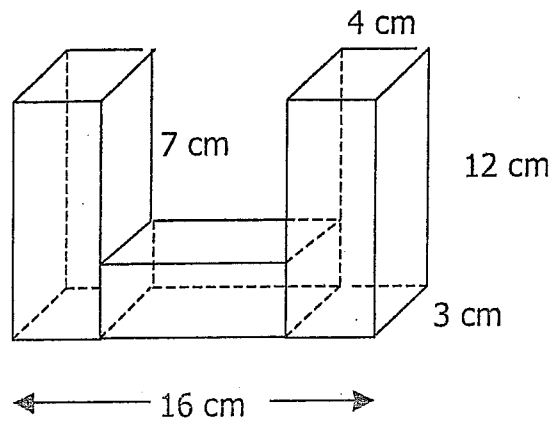


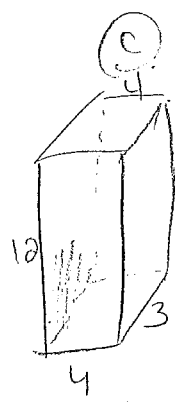
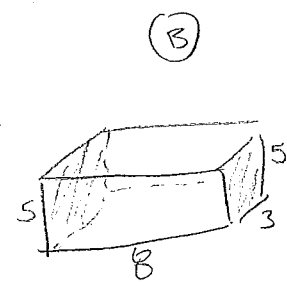
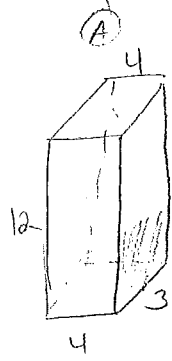
Ma 9 4.4 Surface Area Composite 3-D Shapes 1 Name: Key

Find the surface area of the following.

1.



decomposed:



(A) $SA = 2(lw) + 2(lh) + 2(wh)$
 $= 2(12 \times 4) + 2(3 \times 4) + 2(12 \times 3)$
 $= (2 \cdot 48) + (2 \cdot 12) + 2(36)$
 $= 96 + 24 + 72$
 $= 192 \text{ cm}^2$

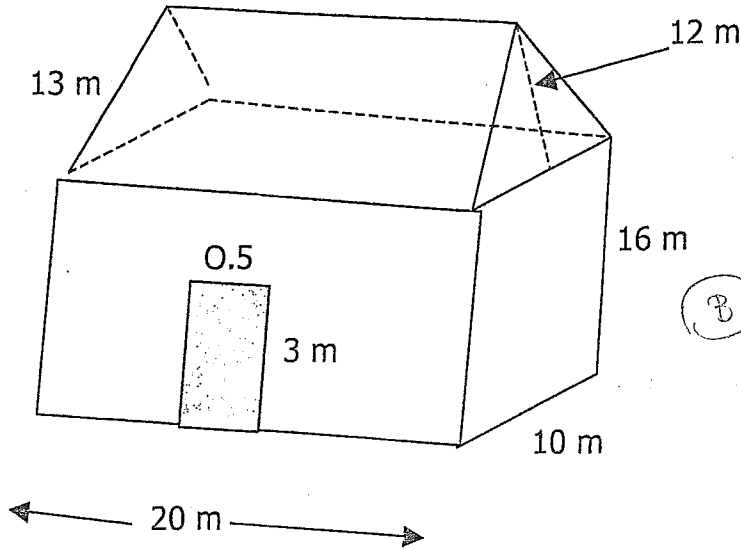
(B) $SA = 2(lw) + 2(lh) + 2(wh)$
 $= 2(5 \times 8) + 2(5 \times 3) + 2(3 \times 8)$
 $= 2(40) + 2(15) + 2(24)$
 $= 80 + 30 + 48$
 $= 158 \text{ cm}^2$

(C) $SA = 2(lw) + 2(lh) + 2(wh)$
 $= 2(12 \cdot 4) + 2(3 \cdot 4) + 2(12 \cdot 3)$
 $= 96 + 24 + 72$
 $= 192 \text{ cm}^2$

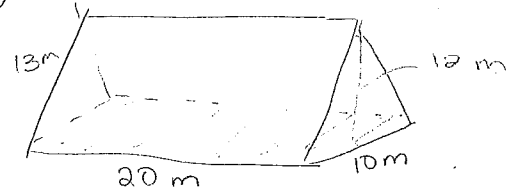
overlap:
 $A = (5 \times 3) 4$
 $= 15 \cdot 4$
 $= 60 \text{ cm}^2$

Total area = $192 + 192 + 158 - 60$
 $= 482 \text{ cm}^2$

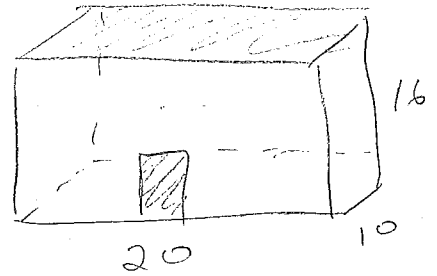
2.



(A)



(B)



$$\begin{aligned} \text{(A) SA} &= 2(13 \times 20) + (0.5 \times 20) + 2 \left[\frac{1}{2} \cdot (10)(12) \right] \\ &= 520 + 200 + 120 \\ &= 840 \text{ m}^2 \end{aligned}$$

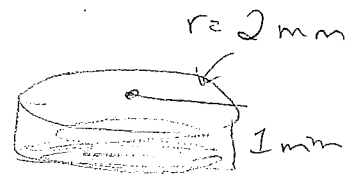
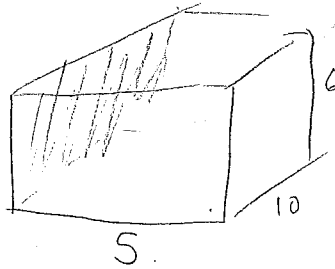
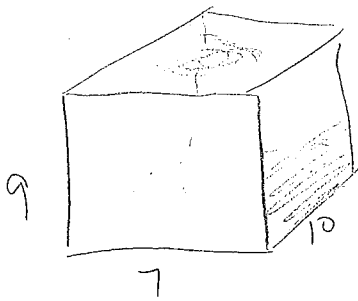
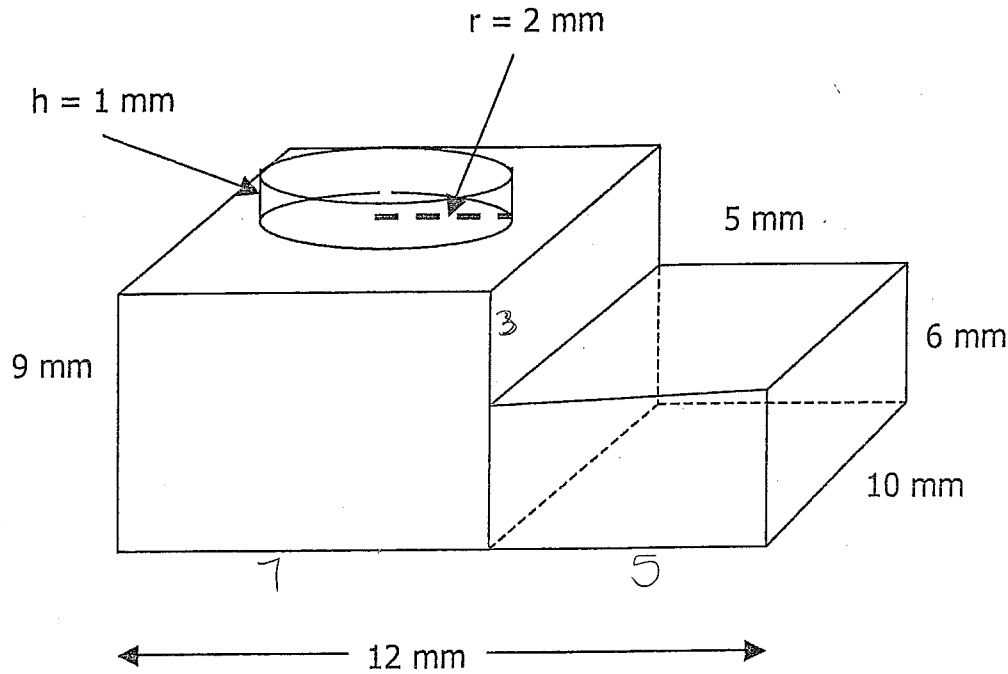
$$\begin{aligned} \text{(B) SA} &= 2(20 \times 16) + 2(10 \times 16) + 2(20 \times 10) \\ &= 640 + 320 + 400 \\ &= 1360 \text{ m}^2 \end{aligned}$$

$$\begin{aligned} \text{overlap} &= 2(20 \times 10) + (0.5 \times 3) \\ &= 400 + 1.5 = 401.5 \end{aligned}$$

$$\text{Total area} = 1360 - 401.5 = 958.5$$

$$\boxed{958.5 \text{ m}^2}$$

3.



$$\begin{aligned}
 A &= 2(9 \times 7) + 2(9 \times 10) + 2(10 \times 7) \\
 &= 126 + 180 + 140 \\
 &= 446 \text{ mm}^2
 \end{aligned}$$

$$\begin{aligned}
 SA &= 2(5 \times 6) + 2(10 \times 5) + 2(10 \times 6) \\
 &= 60 + 100 + 120 \\
 &= 280 \text{ mm}^2
 \end{aligned}$$

$$\begin{aligned}
 A &= \pi r^2 h \\
 &= \pi (2)^2 (1) \\
 &= [12.56] \times 2 \\
 &= 25.3
 \end{aligned}$$

$$\boxed{12.56} \times 1 = 37.86 \text{ mm}$$

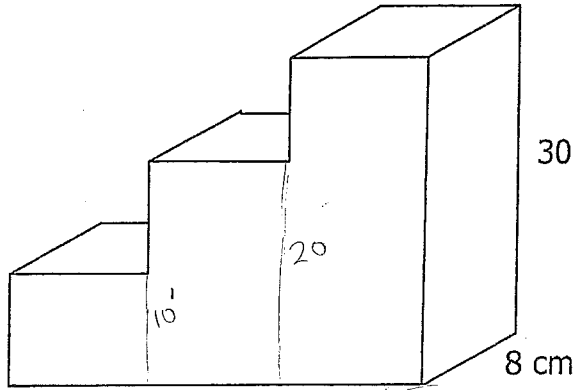
overlap: $2(6 \times 10) + 2(4\pi)$

$$\begin{aligned}
 &= 120 + 25.12 \\
 &= 145.12 \text{ mm}
 \end{aligned}$$

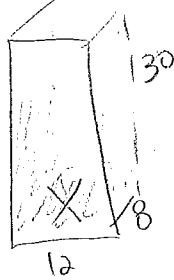
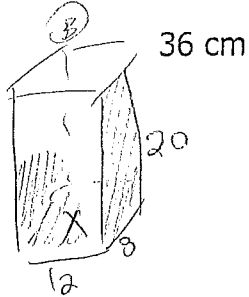
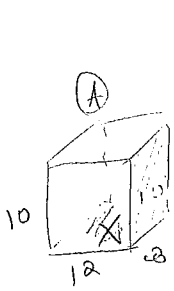
Total: $446 + 280 + 37.86 - 145.12$

$$\boxed{618.74 \text{ mm}}$$

4. The stairs below are of an equal height and length. How much carpeting is needed, excluding the bottom?



$$\begin{aligned} 30 \text{ cm } \textcircled{A} &= 2(12 \times 10) + (8 \times 12) + 2(8 \times 10) \\ &= 240 + 96 + 160 \\ &= 496 \text{ cm}^2 \end{aligned}$$



$$\begin{aligned} \textcircled{B} &= 2(20 \times 8) + (8 \times 12) + 2(8 \times 20) \\ &= 320 + 96 + 480 \\ &= 896 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \textcircled{C} &= 2(30 \times 8) + (12 \times 8) + 2(8 \times 30) \\ &= 480 + 96 + 720 \\ &= 1296 \text{ cm}^2 \end{aligned}$$

* didn't include bottom of rect. while calculating surface area of 3 rectangles *

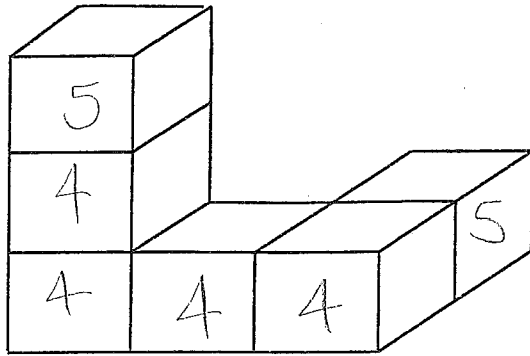
overlap

$$\begin{aligned} &2(10 \times 8) + 2(20 \times 8) \\ &= 160 + 320 \\ &= 480 \text{ cm}^2 \end{aligned}$$

Total SA: $496 + 896 + 1296 - 480 =$

$$\boxed{2208 \text{ cm}^2}$$

5.



Each cube has side lengths of 3

$$5 + 4 + 4 + 4 + 4 + 5 = 26$$

↑
sides exposed

$$A = lw \\ = (3)(3)$$

$$= 9 \text{ cm}^2$$

↑
area of a side

$$26 \times 9 = \boxed{234 \text{ units}^2}$$