

Objective: Find the surface area of composite figures

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Concept

Formulas are not always useful when finding the surface area of a composite figure since not all surfaces lie on the outside of the figure.

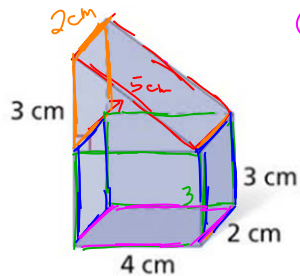
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Procedure

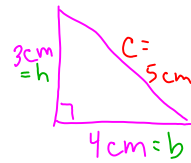
1. Determine the shapes and dimensions of all outside surfaces.
2. Consider drawing a Net of outside surfaces.
3. Determine whether any surface area formulas can be used.  
Modify if necessary.
4. Find the area of all shapes not included in surface area formulas.
5. Add the areas of all outside surfaces together.

Objective: Find the surface area of composite figures

Ex) Find the surface area of the composite figure.



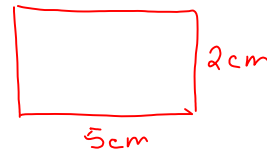
① two



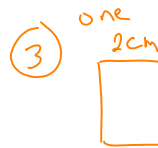
$$A = \frac{1}{2} \cdot b \cdot h = \frac{b \cdot h}{2}$$

$$= \frac{3 \text{ cm} \cdot 4 \text{ cm}}{2} = 6 \text{ cm}^2$$

②  $3^2 + 4^2 = c^2$   
 $25 = c^2$   
 $c = 5$

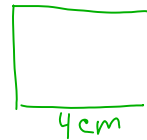


$$A = l \cdot w = 5 \text{ cm} \cdot 2 \text{ cm} = 10 \text{ cm}^2$$



$$A = 6 \text{ cm}^2$$

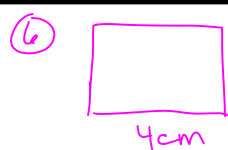
④ two



$$A = 12 \text{ cm}^2$$



$$A = 6 \text{ cm}^2$$



$$A = 8 \text{ cm}^2$$

⑦ Total

$$12 \text{ cm}^2 + 10 \text{ cm}^2 + 6 \text{ cm}^2 + 24 \text{ cm}^2$$

$$+ 12 \text{ cm}^2 + 8 \text{ cm}^2$$

$$= 72 \text{ cm}^2$$

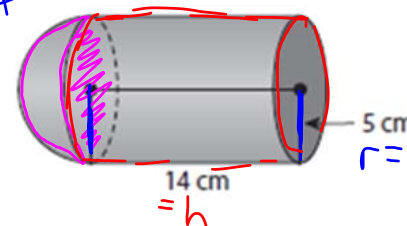
⑧ The surface area of the composite figure is  $72 \text{ cm}^2$ .

Objective: Find the surface area of composite figures

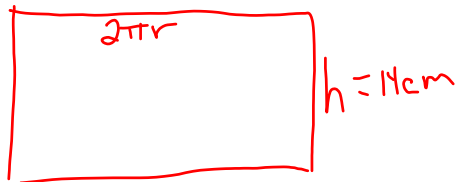
Ex) Find the surface area of the composite figure in terms of  $\pi$  and to the nearest tenth.

① hemisphere (no base)

$$S = 2\pi r^2 \rightarrow 2\pi (5\text{cm})^2 = 50\pi \text{ cm}^2$$



② side of the cylinder and one base



$$A = 2\pi r h + \pi r^2$$

$$= 2\pi (5\text{cm})(14\text{cm}) + \pi (5\text{cm})^2$$

$$140\pi \text{ cm}^2 + 25\pi \text{ cm}^2 = 165\pi \text{ cm}^2$$

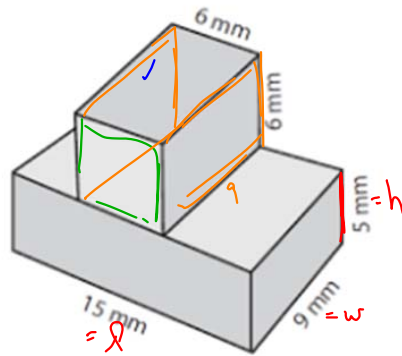
③ Total

$$50\pi \text{ cm}^2 + 165\pi \text{ cm}^2 = 215\pi \text{ cm}^2 \approx 675.4 \text{ cm}^2$$

④ The surface area of the composite figure is  $215\pi \text{ cm}^2$  or about  $675.4 \text{ cm}^2$ .

Objective: Find the surface area of composite figures

Ex) Find the surface area of the composite figure.



① Bottom Rect. Prism

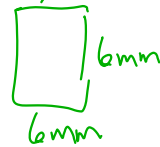
$$S = P \cdot h + 2B$$

$$S = (15 + 15 + 9 + 9)5 + 2(15 \cdot 9)$$

$$= 48 \text{ mm} + 270 = 510 \text{ mm}^2$$

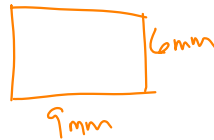
② sides of top rect. Prism

front/back



$$A = 36 \text{ mm}^2 \times 2 = 72 \text{ mm}^2$$

right  
+ left.



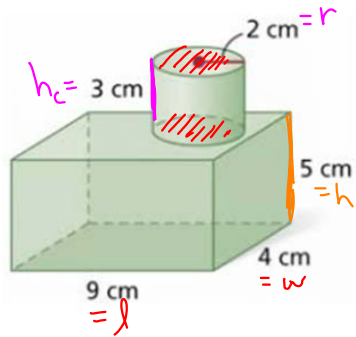
$$A = 54 \text{ mm}^2 \times 2 = 108 \text{ mm}^2$$

$$\textcircled{3} \text{ Total: } 510 \text{ mm}^2 + 72 \text{ mm}^2 + 108 \text{ mm}^2 = 690 \text{ mm}^2$$

④ The surface area of the composite figure is  $690 \text{ mm}^2$ .

Objective: Find the surface area of composite figures

Ex) Find the surface area of the composite figure in terms of pi and to the nearest tenth.



① Rect. Prism

$$S = P \cdot h + 2B$$

$$= (9 + 9 + 4 + 4) \cdot 5 + 2(9 \cdot 4)$$

$$= 202 \text{ cm}^2$$

② side of the cylinder



$$A = 2\pi r h = 2\pi (2\text{cm})(3\text{cm}) = 12\pi \text{ cm}^2$$

③ Total

$$\underbrace{202 \text{ cm}^2 + 12\pi \text{ cm}^2}_{\text{exact}} \approx 239.7 \text{ cm}^2$$

④ The surface area of the composite figure is  $(202 + 12\pi) \text{ cm}^2$  or about  $239.7 \text{ cm}^2$ .

Objective: Find the surface area of composite figures

Ex) a) Find the surface area of the sides of the barn.

\* not included: bottom, roof

① left/right



$$A = l \cdot w = 12 \text{ ft} \cdot 12 \text{ ft} \\ = 144 \text{ ft}^2 \times 2 \\ = 288 \text{ ft}^2$$

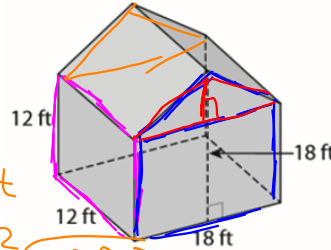
② front/back



$$A = \frac{1}{2} \cdot b \cdot h = \frac{1}{2} \cdot 18 \text{ ft} \cdot 6 \text{ ft} \\ = 54 \text{ ft}^2 \times 2 = 108 \text{ ft}^2$$



$$A = 18 \text{ ft} \cdot 12 \text{ ft} \\ = 216 \text{ ft}^2 \\ \times 2 \\ = 432 \text{ ft}^2$$



③ total

$$108 \text{ ft}^2 \\ 432 \text{ ft}^2 \\ + 288 \text{ ft}^2 \\ \hline 828 \text{ ft}^2$$

④ The sides of the barn have an area of 828 square feet.

b) If one gallon of paint covers 250 square feet, how many gallons of paint will need to be purchased to paint the sides of the barn?

convert  $\text{ft}^2$  to gallons

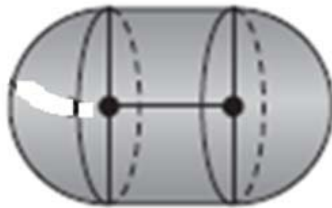
$$\frac{828 \text{ ft}^2}{1} \cdot \frac{1 \text{ gallon}}{250 \text{ ft}^2} = 3.312 \text{ gallons} \\ \downarrow \\ 4 \text{ gallons}$$

Four gallons of paint need to be purchased to paint the sides of the barn.

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Closure

Explain how you would find the surface area of the figure shown.



The two hemispheres form a sphere, so I would find the surface area of the two hemispheres using the surface area formula for a sphere  $S = 4\pi r^2$ , and then I would find the surface area of the side of the cylinder using  $L = 2\pi rh$ . Finally, I would add the areas together.