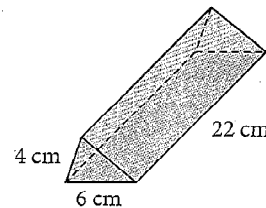
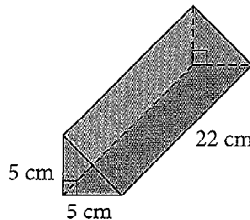


Apply the Concepts B

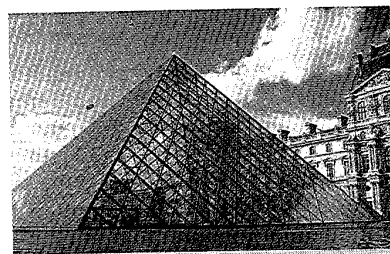
6. Winnie is spraying a sealant on the concrete floor and walls in her basement. The basement floor is rectangular with dimensions 30' by 34' and the walls are 8' high. For what area does Winnie need to buy sealant?



7. Which has greater surface area, a right triangular prism with a base and height of 5 cm and a length of 22 cm, or an isosceles triangular prism with a base of 6 cm, a side length of the triangle of 4 cm, and a length of 22 cm?



8. The Louvre Museum in Paris, France, has a large square-based glass pyramid covering its main entrance. Each triangle on the slant surfaces has a base that measures 35.4 m and a slant height of 27.9 m.



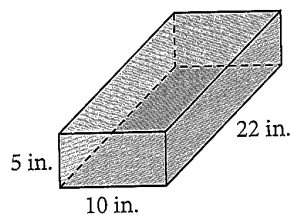
- Calculate the amount of glass that was needed to cover the sides of this pyramid.
- A glass cleaner charges $32¢/m^2$. How much will they charge to clean the outside of these windows?

Literacy Connect



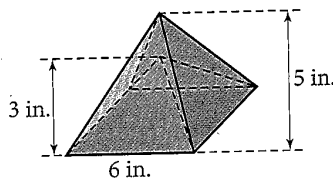
9. Suppose a doghouse is constructed by placing a square-based pyramid on top of a cube with the same side length as the square base of the pyramid. Draw a diagram, and then explain how you would determine the total surface area of the doghouse that would need to be painted.

10. The cost to make the top of a rectangular container is $5¢/in.^2$ and for all other sides is $4¢/in.^2$. How much will it cost to make the rectangular box below?



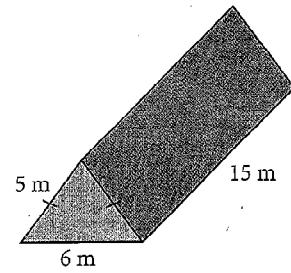
Chapter Problem

11. Vanessa has decided to package her winter toques for the United States in a package created using two square-based pyramids of side length 6 in. One of these pyramids will have height 5 in. while the second will have height 3 in. The toque will be placed between these two pyramids. The idea is to market the toque in a unique package that will also be stackable and easy to display on a shelf.



- Find the surface area of each pyramid. Each pyramid has an open base, so they will stack.
- The material used to make the outer pyramid costs $25¢/in.^2$ and the material used to make the inner pyramid costs $21¢/in.^2$. Find the total cost to produce each package.

12. A storage shed in the shape of an isosceles triangular prism is to be painted. The paint is sold in cans that each cover 40 m^2 and cost $\$16.50$. How much will it cost to give the shed two coats of the paint? You will not need to paint the bottom side of the prism.



Extend the Concepts



13. Suppose someone wanted to cover the surface of Menkaure's pyramid with a 10 cm layer of plaster.
- How many cubic metres of plaster would be needed? Ignore the slight change to the dimensions a 10 cm layer of plaster would create on the pyramid, and assume its surface to be relatively flat.
 - If the cost of plaster is $\$114/\text{m}^3$, what would the total cost of the plaster be?
 - If a worker can place 15 m^3 of plaster per day, how many workers would be needed if the project were to be completed in 50 working days?
14. The height of a square-based pyramid is 6 cm and its slant height is 8 cm.
- Calculate the dimensions of the base.
 - Find the volume of the pyramid.
 - Find the surface area of the pyramid.
15. Pyramids A, B, and C are each in the shape of square-based pyramids with height 12 cm. The base of pyramid A has side length 5 cm and the base of pyramid B has side length 9 cm. The volume of pyramid C is equal to the total volume of pyramids A and B. Find the side length of the base of pyramid C.

