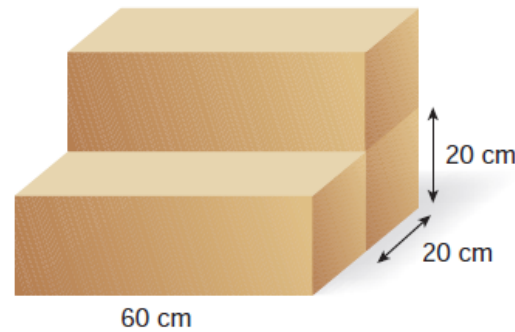


Section 1.3 - Surface Area

Example - Text page 28

a) Determine the surface area of the composite (chair) object made from right rectangular prisms.



b) Can this object be covered with 2m^2 of fabric?

Convert units to meters...

$$60\text{cm} = 0.6\text{m}$$

$$20\text{cm} = 0.2\text{m}$$

Step 1: Determine surface area of base of the chair without the back rest.

$$\begin{aligned} \text{SA} &= 2(\text{top}) + 2(\text{front}) + 2(\text{sides}) \\ &= 2(0.6 \times 0.4) + 2(0.6 \times 0.2) + 2(0.4 \times 0.2) \\ &= 0.48 + 0.24 + 0.16 \\ &= 0.88\text{m}^2 \end{aligned}$$

Step 2: Determine the surface area of the back rest

$$\begin{aligned} \text{SA} &= 2(\text{top}) + 2(\text{front}) + 2(\text{sides}) \\ &= 2(0.6 \times 0.2) + 2(0.2 \times 0.6) + 2(0.2 \times 0.2) \\ &= 0.24 + 0.24 + 0.08 \\ &= 0.56\text{m}^2 \end{aligned}$$

Step 3: Determine the surface area of the overlap

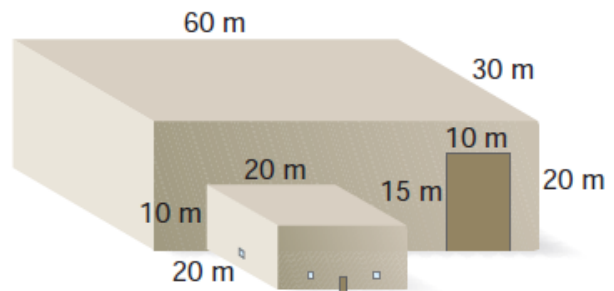
$$\begin{aligned} \text{SA} &= 2(0.6 \times 0.2) \\ &= 0.24\text{m}^2 \end{aligned}$$

$$\begin{aligned} \text{TSA} &= \text{SA}_{\text{base}} + \text{SA}_{\text{backrest}} - 2(\text{overlap Area}) \\ &= 0.88 + 0.56 - 0.24 \\ &= 1.44 - 0.24 \\ &= 1.2\text{m}^2 \end{aligned}$$

Since $2\text{m}^2 > 1.2\text{m}^2$, the chair can be covered with 2m^2 fabric.

Example text page 29

A warehouse measure 60m x 30m x 20m.
An office attached to one wall of the
warehouse measures 20m x 20m x 10m.



a) Determine the SA of the building (omit floor)

$$\begin{aligned} SA_{wh} &= 1(\text{top}) + 2(\text{front}) + 2(\text{side}) \\ &= (60 \times 30) + 2(60 \times 20) + 2(30 \times 20) \\ &= 1800 + 2400 + 1200 \\ &= 5400\text{m}^2 \end{aligned}$$

$$\begin{aligned} SA_{office} &= (\text{top}) + 2(\text{front}) + 2(\text{side}) \\ &= (20 \times 20) + 2(20 \times 10) + 2(20 \times 10) \\ &= 400 + 400 + 400 \\ &= 1200\text{m}^2 \end{aligned}$$

$$\begin{aligned} SA_{overlap} &= 2(20 \times 10) \\ &= 400\text{m}^2 \end{aligned}$$

$$\begin{aligned} TSA &= SA_w + SA_o - SA_{ov} \\ &= 5400 + 1200 - 400 \\ &= 6600 - 400 \\ &= 6200\text{m}^2 \end{aligned}$$

b) A contractor quotes to paint the exterior of the building at a rate of \$2.50/m².

Not To Be Painted...

- 2 roofs
- office door (A = 2m²)
- 3 loading doors each measure 10m x 15m
- 4 windows each has area = 1m²

How much does it cost to paint the building?

$$A_{2\text{roof}} = 1800 + 400 = 2200\text{m}^2$$

$$A_{\text{o.door}} = 2\text{m}^2$$

$$A_{\text{load door}} = \begin{array}{l} 3(10 \times 15) \\ 3(150) \\ 450\text{m}^2 \end{array}$$

$$A_{\text{windows}} = \begin{array}{l} 4(1) \\ 4\text{m}^2 \end{array}$$

$$\text{Total not to be painted} = \begin{array}{l} 2200 + 2 + 450 + 4 \\ 2656\text{m}^2 \end{array}$$

$$\therefore \text{ to be painted...} \quad \begin{array}{l} 6200 - 2656 \\ 3544\text{m}^2 \end{array}$$

$$\text{Cost} \quad \begin{array}{l} 3544 \times 2.50/\text{m} \\ \$8860.00 \end{array}$$

Book Work... Page 31 - #'s 8 & 10

