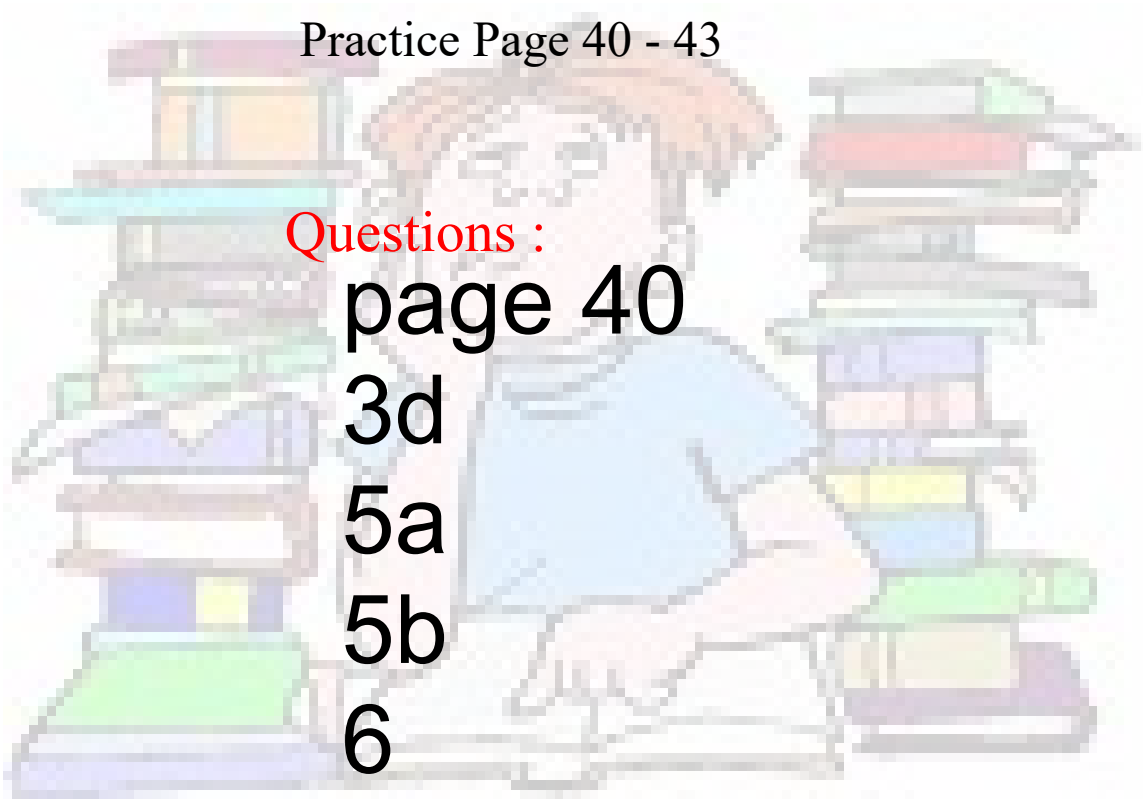
Class / Homework

Practice Page 40 - 43



Questions :

page 40

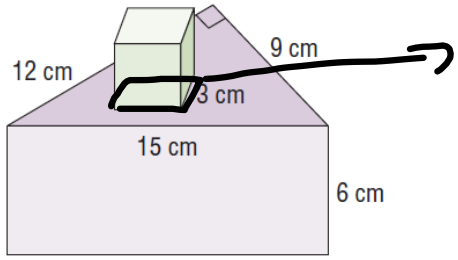
3d

5a

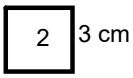
5b

6

d) cube on a triangular prism



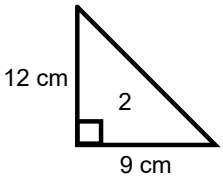
Over lap



A = b x h
A= 3 x 3
A= 9 cm^2

2A = 18 cm^2

Triangular Prism



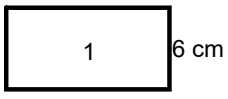
A = $\frac{b \times h}{2}$

A = $\frac{9 \times 12}{2}$

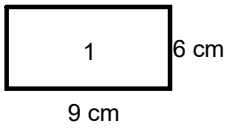
A = $\frac{108}{2}$

A = 54

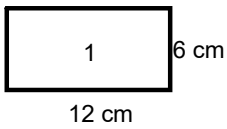
2A = 108 cm^2



A = b x h
A= 15 x 6
A= 90 cm^2



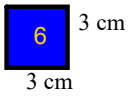
A = b x h
A= 9 x 6
A= 54 cm^2



A = b x h
A= 12 x 6
A= 72 cm^2

Total SA Large = 2 Triangles +Side + Side + Side
= 108 + 90 +54 +72
= 324 cm^2

Cube



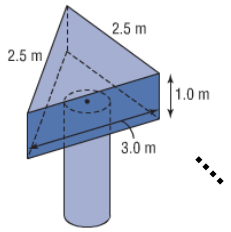
A = b x h
A= 3 x 3
A= 9 cm^2

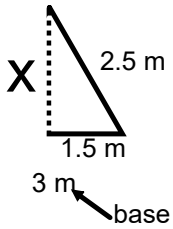
Area = 6 faces x (area of one face)
= 6 x (9 cm^2)
= 54 cm^2

Total SA = Triangular Prism + Cube - Overlap
= 324 cm^2 + 54cm^2 - 18 cm^2
= 360 cm^2

5. Determine the surface area of each composite object.

a) The cylinder is 2.5 m long with radius 0.5 m.





$height^2 = c^2 - b^2$

$= (2.5\ m)^2 - (1.5\ m)^2$

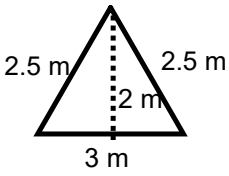
$= 6.25\ m^2 - 2.25 m^2$

$= 4\ m^2$

$height = \sqrt{4 m^2}$

$height = 2\ m$

Triangular prism



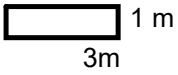
$A = \frac{b \times h}{2}$

$A = \frac{3m \times 2m}{2}$

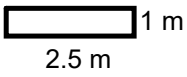
$A = \frac{6m^2}{2}$

$A = 3\ m^2$

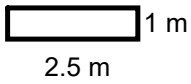
$2A = 6\ m^2$



A= b x h
= 3 m x 1m
= $3m^2$



A= b x h
= 2.5 m x 1m
= $2.5m^2$



A= b x h
= 2.5 m x 1m
= $2.5m^2$

Total SA Triangular Prism = 2 triangles + rectangle + rectangle + rectangle

$= 6\ m^2 + 3\ m^2 + 2.5\ m^2 + 2.5\ m^2$

$= 14\ m^2$

Cylinder

Area of cylinder = $2\pi r^2 + 2\pi rh$

$= 2(3.14)(0.5)^2 + 2(3.14)(0.5)(2.5)$

$= 2(3.14)(0.25) + 2(3.14)(0.5)(2.5)$

$= 1.57\ m^2 + 7.85\ m^2$

$= 9.42\ m^2$

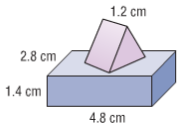
Area of Overlap

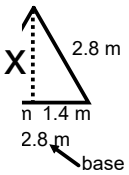
Total Surface = Triangular Prism + Cylinder - total overlap

$= 14\ m^2 + 9.42\ m^2 - 1.57\ m^2$

$= 21.85\ m^2$

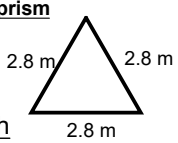
b) The base of the triangular prism is an equilateral triangle with side length 2.8 cm.





$height^2 = c^2 - b^2$
$= (2.8\ m)^2 - (1.4\ m)^2$
$= 7.84\ m^2 - 1.96 m^2$
$= 5.88\ m^2$
$height = \sqrt{5.88 m^2}$
$height = 2.4\ m$

Triangular prism



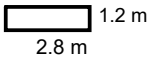
$A = \frac{b \times h}{2}$

$A = \frac{2.8\ m \times 2.4\ m}{2}$

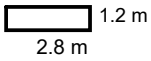
$A = \frac{6.72\ m^2}{2}$

$A = 3.36\ m^2$

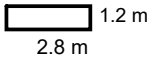
$2A = 6.72\ m^2$



A= b x h
= 2.8 m x 1.2 m
= 3.36 m^2



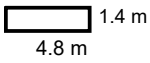
A= b x h
= 2.8 m x 1.2 m
= 3.36 m^2



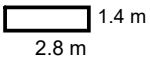
A= b x h
= 2.8 m x 1.2 m
= 3.36 m^2

Total SA Triangular Prism = 2 triangles + rectangle + rectangle + rectangle
= 6.72 m^2 + 3.36 m^2 + 3.36 m^2 + 3.36 m^2
= 16.8 m^2

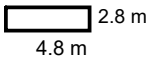
Prism



A= b x h
= 4.8 m x 1.4 m
= 6.72 m^2



A= b x h
= 2.8 m x 1.4 m
= 3.92 m^2



A= b x h
= 2.8 m x 4.8 m
= 13.44 m^2

Prism = 2 top + 2 side + 2 front
= 2 (6.72) + 2 (3.92) + 2(13.44)
= 13.44 + 7.84 + 26.88
= 48.16

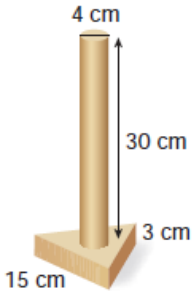
Overlap Area

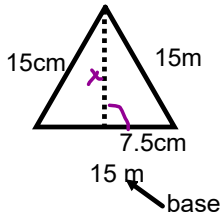
A= b x h
= 2.8 m x 1.2 m
= 3.36 m^2
x 2 faces
6.72 m^2

Total SA = Triangular Prism + Rectangular Prism - overlap
= 16.8 m^2 + 48.12 m^2 - 6.72 m^2
= 64.92 m^2 - 6.72 m^2
= 58.2 m^2

Apply

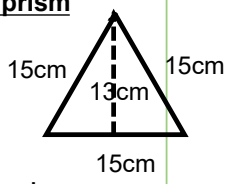
6. Here is the lamp stand from the top of page 33. The base of the lamp is a triangular prism with an equilateral triangle base. The surface of the stand is to be painted. What is the area that will be painted? Give the answer to the nearest whole number.





height^2 = c^2 - b^2
= (15)^2 - (7.5)^2
= 225 - 56.25
= 168.75 m^2
height = $\sqrt{168.75m^2}$
height = 13 m

Triangular prism



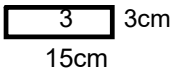
$A = \frac{b \times h}{2}$

$A = \frac{15cm \times 13m}{2}$

$A = \frac{195cm^2}{2}$

$A = 97.5cm^2$

$2A = 195cm^2$



A= b x h
= 15cm x 3cm
= 45cm^2
x3

Total SA Triangular Prism = 2 triangles + rectangle + rectangle + rectangle

= 195cm^2 +45cm^2 + 45cm^2 + 45cm^2

= 330cm^2

Cylinder

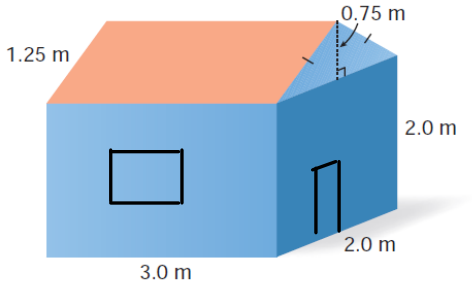
Area of cylinder = $2\pi r^2 + 2\pi rh$
$= 2(3.14)(2)^2 + 2(3.14)(2)(30)$
$= 2(3.14)(4) + 2(3.14)(2)(30)$
$= 25.12cm^2 + 379.8cm^2$
$= 401.92cm^2$

Area of Overlap

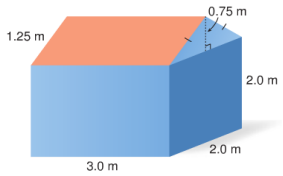
Total Surface = Triangular Prism + Cylinder - total overlap
= 330cm^2 + 401.92 m^2 - 25.12cm^2
= 706.8cm^2

7. Assessment Focus

a) A playhouse has the shape of a rectangular prism with a triangular prism roof. Determine the surface area of the playhouse.



b) Door is 0.5m x 1m
2 Windows 1m x 1 m



Triangular Prism

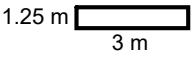
Without bottom

Area of Triangle = $\frac{b \times h}{2}$

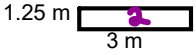
$= \frac{(2\text{ m}) \times (0.75\text{ m})}{2}$

$= \frac{1.5\text{ m}^2}{2}$

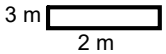
$= 0.75\text{ m}^2$



A = b x h
= 1.25 m x 3 m
= 3.75 m^2



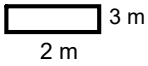
A = b x h
= 1.25 m x 3 m
= 3.75 m^2



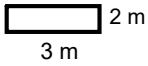
A = b x h
= 2 m x 3 m
= 6 m^2

Total SA = 2 Triangles + Rectangle + Rectangle + Rectangle
of triangular prism = 2(0.75 m^2) + 3.75 m^2 + 3.75 m^2 + 6 m^2
= 1.5 m^2 + 3.75 m^2 + 3.75 m^2 + 6 m^2
= 15 m^2

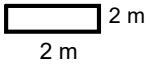
Prism



A= b x h
= 3 m x 2 m
= 6 m^2



A= b x h
= 3 m x 2 m
= 6 m^2



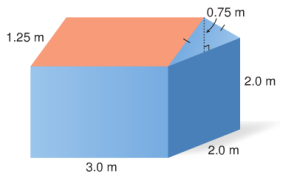
A= b x h
= 2 m x 2 m
= 4 m^2

Prism = 2 top + 2 side + 2 front
= 2 (6) + 2 (6) + 2(4)
= 12 + 12 + 8
= 32

Overlap = b x h
= 3 m x 2 m
= 6 m^2
x 2 faces
12 m^2

Bottom = b x h
= 3 m x 2 m
= 6 m^2

without bottom = Triangular Prism + Rectangular Prism - overlap - bottom
= 15 m^2 + 32 m^2 - 12 m^2 - 6 m^2
= 29 m^2



Triangular Prism

With bottom

Area of Triangle = $\frac{b \times h}{2}$

$= \frac{(2\text{ m}) \times (0.75\text{ m})}{2}$

$= \frac{1.5\text{ m}^2}{2}$

$= 0.75\text{ m}^2$

1.25 m, 3 m

A = b x h
= 1.25 m x 3 m
= 3.75 m^2

1.25 m, 3 m

A = b x h
= 1.25 m x 3 m
= 3.75 m^2

3 m, 2 m

A = b x h
= 2 m x 3 m
= 6 m^2

Total SA = 2 Triangles + Rectangle + Rectangle + Rectangle
of triangular prism = 2(0.75 m^2) + 3.75 m^2 + 3.75 m^2 + 6 m^2
= 1.5 m^2 + 3.75 m^2 + 3.75 m^2 + 6 m^2
= 15 m^2

Prism

3 m, 2 m

A= b x h
= 3 m x 2 m
= 6 m^2

2 m, 3 m

A= b x h
= 3 m x 2 m
= 6 m^2

2 m, 2 m

A= b x h
= 2 m x 2 m
= 4 m^2

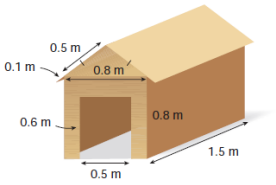
Prism = 2 top + 2 side + 2 front
= 2 (6) + 2 (6) + 2(4)
= 12 + 12 + 8
= 32

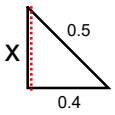
Overlap = b x h
= 3 m x 2 m
= 6 m^2
x 2 faces
12 m^2

with bottom = Triangular Prism + Rectangular Prism - overlap
= 15 m^2 + 32 m^2 - 12 m^2
= 35 m^2

8. Jemma has built this doghouse. The roof is a triangular prism with an isosceles triangle base. There is an overhang of 0.1 m. There is an opening for the doorway.

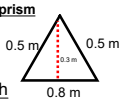
a) Determine the surface area of the outside of the doghouse.





$height^2 = c^2 - b^2$
$= (0.5)^2 - (0.4)^2$
$= 0.25 - 0.16$
$= 0.09\ m^2$
$height = \sqrt{0.09 m^2}$
$height = 0.3\ m$

Triangular prism



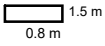
$A = \frac{b \times h}{2}$

$A = \frac{0.8\ m \times 0.3\ m}{2}$

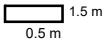
$A = \frac{0.24\ m^2}{2}$

$A = 0.12\ m^2$

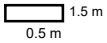
$2A = 0.24\ m^2$



$A = b \times h$
$= 0.8\ m \times 1.5\ m$
$= 1.2\ m^2$



$A = b \times h$
$= 0.5\ m \times 1.5\ m$
$= 0.75\ m^2$

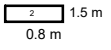


$A = b \times h$
$= 0.5\ m \times 1.5\ m$
$= 0.75\ m^2$

TSA= 0.24 m^2 + 1.2 m^2 + 0.75 m^2 + 0.75 m^2

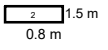
= 2.94 m^2

Prism (0.8, 1.5, 0.8)



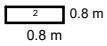
$A = b \times h$
$= 0.8\ m \times 1.5\ m$
$= 1.2\ m^2$

$2A = 2.4\ m^2$



$A = b \times h$
$= 0.8\ m \times 1.5\ m$
$= 1.2\ m^2$

$2A = 2.4\ m^2$



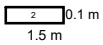
$A = b \times h$
$= 0.8\ m \times 0.8\ m$
$= 0.64\ m^2$

$2A = 1.28\ m^2$

$TSa = 2.4 + 2.4 + 1.28$

$TSa = 6.08\ m^2$

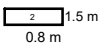
Over hang:



$A = b \times h$
$= 0.1\ m \times 1.5\ m$
$= 0.15\ m^2$

$2A = 0.3\ m^2$

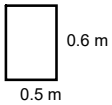
Over Lap:



$A = b \times h$
$= 0.8\ m \times 1.5\ m$
$= 1.2\ m^2$

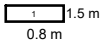
$2A = 2.4\ m^2$

Door



$A = b \times h$
$= 0.6\ m \times 0.5\ m$
$= 0.3\ m^2$

Floor



$A = b \times h$
$= 0.8\ m \times 1.5\ m$
$= 1.2\ m^2$

$FSA = T_{ri\ Prism} + R_{ect\ Prism}$ + Overhang - overlap - door- floor

FSA=2.94 m^2 + 6.08 m^2 + 0.3 m^2 -2.4 m^2 - 0.3 m^2 - 1.2m^2