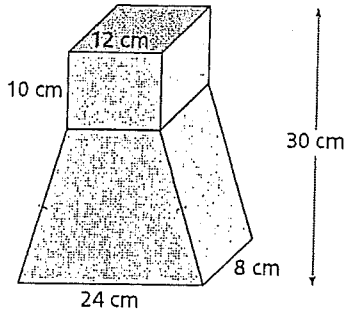
PM 9
Ch 4 Review

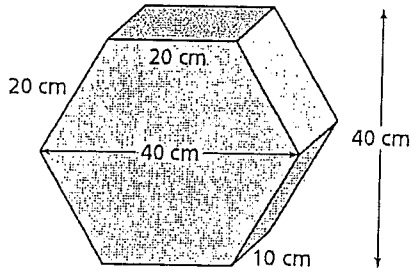
Name: KEY

1. Decompose the following objects. Include the dimensions of all components.

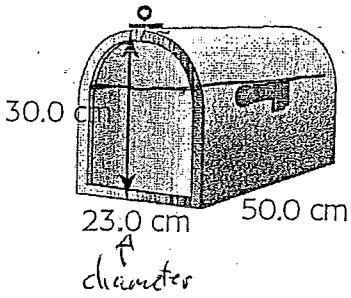
a)



b)



2. Joe is making a mailbox, as shown. Calculate the amount of metal required, not including the flag and top catch. Include the bottom.



½ cylinder
→ radius is 11.5 b/c diameter is 23.0

$SA = 2\pi r^2 + 2\pi rh$

$SA = \frac{2\pi(11.5)^2 + 2\pi(11.5)(50)}{2}$

$SA = \frac{830.95 + 3612.83}{2}$

$SA = \frac{4443.8}{2}$

$SA = 2221.9\ cm^2$

Rec Prism
→ height is 18.5 cm b/c radius on cylinder is 11.5

$SA = 2lw + 2lh + 2wh$

$= 2(50)(23) + 2(50)(18.5) + 2(23)(18.5)$

$= 2300 + 1850 + 851$

$= 5001\ cm^2$

overlap → only top of rec. prism

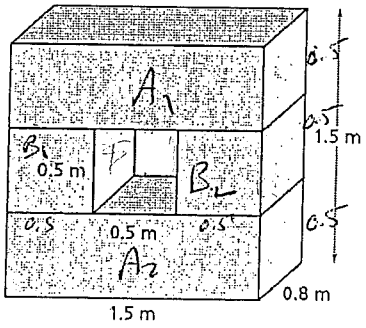
$23 \times 50 = 1150\ cm^2$

Total =

$2221.9 + 5001 - 1150 = 6072.9\ cm^2$

3. Determine the surface area of each object. Include the base for each.

a)



(A) Rec prism

$2(1.5)(0.8) + 2(0.8)(0.5) + 2(0.5)(1.5)$

$= 2.4 + 0.8 + 1.5$

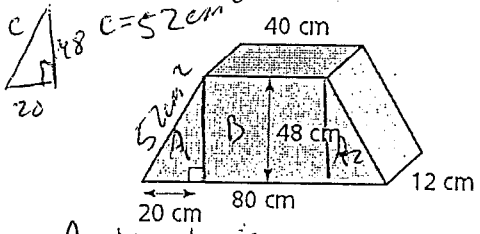
$= 4.7\ m^2 \times 2 = 9.4\ m^2$

(B) $6(0.5)(0.5) \times 2$ shapes $= 3\ m^2$

overlap $= (0.5)(0.5) \times 8$ sides $= 2\ m^2$

Total $= 9.4 + 3 - 2 = 10.4\ m^2$

b)



A - a triangular prism

$SA = 2\left(\frac{20 \times 48}{2}\right) + (20 \times 12) + (52 \times 12)$ ← ignore ends

$= 960 + 240 + 624$

$= 1824\ cm^2 \times 2 + 3648\ cm^2$

B - rec prism → ignore ends

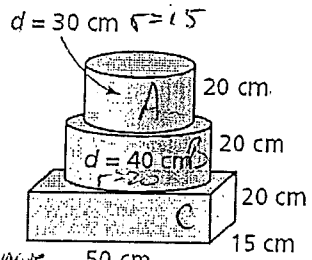
$SA = 2(40 \times 48) + 2(40 \times 12)$

$= 3840 + 960$

$= 4800\ cm^2$

Total $= 8448\ cm^2$

c)



$A = 2\pi(15)^2 + 2\pi(15)(20)$

$= 3298.67\ cm^2$

$B = 2\pi(20)^2 + 2\pi(20)(20)$

$= 5026.5\ cm^2$

$C = 2(50)(15) + 2(15)(20) + 2(50)(20)$

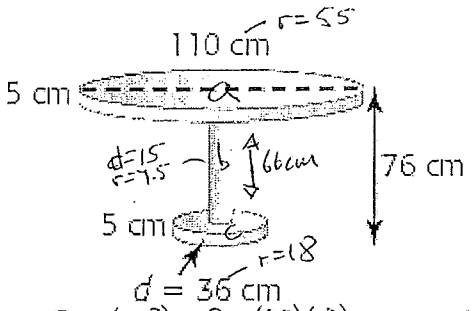
$= 4100\ cm^2$

overlap $= 2(\pi 15^2) + 2(\pi 20^2)$

$= 3926.99\ cm^2$

Total = $8448.18\ cm^2$

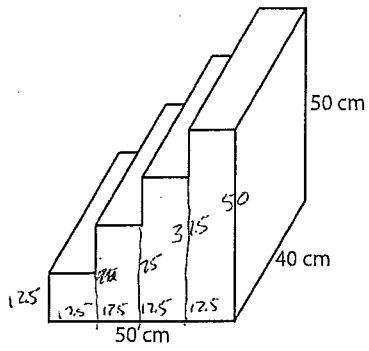
4. The cylindrical post of the table (below left) is 15 cm in diameter. Calculate the surface area of the table (excluding the bottom of the base).



a) $SA = 2\pi(55^2) + 2\pi(55)(5)$
$= 19006.6 + 1727.9$
$= 20734.5\ cm^2$

b) $SA = 2\pi(7.5^2) + 2\pi(7.5)(66)$
$= 353.43 + 3110.2$
$= 3463.63\ cm^2$

c) $SA = 2\pi(18^2) + 2\pi(18)(5)$
$= 2035.75 + 565.49$
$= 2601.24\ cm^2$



$Overlap = 4 \times \pi r^2$
$= 4 \times \pi(7.5^2)$
$= 4 \times 176.7$
$= 706.86\ cm^2$

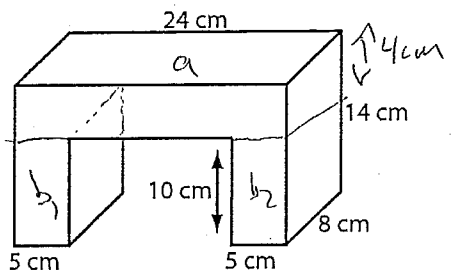
$Total = 20734.5 + 3463.63 + 2601.24 - 706.86$
$= 26092.51\ cm^2$

5. Each step is the same size in the pet stairs above (right). Determine the amount of carpet needed to cover all but the bottom of the structure.

Step 1 $= 2(12.5 \times 12.5) + (12.5 \times 40) + (12.5 \times 40) = 1312.5\ cm^2$
Step 2 $= 2(25 \times 12.5) + (12.5 \times 40) + (12.5 \times 40) = 1625\ cm^2$
Step 3 $= 2(37.5 \times 12.5) + (12.5 \times 40) + (12.5 \times 40) = 1937.5\ cm^2$
Step 4 $= 2(50 \times 12.5) + (12.5 \times 40) + (12.5 \times 40) = 2250\ cm^2$
Back $= 40 \times 50 = 2000\ cm^2$

$Total = 1312.5 + 1625 + 1937.5 + 2250 + 2000$
$= 9125\ cm^2$

6. The table below will be stained on all surfaces except the bottom of the legs. What is the area of the surface that will be stained?



a) $SA = 2(24 \times 8) + 2(24 \times 4) + 2(8 \times 4)$
$= 384 + 192 + 64$
$= 640\ cm^2$

b) $SA = 2(10 \times 5) + 2(10 \times 8) + 2(8 \times 5)$
$= 100 + 160 + 80$
$= 340\ cm^2$

$Overlap = 6$ sides of $8cm \times 5cm$
$= 6 \times (8 \times 5)$
$= 6 \times 40$
$= 240\ cm^2$

$Total = 640 + 340 - 240$
$= 740\ cm^2$