Section 1.4 - Surface Areas of Other Composite Objects

Review of Right Triangular Prisms

Ex: Find the surface area of the right triangle prism below.
(page 33 of booklet)

To find the surface area of this prism, add the areas of its 5 faces. It has two identical triangular faces and 3 rectangular faces.

Diagram

Corresponding Area (cm\(^2\))

\[
A = 2\left(\frac{8 \times 6}{2}\right) = 48\text{ cm}^2
\]

\[
A = (10 \times 4) = 40\text{ cm}^2
\]

\[
A = 6 \times 4 = 24\text{ cm}^2
\]

\[
A = 8 \times 4 = 32\text{ cm}^2
\]

\[
\text{TSA} = 144\text{ cm}^2
\]
Surface Area of a Composite Object Made from a Rectangular Prism and a Triangular Prism

Ex. Find the surface area of the following composite object. (page 36 of booklet)

Solution
Surface Area of Rectangular Prism

**Diagram**

**Front/Back**
- 10 cm
- 6 cm
- \( A = 2(10 \times 6) = 120 \text{cm}^2 \)

**Top/Bottom**
- 10 cm
- 4 cm
- \( A = 2(10 \times 4) = 80 \text{cm}^2 \)

**Side/Side**
- 6 cm
- 4 cm
- \( A = 2(6 \times 4) = 48 \text{cm}^2 \)

**SA = 248 \text{cm}^2**
Surface Area of Triangular Prism

Diagram

Corresponding Area

\[ A = 2\left(\frac{6 \times 8}{2}\right) = 48 \text{ cm}^2 \]
\[ A = 10 \times 4 = 40 \text{ cm}^2 \]
\[ A = 6 \times 4 = 24 \text{ cm}^2 \]
\[ A = 8 \times 4 = 32 \text{ cm}^2 \]
\[ \text{SA} = 144 \text{ cm}^2 \]
\[ A = 6 \times 4 = 24 \text{ cm}^2 \]

Area of Overlap

Surface Area of Composite Object

\[ \text{SA} = \text{SA}_{\text{prism}} + \text{SA}_{\text{prism}} - 2(\text{Area of Overlap}) \]
\[ = 248 + 144 - 2(24) \]
\[ = 344 \text{ cm}^2 \]
Ex. Determine the area of this object.

Solution
Find the surface area of the triangular prism and the rectangular prism. Then find the surface area of the overlap. Add the surface areas of the prisms together and then subtract twice the overlap.
Solution:

Area of the Triangular Prism

\[ \text{2 Triangles: } A = 2 \left( \frac{6 \times 8}{2} \right) \]
\[ A = 48 \text{ cm}^2 \]

\[ \text{Rectangles: } \]
\[ A_1 = 8 \times 3 = 24 \text{ cm}^2 \]
\[ A_2 = 10 \times 3 = 30 \text{ cm}^2 \]
\[ A_3 = 6 \times 3 = 18 \text{ cm}^2 \]

\[ SA_{\text{triangle}} = 120 \text{ cm}^2 \]
Area of the Rectangular Prism

\[ \text{F/B: } A = 2(4 \times 8) = 64 \text{ cm}^2 \]
\[ \text{T/B: } A = 2(8 \times 3) = 48 \text{ cm}^2 \]
\[ \text{S/S: } A = 2(4 \times 3) = 24 \text{ cm}^2 \]

\[ \text{SA}_{\text{Rect}} = 136 \text{ cm}^2 \]
Area of the overlap

\[ A = 8 \times 3 = 24 \text{ cm}^2 \]

Total surface Area of the Composite Object

\[
TSA = S_{A_{\text{Tri}}} + S_{A_{\text{rect}}} - 2(\text{Overlap}) \\
= 120 + 136 - 2(24) \\
= 208 \text{ cm}^2
\]
Homework:

Booklet:  #1 p. 34
          #1a-2 p. 37-38
          #1 p. 41

Textbook:  #3 d, e p. 40
Example: A playhouse has the shape of a rectangular prism with a triangular prism roof. Determine the surface area of the playhouse.