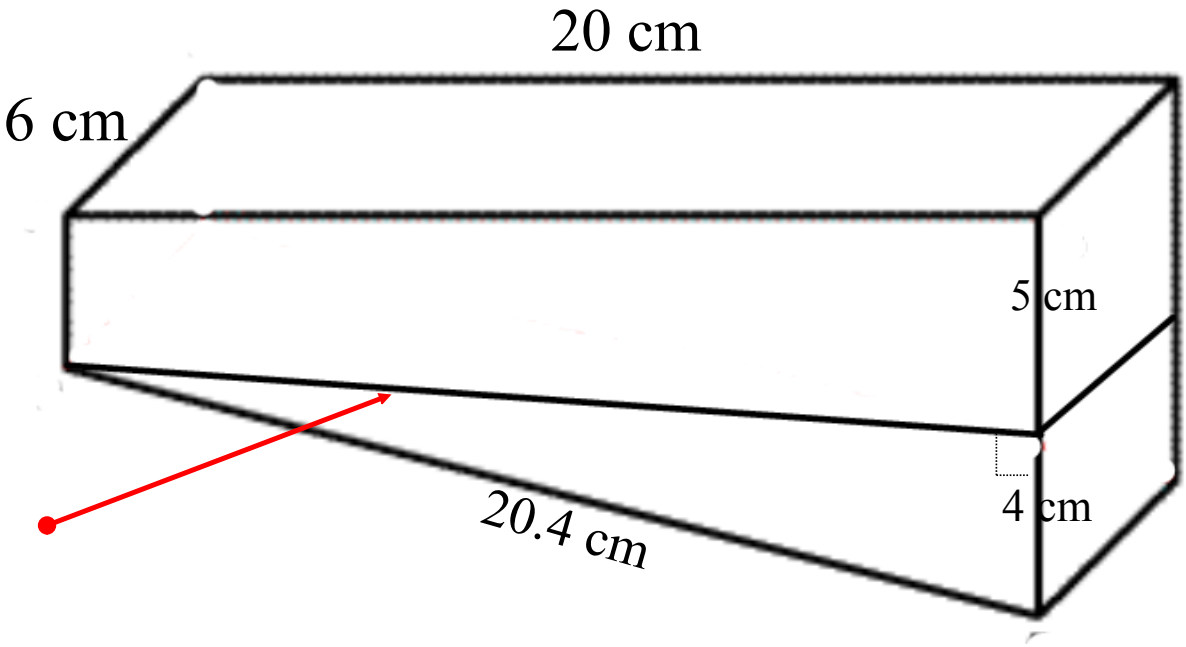
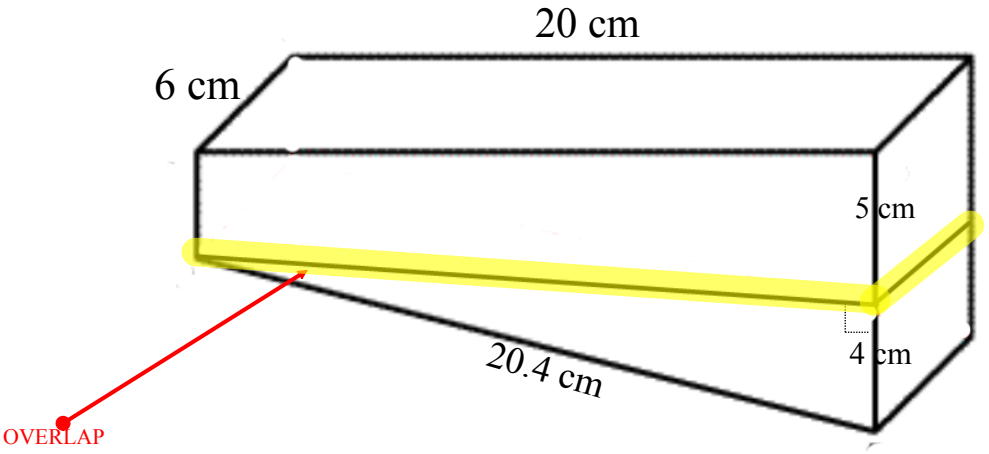
Warm Up



OVERLAP

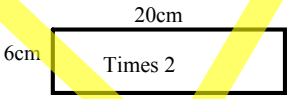
Calculate the surface area

Method 1)



Step 1) Calculate the Surface area of each Prism INDIVIDUALLY

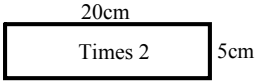
Rectangular prism (Surface)



A = 6cm x 20 cm
= 120 cm^2

2(120) cm^2

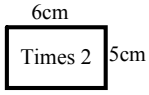
240 cm^2



A =5cm x 20 cm
= 100 cm^2

2(100 cm^2)

200 cm^2



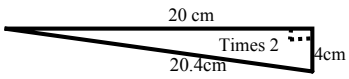
A =5cm x 6 cm
= 30 cm^2

2(30cm^2)

60cm^2

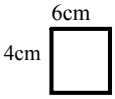
Area of rectangular prims = 240 cm^2 + 200 cm^2 + 60cm^2
= 500 cm^2

Triangular Prism

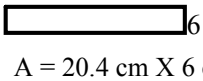


A = (20 cm X 4 cm) / 2
= (80 cm^2) / 2
= 40 cm^2

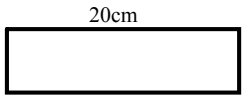
2A= 80cm^2



A = 4cm x 6cm
= 24 cm^2



A = 20.4 cm X 6 cm
= 122.4 cm^2



A = 6cm x 20 cm
= 120 cm^2

Area of triangular prism
= 80cm^2 + 24 cm^2 + 122.4cm^2 + 120cm^2
= 346.4cm^2

Total Surface Area = Rectangular prism + Triangular Prism - (OVERLAP)

= (500cm^2) + 346.4 cm^2 - 240cm^2

= 606.4 cm^2

Homework solutions

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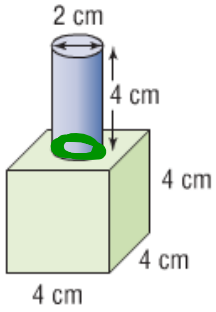
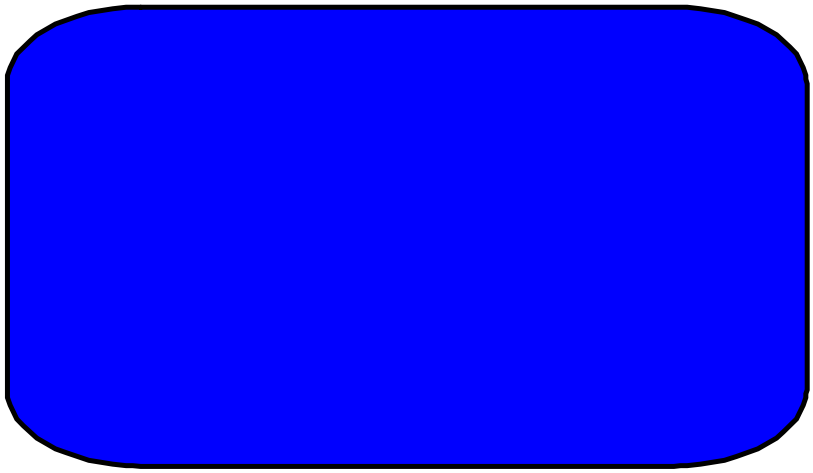
3 a) cylinder on a cube





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

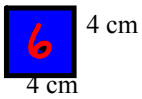
$= 2(3.14)(1cm)^2 + 2(3.14)(1cm)(4cm)$

$= 2(3.14)(1cm) + 2(3.14)(1cm)(4cm)$

$= 6.28\ cm^2 + 25.12\ cm^2$

$= 31.4\ cm^2$

Cube

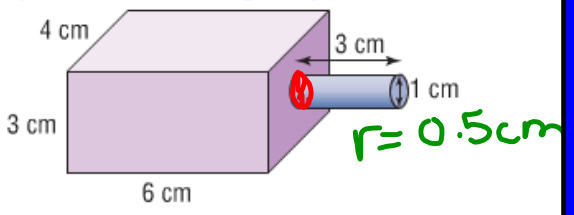


area = 4cm x 4cm
$= 16\ cm^2$

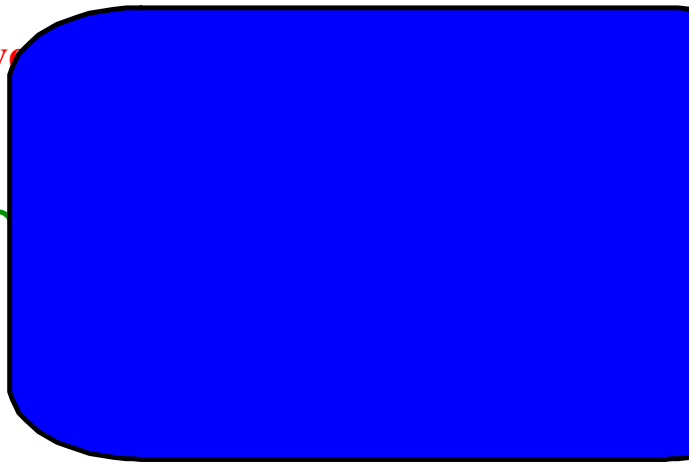
Area = 6 faces x (area of one face)
$= 6 \times (16\ cm^2)$
$= 96\ cm^2$

Total SA = Cylinder + Cube - Overlap
$= 31.4\ cm^2 + 96\ cm^2 - 6.28\ cm^2$
$= 121.12\ cm^2$
$= 121\ cm^2$

3 b) cylinder on a rectangular prism



Ov



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

$= 2(3.14)(0.5cm)^2 + 2(3.14)(0.5cm)(3cm)$

$= 2(3.14)(0.25cm) + 2(3.14)(0.5cm)(3cm)$

$= 1.57\ cm^2 + 9.42\ cm^2$

$= 10.99\ cm^2$

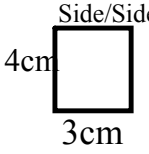
Rectangular Prism

Front/Back

A = 3cm x 6 cm
= 18 cm^2

2A = 36

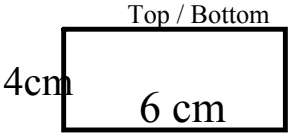
Side/Side



A = 3cm x 4 cm
= 12 cm^2

2A=24

Top / Bottom



A = 4cm x 6 cm
= 24 cm^2

2 A=48

Rectangular Prism SA = $2(18\ cm^2) + 2(12cm^2) + 2(24cm^2)$

$= 36\ cm^2 + 24cm^2 + 48cm^2$

$= 108cm^2$

Total SA = Cylinder + Rect Prism - Overlap

$= 10.99\ cm^2 + 108\ cm^2 - 1.57\ cm^2$

$= 117.42\ cm^2$

$= 117\ cm^2$

Homework solutions

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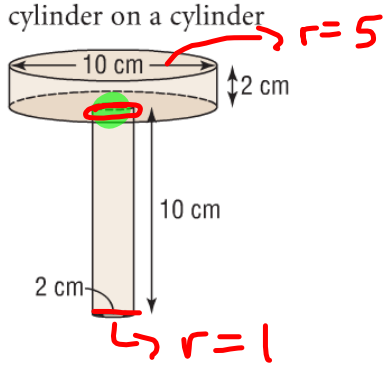
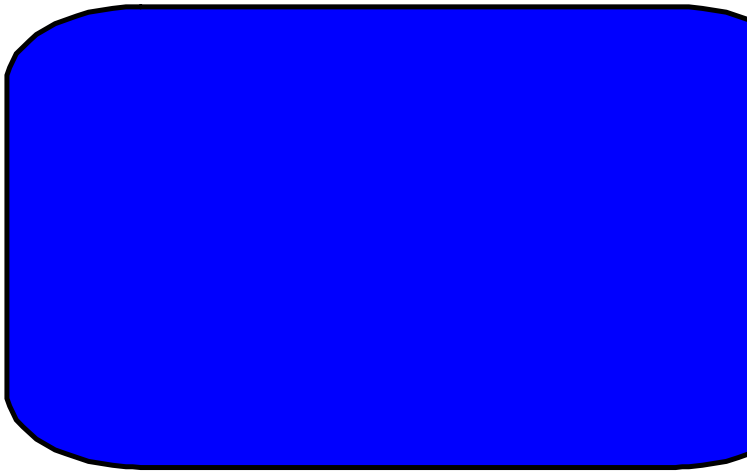
3c

c) cylinder on a cylinder





long tube

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

$= 2(3.14)(1cm^2) + 2(3.14)(1cm)(10cm)$

$= 2(3.14)(1cm) + 2(3.14)(1cm)(10cm)$

$= 6.28\ cm^2 + 62.8\ cm^2$

$= 69.08\ cm^2$

puck shape

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

$= 2(3.14)(5cm^2) + 2(3.14)(5cm)(2cm)$

$= 2(3.14)(25cm) + 2(3.14)(5cm)(2cm)$

$= 157\ cm^2 + 62.8cm^2$

$= 219.8\ cm^2$

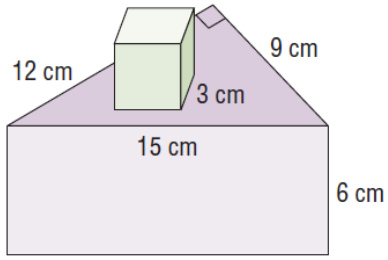
Total SA = Cylinder + Cylinder - Overlap

$= 69.08\ cm^2 + 219.8\ cm^2 - 6.28\ cm^2$

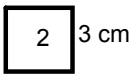
$= 282.6\ cm^2$

$= 283\ cm^2$

d) cube on a triangular prism



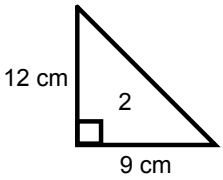
Over lap



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

2A = 18 cm^2

Triangular Prism



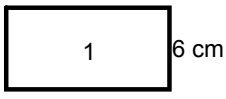
A = $\frac{b \times h}{2}$

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

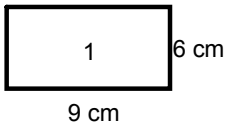
A = $\frac{108}{2}$

A = 54

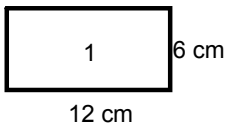
2A = 108 cm^2



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



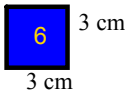
A = b x h
A= 9 x 6
A= 54 cm^2



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



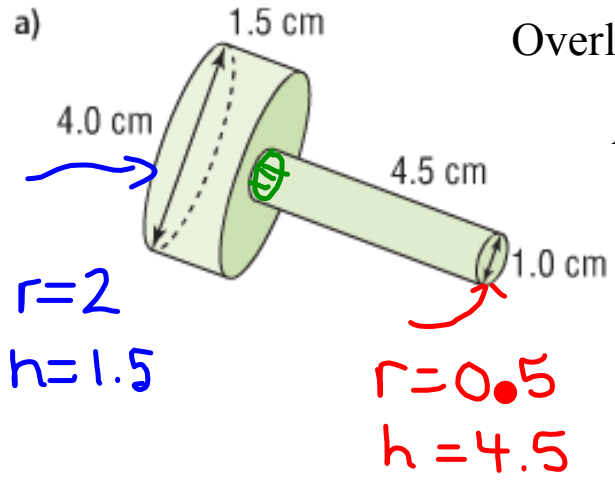
A = b x h
A= 3 x 3
A= 9 cm^2

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

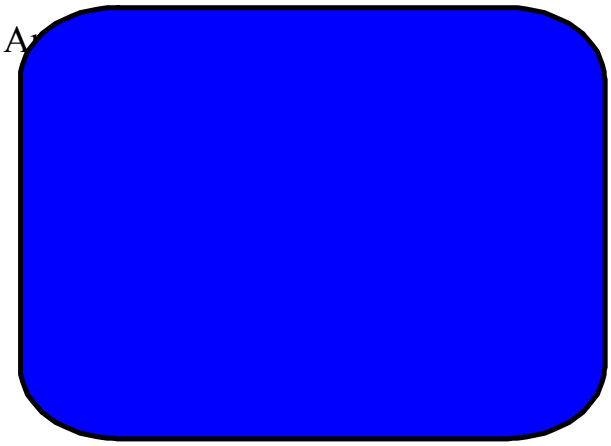
Total SA = Triangular Prism + Cube - Overlap
= 324 cm^2 + 54cm^2 - 18 cm^2
= 360 cm^2

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

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

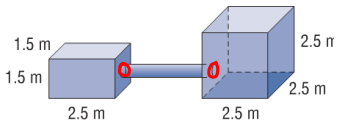
$= 58.09\ cm^2$

$= 58.1\ cm^2$

Homework solutions

Solutions

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



overlap 1

$A = \pi r^2$

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

$= (3.14)(0.0625m)$

$= 0.19625\ m^2$

x 2 for face involved

$=0.3925 m^2$

Overlap 2

$A = \pi r^2$

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

$= (3.14)(0.0625m)$

$= 0.19625\ m^2$

x 2 for face involved

$=0.3925\ m^2$

total overlap = overlap 1 + overlap 2

$0.3925\ m^2 + 0.3925\ m^2$

$= 0.785\ m^2$

overlap x 2

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: 2.5m, 1.5 m

A= 1.5 m x 2.5 m

$= 3.75\ m^2$

side/side: 1.5 m, 1.5 m

A= 1.5 m x 1.5 m

$= 2.25\ m^2$

Top/Bottom: 1.5 m, 2.5m

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

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

4 circles

$= 61.6025\ m^2$

Or if you rounded to the nearest thenth

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

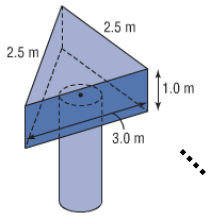
= $19.5\ m^2$ + $37.5\ m^2$ + $5.8875\ m^2$ - $0.785\ m^2$

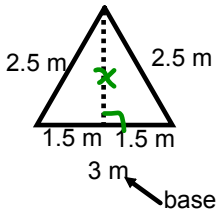
= $19.5\ m^2$ + $37.5\ m^2$ + $5.9\ m^2$ - $0.8\ m^2$

= $62.1\ m^2$

5. Determine the surface area of each composite object.

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





Missing Side

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

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

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

$= 4\ m^2$

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

$height = 2\ m$

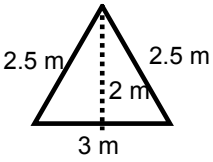
Triangular prism

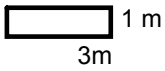
$A = \frac{b \times h}{2}$

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

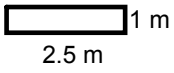
$A = \frac{6 m^2}{2}$

$A = 3\ m^2$

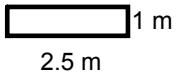




A= b x h
= 3 m x 1m
= $3m^2$



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

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

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

$= 14\ m^2$

Cylinder

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

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

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

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

$= 9.42\ m^2$

Area of Overlap

Area of circle = πr^2

$= (3.14)(0.5^2)$

$= (3.14)(0.25)$

$= 0.785\ m^2$

x 2 faces

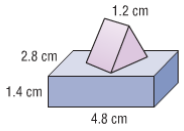
$1.57\ m^2$

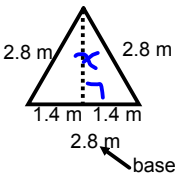
Total Surface = Triangular Prism + Cylinder - total overlap

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

$= 21.85\ m^2$

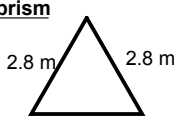
b) The base of the triangular prism is an equilateral triangle with side length 2.8 cm.





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

Triangular prism

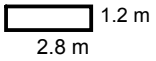


A= $\frac{b \times h}{2}$

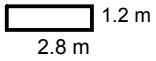
A= $\frac{2.8 \text{ m} \times 2.4 \text{ m}}{2}$

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

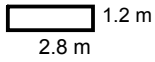
A= 3.36 m^2



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



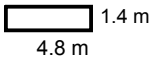
A= b x h
= 2.8 m x 1.2 m
= 3.36 m^2



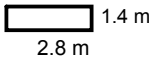
A= b x h
= 2.8 m x 1.2 m
= 3.36 m^2

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

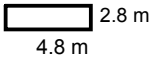
Prism



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



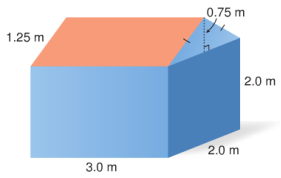
A= b x h
= 2.8 m x 4.8 m
= 13.44 m^2

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

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



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

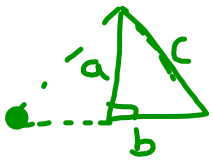
2 m, 2 m

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



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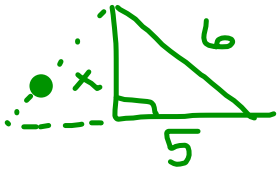
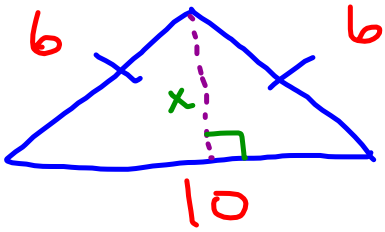


$c^2 = a^2 + b^2$

5a, b

x

$x^2 = c^2 - b^2$



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

$= \frac{10 \times (x)}{2}$

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Class / Homework

Review For Test

- Handout: Surface Area Worksheet

Questions: 1-6

answers were on the board

- Questions from Textbook:

page 45 - 46

#2(b, d, f, h)
#3(a,b,c,d,e)
#4(a,d)
#5 (a, c, e)
#6 (b,d)
7(ad)
12ac
#13ab
#15(bc)
#16(bc)
#19(a)

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#10 Warehouse question

Worksheet

Answers

1) $1680\ cm^2$

2) $952.8\ mi^2$

3) $791.3\ cm^2$

4) $990\ mm^2$

5) $528.9\ cm^2$

6) $426.8\ cm^2$