Curriculum Outcome

(N5) Determine the square root of positive rational numbers that are perfect squares.

(N6) Determine an approximate square root of positive rational numbers that are non-perfect squares.

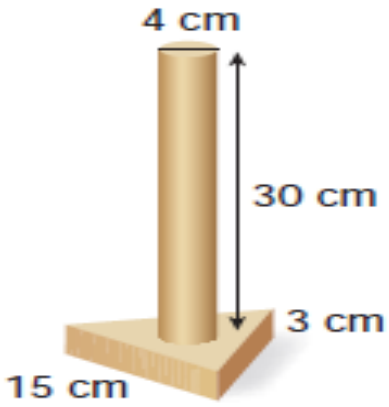
(SS2) Determine the surface area of composite 3-D objects to solve problems

(N4) **Explain and apply the order of operations, including exponents, with and without technology.**

Warm Up

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.



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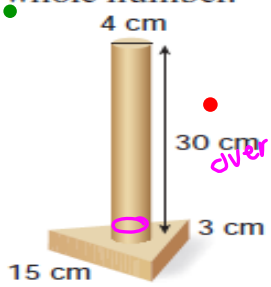


Cylinder: r= 2, h= 30

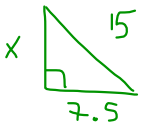
$SA = 2\pi r^2 + 2\pi rh$

overlap $SA = 2(3.14)(2)^2 + 2(3.14)(2)(30)$

$SA = 25.12 + 376.8$

$SA = 401.92\ cm^2$

-triangular prism



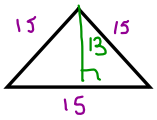
$b^2 = c^2 - a^2$

$b^2 = 15^2 - 7.5^2$

$b^2 = 225 - 56.25$

$\sqrt{b^2} = \sqrt{168.75}$

$b = 13$

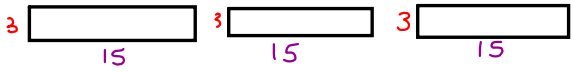


$A = \frac{b \times h}{2}$

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

$A = 97.5$

$2A = 195$



$A = b \times h$

$A = 3 \times 15$

$A = 45\ cm^2$

$45\ cm^2$ $45\ cm^2$

$SA = 195 + 45 + 45 + 45$

$= 330\ cm^2$

$T_{SA} = SA_1 + SA_2 - \text{overlap}$

$= 401.92 + 330 - 25.12$

$= 706.8\ cm^2$

Class / Homework

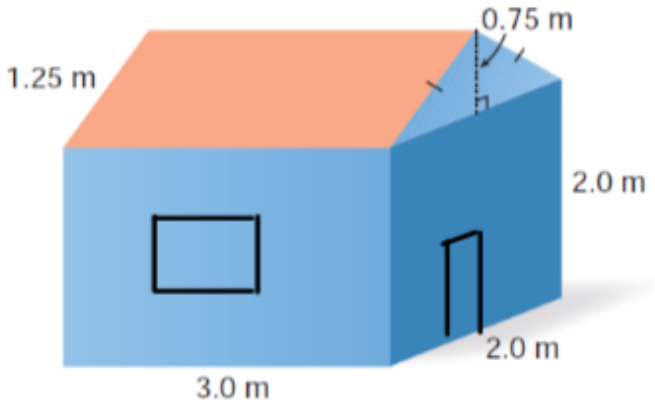
Practice Page 40 - 43

Questions :

Page 40-41
Questions: 3e, 4ab, 5ab, 7

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.



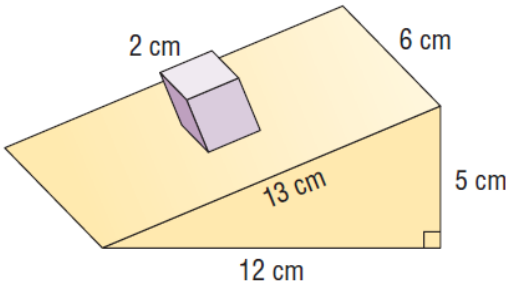
Without bottom

a) $29\ m^2$

b) $25.87 m^2$

b) Door is 0.5m x 0.5m
2 Windows 1.2m x 1.2m

3) e) cube on a triangular prism



Cube (2,2,2)

2 | 6 | 2

A= b x h

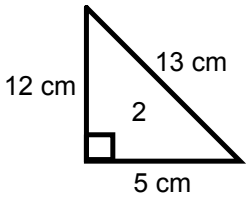
A= 2cm x 2 cm

A= 4 cm^2

x 6

=24 cm^2

Triangular Prism



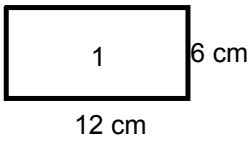
A = $\frac{b \times h}{2}$

A = $\frac{5 \times 12}{2}$

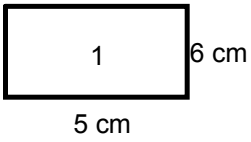
A = $\frac{60}{2}$

A = 30

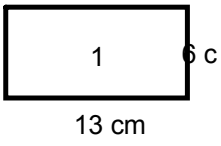
2A = 60 cm^2



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



A = b x h
A= 5 x 6
A= 30 cm^2



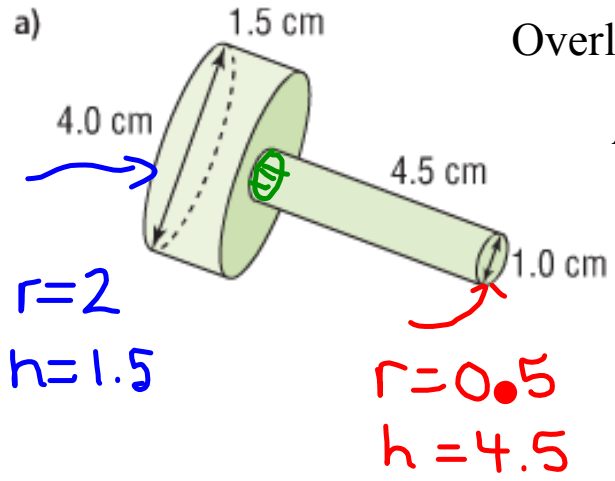
A = b x h
A= 13 x 6
A= 78 cm^2

SA Large = 60+ 72 +30+78
= 240 cm^2

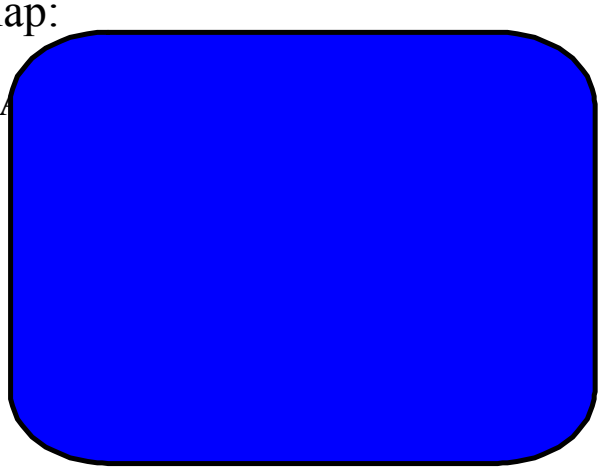
Total SA = Triangular Prism + Cube - Overlap
= 240 cm^2 + 24cm^2 - 8 cm^2
= 256 cm^2

4

a)



Overlap:



Top

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

$= 2(3.14)(2cm)^2 + 2(3.14)(2cm)(1.5cm)$

$= 2(3.14)(4cm) + 2(3.14)(2cm)(1.5cm)$

$= 25.12\ cm^2 + 18.84\ cm^2$

$= 43.96\ cm^2$

Overlap

Long

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

$= 2(3.14)(0.5cm)^2 + 2(3.14)(0.5cm)(4.5cm)$

$= 2(3.14)(0.25cm) + 2(3.14)(0.5cm)(4.5cm)$

$= 1.57\ cm^2 + 14.13\ cm^2$

$= 15.7\ cm^2$

Total SA = Cylinder + Cylinder - Overlap

$= 43.96\ cm^2 + 15.7\ cm^2 - 1.57\ cm^2$

$= 58.09\ cm^2$

$= 58.1\ cm^2$

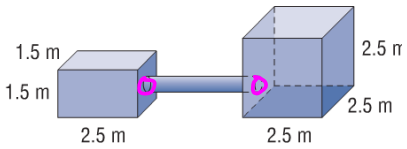
Homework solutions

Solutions

4 b) The cylinder is 3.5 m long with diameter 0.5 m.

h = 3.5

r = 0.25



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

$= 2(3.14)(0.25m)^2 + 2(3.14)0.25m)(3.5m)$

$= 2(3.14)(0.0625m^2) + 2(3.14)(0.25cm)(3.5m)$

$= 0.3925\ m^2 + 5.495\ m^2$

$= 5.8875\ m^2$

Prism 1)

Front/back: 1.5 m x 2.5 m

A= 1.5 m x 2.5 m
= 3.75 m^2

side/side: 1.5 m x 1.5 m

A= 1.5 m x 1.5 m
= 2.25 m^2

Top/Bottom: 1.5 m x 2.5 m

A= 1.5 m x 2.5 m
= 3.75 m^2

SA Prism 1 = $2(3.75\ m^2) + 2(2.25m^2) + 2(3.75m^2)$

$= 7.5\ m^2 + 4.5m^2 + 7.5m^2$

$= 19.5\ m^2$

Cube)

Surface area of 1 face = 2.5 m x 2.5m

= 6.25 m^2

x 6 ← 6 equal faces

37.5 m^2

Total SA= Rectangular Prism + Cube + Cylinder - Total Overlap

= 19.5 m^2 + 37.5 m^2 + 5.8875 m^2 - 0.785 m^2

= 61.6025 m^2

Or if you rounded to the nearest thenth

Total SA= Rectangular Prism + Cube + Cylinder - Total Overlap

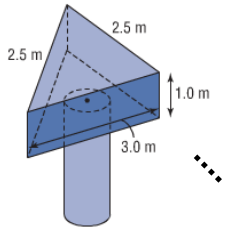
= 19.5 m^2 + 37.5 m^2 + 5.8875 m^2 - 0.785 m^2

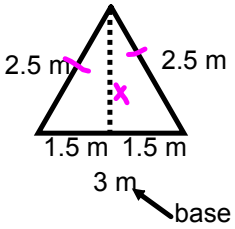
= 19.5 m^2 + 37.5 m^2 + 5.9 m^2 - 0.8 m^2

= 62.1 m^2

5. Determine the surface area of each composite object.

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





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

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

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

$= 4\ m^2$

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

$height = 2\ m$

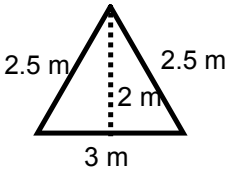
Triangular prism

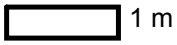
$A = \frac{b \times h}{2}$

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

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

$A = 3\ m^2$

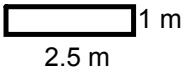




$A = b \times h$

$= 3\ m \times 1m$

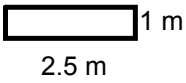
$= 3m^2$



$A = b \times h$

$= 2.5\ m \times 1m$

$= 2.5m^2$



$A = b \times h$

$= 2.5\ m \times 1m$

$= 2.5m^2$

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

$= 2\ (3\ m^2) + 3\ m^2 + 2.5\ m^2 + 2.5\ m^2$

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

$= 14\ m^2$

Cylinder

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

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

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

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

$= 9.42\ m^2$

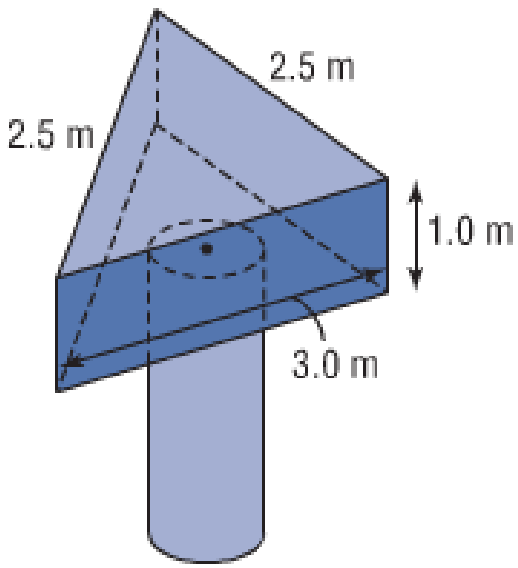
Total Surface = Triangular Prism + Cylinder - total overlap

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

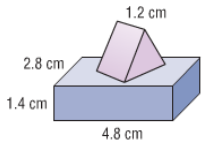
$= 21.85\ m^2$

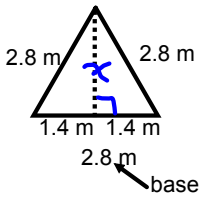
5. Determine the surface area of each composite object.

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



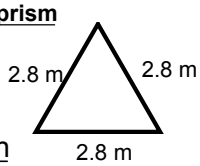
b) The base of the triangular prism is an equilateral triangle with side length 2.8 cm.





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

Triangular prism

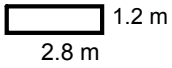


A= $\frac{b \times h}{2}$

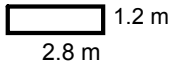
A= $\frac{2.8\ m \times 2.4\ m}{2}$

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

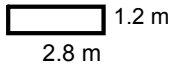
A= 3.36 m^2



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



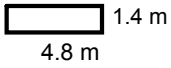
A= b x h
= 2.8 m x 1.2 m
= 3.36 m^2



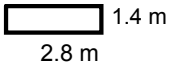
A= b x h
= 2.8 m x 1.2 m
= 3.36 m^2

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

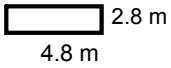
Prism



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

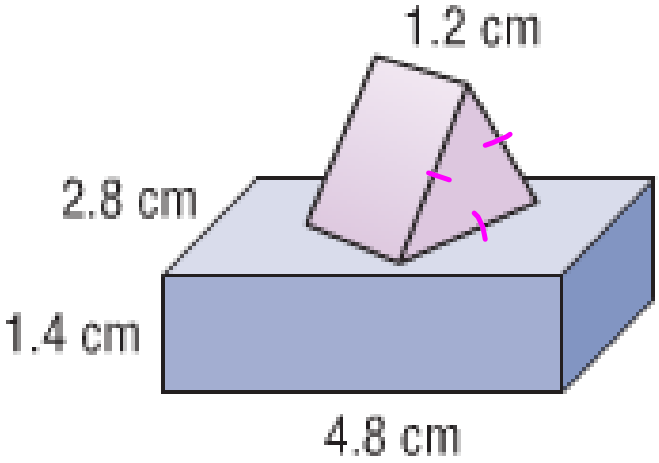


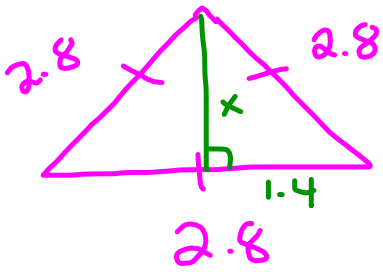
A= b x h
= 2.8 m x 4.8 m
= 13.44 m^2

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

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

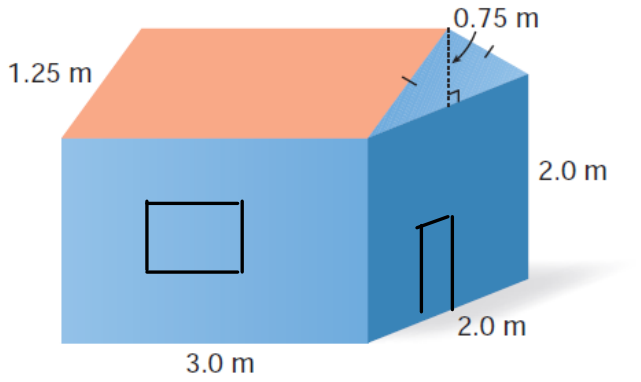
b) The base of the triangular prism is an equilateral triangle with side length 2.8 cm.





7. Assessment Focus

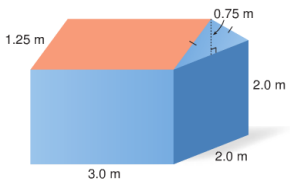
a) A playhouse has the shape of a rectangular prism with a triangular prism roof. Determine the surface area of the playhouse.



a) $29\ m^2$

b) $25.87 m^2$

b) Door is 0.5m x 0.5m
2 Windows 1.2m x 1.2m



Triangular Prism

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

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

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

$= 0.75\text{ m}^2$

Without bottom

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

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

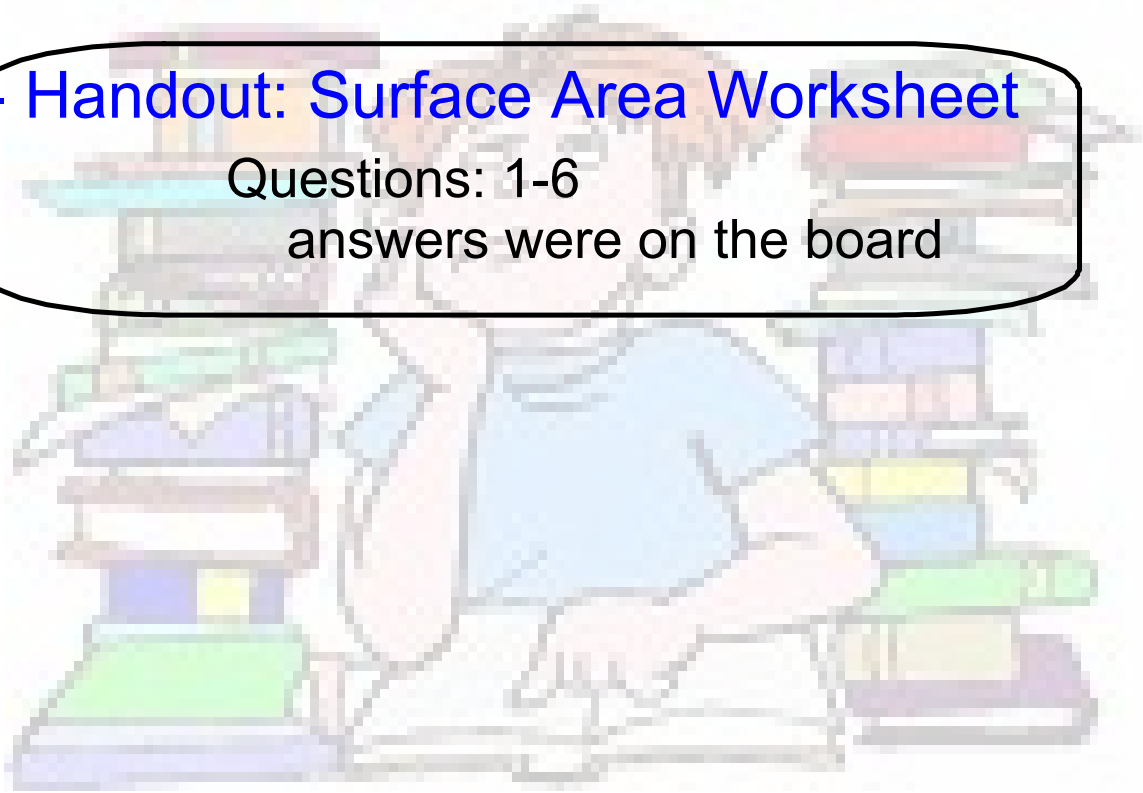
Class / Homework

Review For Test

- Handout: Surface Area Worksheet

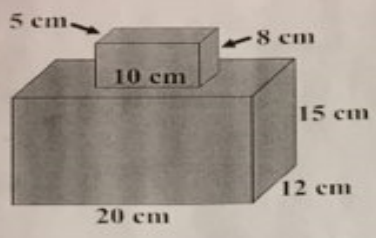
Questions: 1-6

answers were on the board

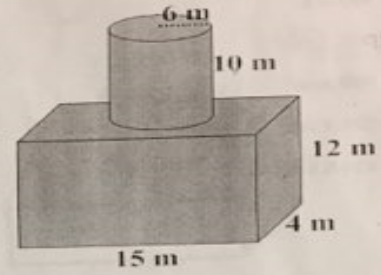


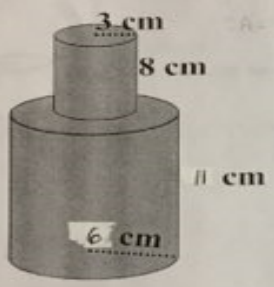
NIT 3 ASSIGNMENT – SURFACE AREA OF COMPOSITE OBJECTS

etermine the surface area of each composite object. Round answers to the nearest tenth, where ecessary. Show ALL work on loose-leaf.

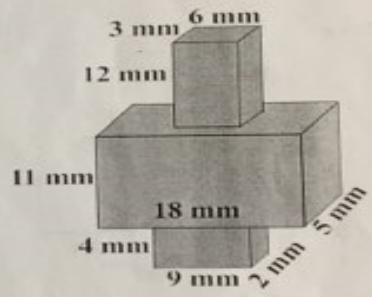


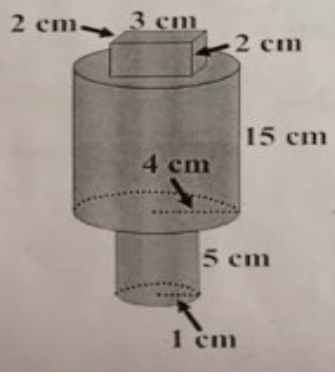
2.



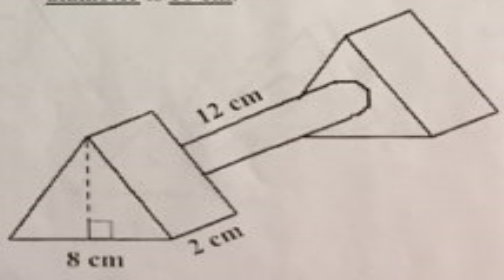


4.





6. The cylinder below is connected to two **IDENTICAL EQUILATERAL TRIANGULAR prisms**. The cylinder's **diameter** is **10 cm**.



Worksheet

Answers

1) $1680\ cm^2$

2) $952.8\ mi^2$

3) $791.3\ cm^2$

4) $990\ mm^2$

5) $5289\ cm^2$

6) $4268\ cm^2$