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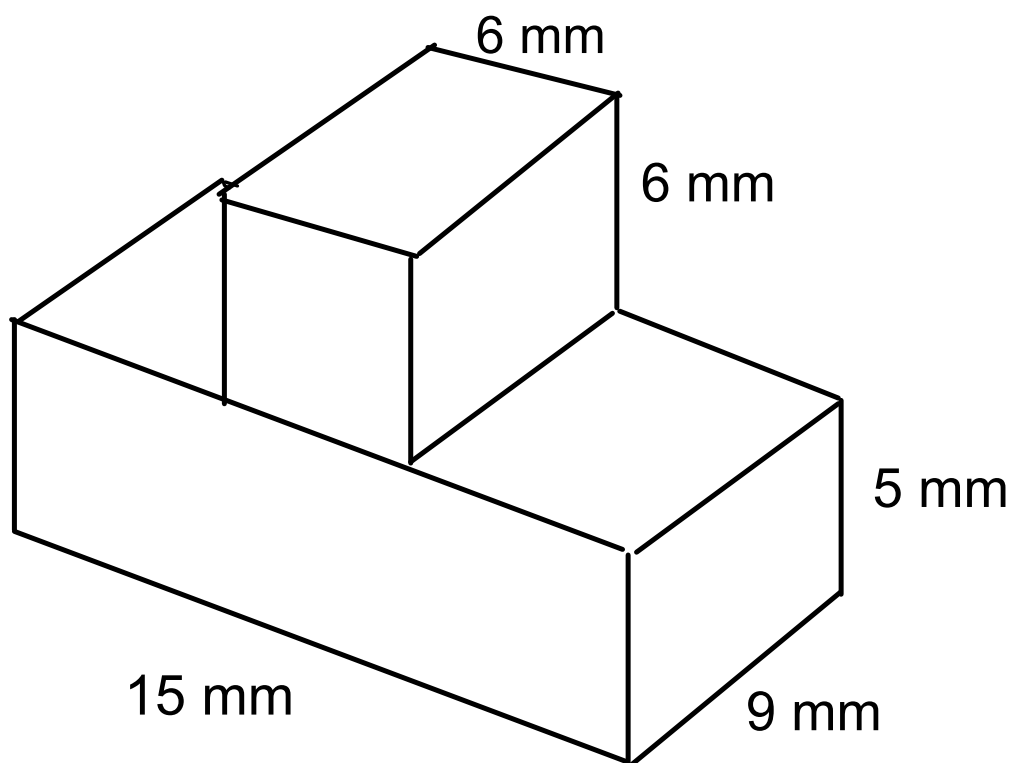
(SS2) Determine the surface area of composite 3-D objects to solve problems

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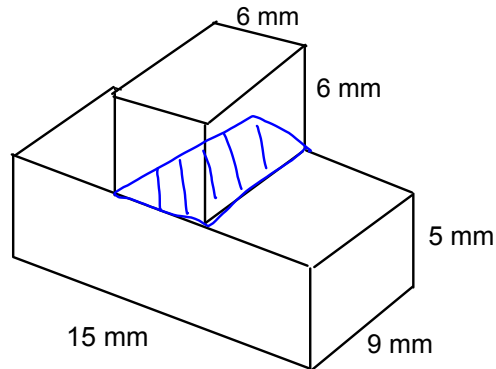
Get homework out

Warm Up

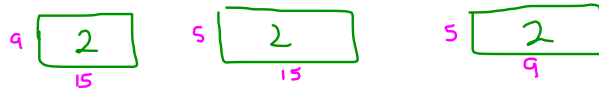Find the area of the composite shape.

6 mm

6 mm

5 mm

15 mm

9 mm

Get homework out

Warm Up

Find the area of the composite shape.

6 mm

6 mm

5 mm

15 mm   9 mm

Big $(15, 9, 5)$

9	2		5	2		5	2
	15			15			9

$A = b \times h$ $A = b \times h$ $A = b \times h$

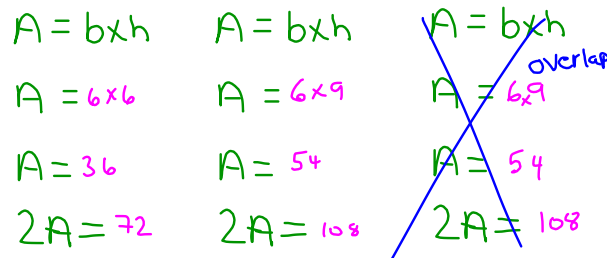$A = 9 \times 15$ $A = 5 \times 15$ $A = 9 \times 5$

$A = 135$ $A = 75$ $A = 45$

$2A = 270$ $2A = 150$ $2A = 90$

$SA_1 = 270 + 150 + 90$
$\quad = 510 \ mm^2$

Small $(6, 6, 9)$

$A = b \times h$ $A = b \times h$ $A = b \times h$ overlap

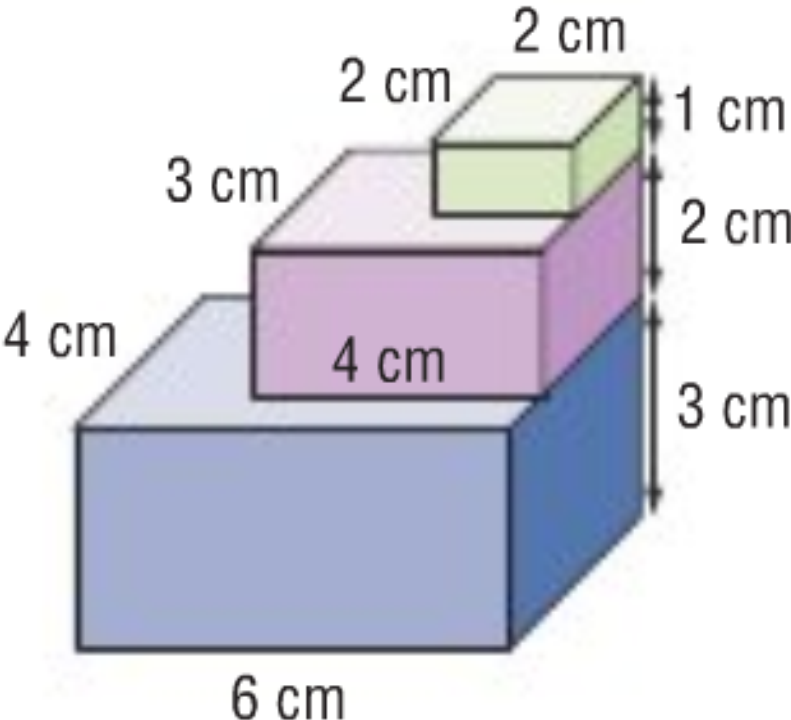$A = 6 \times 6$ $A = 6 \times 9$ $A = 6 \times 9$
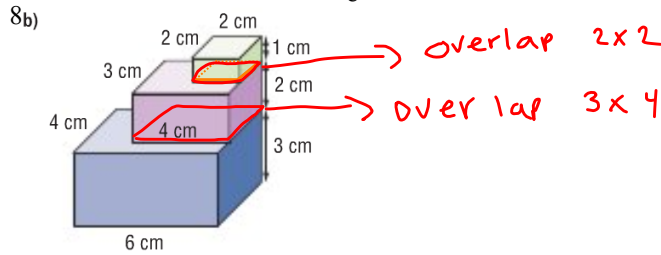
$A = 36$ $A = 54$ $A = 54$

$2A = 72$ $2A = 108$ $2A = 108$

$SA_2 = 72 + 108 + 108$
$\quad = 288 \ mm^2$

$T_{SA} = SA_1 + SA_2 - overlap$
$\qquad 510 + 288 \quad -108$

$\qquad = 690 \ mm^2$

b)

2 cm

2 cm

1 cm

3 cm

2 cm

4 cm

4 cm

3 cm

6 cm

Homework Solutions
Page 31

8b)

overlap 2x2
overlap 3x4

BIG Prism (if alone) BLUE   4, 6, 3

front/back

2	3cm

6cm
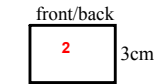
$A_1 = l \times w$
$= 6cm \times 3\ cm$
$= 18\ cm^2$

$2A_1 = 36\ cm^2$

side/side

2	3cm

4cm
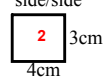
$A_2 = l \times w$
$= 3cm \times 4\ cm$
$= 12\ cm^2$

$2A_3 = 24\ cm^2$

top/bottom

2	4cm

6cm
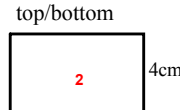
$A_3 = l \times w$
$= 6cm \times 4\ cm$
$= 24\ cm^2$

$2A_3 = 48\ cm^2$

SA of BIG $= 2A_1 + 2A_2 + 2A_3$
$= 36cm^2 + 24cm^2 + 48\ cm^2$
$= 108\ cm^2$

Middle Prism (if alone) Purple   3, 4, 2

front/back

2	2cm

4cm
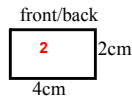
$A = l \times w$
$= 4cm \times 2\ cm$
$= 8\ cm^2$

$2A_1 = 16\ cm^2$

side/side

2	2cm

3cm

$A = l \times w$
$= 3cm \times 2\ cm$
$= 6\ cm^2$

$2A_3 = 12\ cm^2$

top/bottom

2	3cm

4cm

overlap
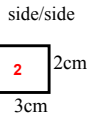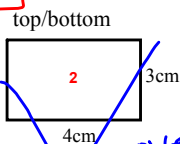
$A = l \times w$
$= 3cm \times 4\ cm$
$= 12\ cm^2$

$2A_3 = 24\ cm^2$

SA of Middle $= 2A_1 + 2A_2 + 2A_3$
$= 16cm^2 + 12cm^2 + 24\ cm^2$
$= 52\ cm^2$

Small Prism (if alone) Green   2, 2, 1

front/back

2	1cm

2cm

$A = l \times w$
$= 2cm \times 1\ cm$
$= 2\ cm^2$

$2A_1 = 4\ cm^2$

side/side

2	1cm

2cm

$A = l \times w$
$= 1cm \times 2\ cm$
$= 2\ cm^2$

$2A_3 = 4\ cm^2$

top/bottom

2	2cm

2cm
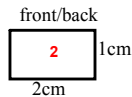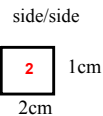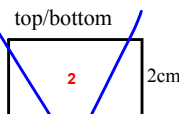
overlap

$A = l \times w$
$= 2cm \times 2\ cm$
$= 4\ cm^2$

$2A_3 = 8\ cm^2$

SA of small $= 2A_1 + 2A_2 + 2A_3$
$= 4cm^2 + 4cm^2 + 8\ cm^2$
$= 16\ cm^2$

-24 - 8

Surface area of object $=$ Big area $+$ Middle area $+$ Small area $-$ overlap area
$= 108\ cm^2 + 52\ cm^2 + 16\ cm^2 - 32\ cm^2$
$= 144\ cm^2$
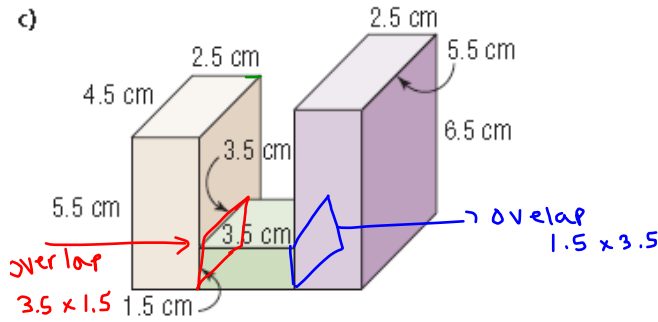
c)

2.5 cm

5.5 cm

2.5 cm

4.5 cm

M

3.5 cm

B

6.5 cm

5.5 cm

3.5 cm

Sn

1.5 cm

c)

2.5 cm
5.5 cm
2.5 cm
4.5 cm
3.5 cm
5.5 cm
6.5 cm
3.5 cm
→ ovelap
1.5 x 3.5
overlap
3.5 x 1.5   1.5 cm
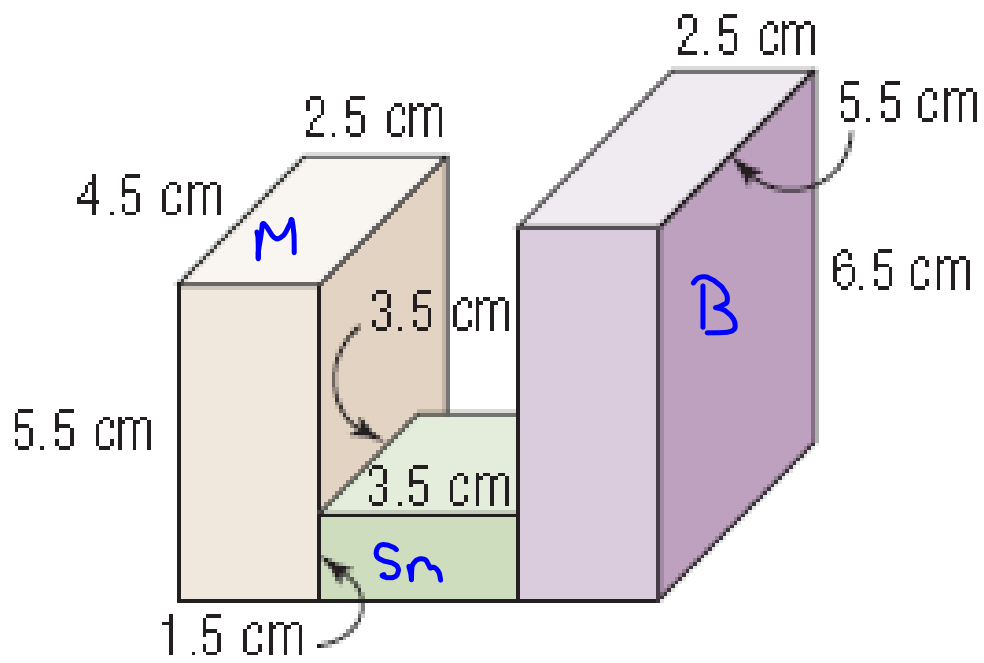
BIG Prism (if alone) Purple   (2.5 , 5.5 , 6.5
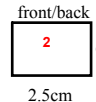
front/back   side/side   top/bottom

2   6.5cm   2   6.5cm   2   5.5cm
2.5cm   5.5cm   2.5cm

A = l x w   A = l x w   A = l x w
= 2.5cm x 6.5 cm   = 5.5cm x 6.5 cm   = 2.5cm x 5.5 cm
= 16.25 cm^2 = 35.75 cm^2 = 13.75 cm^2
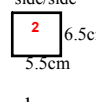
2A$_1$ = 32.5 cm^2   **2A$_3$ = 71.5 cm^2**   **2A$_3$ = 27.5 cm^2**

SA of BIG = 2A$_1$ + 2A$_2$ + 2A$_3$
= 32.5cm^2 + 71.5cm^2 + 27.5cm^2
= 131.5 cm^2

Medium Prism (if alone) Brown   5.5 , 4.5 , 2.5

front/back   side/side   top/bottom

2   5.5cm   2   5.5cm   2   4.5cm
2.5cm   4.5cm   2.5cm

A = l x w   A = l x w   A = l x w
= 2.5cm x 5.5 cm   = 4.5cm x 5.5cm   = 2.5cm x 4.5 cm
= 13.75 cm^2 = 24.75 cm^2 = 11.25 cm^2
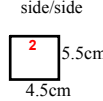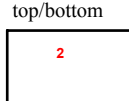
2A$_1$ = 27.5 cm^2   **2A$_3$ = 49.5 cm^2**   **2A$_3$ = 22.5 cm^2**

SA of Medium = 2A$_1$ + 2A$_2$ + 2A$_3$
= 27.5cm^2 + 49.5cm^2 + 22.5 cm^2
= 99.5 cm^2

Small Prism (if alone) Brown   1.5 , 3.5 , 3.5

front/back   side/side   top/bottom

2   3.5cm   2   3.5cm   2   3.5cm
1.5cm   1.5cm   3.5cm

A = l x w   A = l x w   A = l x w
= 1.5cm x 3.5 cm   = 4.5cm x 5.5cm   = 2.5cm x 4.5 cm
= 5.25 cm^2 = 5.25 cm^2 = 12.25 cm^2
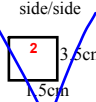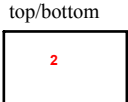
2A$_1$ = 10.5 cm^2   **2A$_3$ = 10.5 cm^2**   **2A$_3$ = 24.5 cm^2**

Total SA of Middle = 2A$_1$ + 2A$_2$ + 2A$_3$
= 10.5cm^2 + 10.5cm^2 + 24.5 cm^2
= 45.5 cm^2

Surface area of object = Big area + Middle area + Small area - overlap area
= 131.5 cm^2 + 99.5 cm^2 + 45.5 cm^2 - 21 cm^2
= 255.5 cm^2

Find the area of the warehouse with the attached storage space.

(Think if you were going to paint this....How much paint is needed???)

No Floor
No window
doors

40 m

20 m

15 m

1

6 m

5 m

3 m 10 m
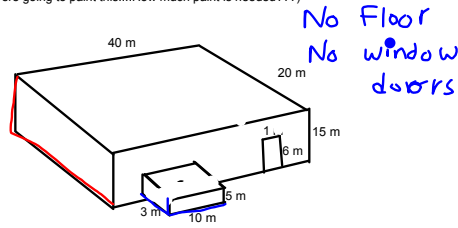
Step 1) Calculate the sides of all of the larger prism, (40m x 20m x 15m)

Top

① 20

40

$A_1 = b \times h$

$A_1 = 40 \times 20$

$A_1 = 800 \, m^2$

left / Right

② 15

20

$A_2 = b \times h$

$A_2 = 20 \times 15$

$A_2 = 300 \, m^2$

$2A_2 = 600 \, m^2$

Front / back

② 15

40

$A_3 = b \times h$

$A_3 = 40 \times 15$

$A_3 = 600 \, m^2$

$2A_3 = 1200 \, m^2$

So surface area of the storage space is:

$$SA_1 = A_1 + 2A_2 + 2A_3$$
$$= 800 + 600 + 1200$$
$$= 2600 \, m^2$$

Step 2) Storage space consist of 3 walls and a roof (3m x 10m x 5m)

Top

① 3

10

$A_1 = B \times h$

$A_1 = 10 \times 3$

$A = 30 \, m^2$

left/Right

① 5

3

$A_2 = b \times h$

$A_2 = 3 \times 5$

$A_2 = 15 \, m^2$

$2A_2 = 30 \, m^2$

Front/back

② 5

10

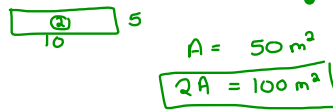$A_3 = b \times h$

$A = 10 \times 5$

$A = 50 \, m^2$

$2A_3 = 100 \, m^2$

So surface area of the storage space is:

$$SA = A_1 + 2A_2 + 2A_3$$
$$= 30 + 30 + 100$$
$$= 160 \, m^2$$

Over lap

② 5

10

$A = 50 \, m^2$

$2A = 100 \, m^2$

door

6m

1 m

$A = 1m \times 6m$

$A = 6m^2$

$$T_{SA} = SA_1 + SA_2 - overlap - door$$
$$= 2600 + 160 - 100 - 6$$
$$= 2654 \, m^2$$

8

10) A garage has the dimension shown. The attached shed has the same height as the garage, but is one-half as long and one-half a width

7.8 m

5.0 m

3.8 m

3.9 m

2.5 m

1 m

3 m

1 m

3.8 m

1 m

2 m

2 m
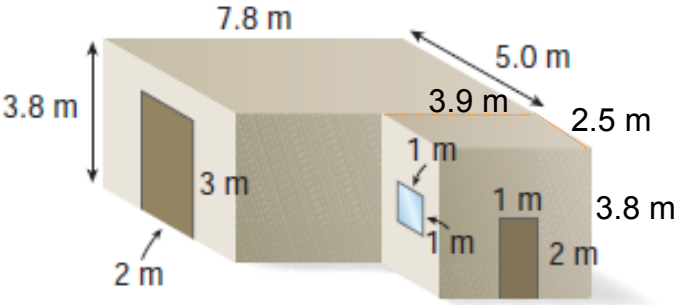
b) Vinyl siding costs $15/m^2$. The doors, windows, and roof will not be covered with siding. How much will it cost to cover this building with siding?
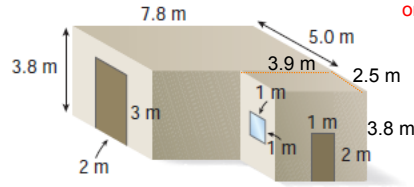
10) A garage has the dimension shown. The attached shed has the same height as the garage, but is one-half as long and one-half a width

Remember you do not have to put anything on the floor

Step 1) Calculate the sides of all of the larger prism,

roof:	left & right sides:	front & back side:

roof: 5 m, **1**, 7.8 m

left & right sides: 3.8 m, **2**, 5 m

front & back side: 3.8 m, **2**, 7.8 m

$A_1 = l \times w$
$\quad = 5 \text{ m} \times 7.8 \text{ m}$
$\quad = 39 \text{ m}^2$

$A_1 = 39 \text{ m}^2$

$A_2 = l \times w$
$\quad = 5 \text{ m} \times 3.8 \text{ m}$
$\quad = 19 \text{ m}^2$

$2A_2 = 38 \text{ m}^2$

$A_3 = l \times w$
$\quad = 3.8 \text{ m} \times 7.8 \text{ m}$
$\quad = 29.64 \text{ m}^2$

$2A_3 = 59.28 \text{ m}^2$

$$\text{SA of BIG} = A_1 + 2A_2 + 2A_3$$
$$= 39 \text{ m}^2 + 38 \text{ m}^2 + 59.28 \text{ m}^2$$
$$= 136.28 \text{ m}^2$$

Step 2) Front building : dimensions 3.8 m x 2.5 m x 3.9 m

roof:	front/back:	left side and right side:

roof: 3.9 m, **1**, 2.5 m

front/back: 3.8 m, **2**, 3.9 m

left side and right side: 2.5 m, **2**, 3.8 m

$A_1 = l \times w$
$\quad = 3.9 \text{ m} \times 2.5 \text{ m}$
$\quad = 9.75 \text{ m}^2$

$A_1 = 9.75 \text{ m}^2$

$A_2 = l \times w$
$\quad = 3.8 \text{ m} \times 3.9 \text{ m}$
$\quad = 14.82 \text{ m}^2$

$2A_2 = 29.64 \text{ m}^2$

$A_3 = l \times w$
$\quad = 2.5 \text{ m} \times 3.8 \text{ m}$
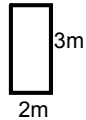$\quad = 9.5 \text{ m}^2$

$2A_3 = 19 \text{ m}^2$

$$\text{SA of Small} = A_1 + 2A_2 + 2A_3$$
$$= 9.75 \text{ m}^2 + 29.64 \text{ m}^2 + 19 \text{ m}^2$$
$$= 58.39 \text{ m}^2$$

So surface area of the storage space with windows and doors:

$$\text{SA} = \text{Big area} + \text{Small area} - \text{overlap area}$$
$$= 136.28 \text{ m}^2 + 58.39 \text{ m}^2 - 29.64 \text{ m}^2$$
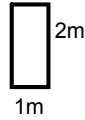$$= 165.03 \text{ m}^2$$

b) Vinyl siding costs $15/m^2. The doors, windows, and roof will not be covered with siding. How much will it cost to cover this building with siding?

Door 1

$A_1 = l \times w$
  $= 2\ m \times 3\ m$
  $= 6\ m^2$

Door 2

$A_2 = l \times w$
  $= 2\ m \times 1\ m$
  $= 2\ m^2$

Window

$A_3 = l \times w$
  $= 1\ m \times 1\ m$
  $= 1\ m^2$

Total area of window & doors = $A_1 + A_2 + A_3$

$$= 6m^2 + 2m^2 + 1m^2$$

$$= 9\ m^2$$

Total area the Roofs = Big Roof Area + Small Roof Area

$$= 39\ m^2 + 9.75\ m^2$$

$$= 48.75\ m^2$$

area of building   - area of windows and doors - area of roofs

$$= 165.03\ m^2 - 9m^2 - 48.75\ m^2$$

$$= 107.28\ m^2$$

Total Price = 107.28 m^2 x 15/m^2

$$= \$1609.20$$

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