

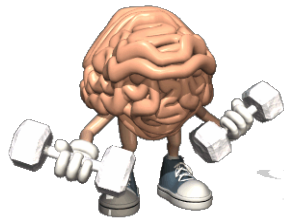
## Curriculum Outcome

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

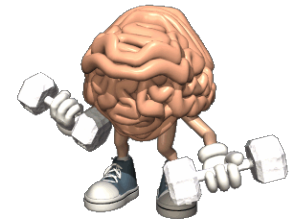
(N6) Determine an approximate square root of positive rational numbers that are non-perfect squares.

(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.\*\*



# Grade 9 Warm Up Quiz



Remember:

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

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

a)

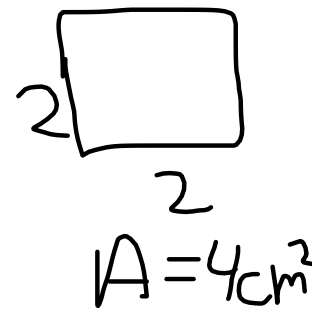
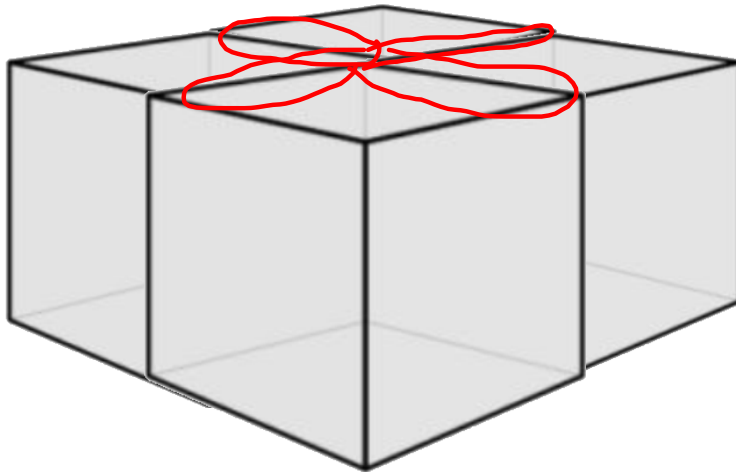
A large purple circular interface for a timer. At the top right is a gear icon. In the center is a white digital display showing "0:00:00". Above the display are three white upward-pointing triangles, and below are three white downward-pointing triangles. At the bottom left is a white play button icon, and at the bottom right is a white refresh/circular arrow icon. To the left of the circle, a blue cone is partially visible, and the text "SA=" is partially visible.



## Warm Up Grade 9



Find the Surface Area of This Composite Object.  
Each cube has edge length of 2 cm.



4 cube x 6 faces

= 24 faces - (4 overlap)

24 faces - 8 faces

= 16 faces

x 4 cm<sup>2</sup>

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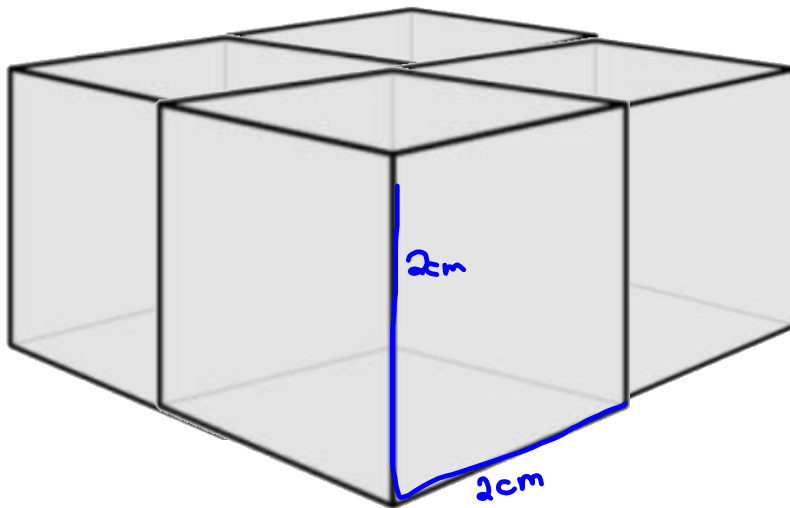

$$\text{TSA} = 64 \text{ cm}^2$$



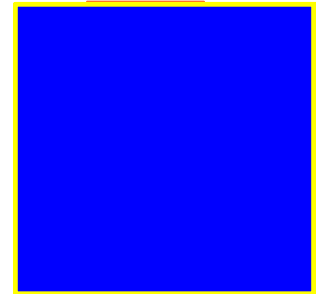
## Warm Up Grade 9



Find the Surface Area of This Composite Object.  
Each cube has edge length of 2 cm.



1 face



4 Cubes

**Total number of faces =  $6 \times 4 = 24$  faces**

**# of overlaps = 4  $\longrightarrow$  8 faces**

**Total Area of all cubes = 24 faces - overlap faces  
= 24 - 8**

**= 16 Faces**

**Total SA = 16 Faces x Area of one face  
= 16 x 4 cm<sup>2</sup>  
= 64 cm<sup>2</sup>**



page 30 & 31

questions  
4abde

## Homework Solutions

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$$A = b \times h$$

$$A = 1 \times 1 \text{ cm}^2$$


4a) Area of a single face = 1 unit<sup>2</sup>

$$\# \text{ of cubes} = 3$$

$$\begin{aligned} \text{Total number of faces} &= 6 \times 3 \\ &= 18 \text{ faces} \end{aligned}$$

$$\# \text{ of overlaps} = 2 \text{ -----} > 4 \text{ faces}$$

$$18 \text{ faces} - 4 \text{ faces} = 14 \text{ faces}$$

$$\begin{aligned} \text{Total SA} &= 14 \text{ faces} \times 1 \text{ units}^2 - \\ &= 14 \text{ units}^2 \end{aligned}$$

4b) Area of a single face = 1 unit<sup>2</sup>

$$\# \text{ of cubes} = 4$$

$$\begin{aligned} \text{Total number of faces} &= 6 \times 4 \\ &= 24 \text{ faces} \end{aligned}$$

$$\# \text{ of overlaps} = 3 \text{ -----} > 6 \text{ faces}$$

$$24 \text{ faces} - 6 \text{ faces} = 18 \text{ faces}$$

$$\begin{aligned} \text{Total SA} &= 18 \text{ Faces} \times 1 \text{ units}^2 \\ &= 18 \text{ units}^2 \end{aligned}$$

4c) Area of a single face = 1 unit<sup>2</sup>

$$\# \text{ of cubes} = 5$$

$$\begin{aligned} \text{Total number of faces} &= 6 \times 5 \\ &= 30 \text{ faces} \end{aligned}$$

$$\# \text{ of overlaps} = 4 \text{ -----} > 8 \text{ faces}$$

$$30 \text{ faces} - 8 \text{ faces} = 22 \text{ faces}$$

$$\begin{aligned} \text{Total SA} &= 22 \text{ Faces} \times 1 \text{ units}^2 \\ &= 22 \text{ units}^2 \end{aligned}$$

4d) Area of a single face = 1 unit<sup>2</sup>

$$\# \text{ of cubes} = 5$$

$$\begin{aligned} \text{Total number of faces} &= 6 \times 5 \\ &= 30 \text{ faces} \end{aligned}$$

$$\# \text{ of overlaps} = 5 \text{ -----} > 10 \text{ faces}$$

$$30 \text{ faces} - 10 \text{ faces} = 20 \text{ faces}$$

$$\begin{aligned} \text{Total SA} &= 20 \text{ Faces} \times 1 \text{ units}^2 \\ &= 20 \text{ units}^2 \end{aligned}$$

Homework Solutions  
Page 30 continued...

4e) Area of a single face = 1 unit<sup>2</sup>

# Of cubes = 5

Total number of faces = 6 x 5  
= 30 faces

# of overlaps = 4 -----> 8 Faces

30 faces - 8 **faces** = 22 faces

Total SA = 22 faces x 1units<sup>2</sup> -  
= 22 units<sup>2</sup>

4f) Area of a single face = 1 unit<sup>2</sup>

# Of cubes = 6

Total number of faces = 6 x 6  
= 36 faces

# of overlaps = 5 -----> 10  
Faces

36 faces - 10 **faces** = 26 faces

Total SA = 26 faces x 1units<sup>2</sup> -  
= 26 units<sup>2</sup>



# of cubes = 4

$$\begin{aligned} \text{5i) Area of a single face} &= L \times W \\ &= 1 \times 1 \\ &= 1 \text{ unit}^2 \end{aligned}$$

**Total number of faces = 6 x 4 = 24 faces**

**# of overlaps = 3**

$$\begin{aligned} \text{Total Area of all cubes} &= 24 \text{ faces} - 2 \text{ (overlap)} \\ &= 24 - 2 \text{ (3)} \\ &= 24 - 6 \\ &= 18 \text{ Faces} \end{aligned}$$

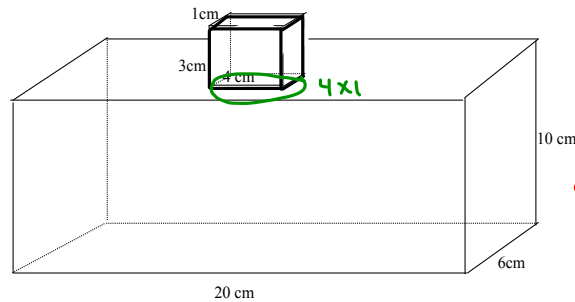
$$\begin{aligned} \text{Total SA} &= 18 \text{ Faces} \times \text{Area of one face} \\ &= 18 \times 1 \text{ unit}^2 \\ &= 18 \text{ units}^2 \end{aligned}$$



Determine the surface area of the composite object.

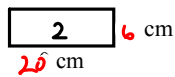
What effect does the overlap have on the calculation of the surface area?

\*count bottom



STEP 1: You can calculate all of the surface areas of the larger rectangular prism

20, 6, 10

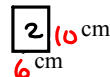


$$A = b \times h$$

$$A = 6 \times 20$$

$$A = 120 \text{ cm}^2$$

$$2A = 240 \text{ cm}^2$$

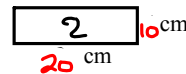


$$A = b \times h$$

$$A = 6 \times 10$$

$$A = 60$$

$$2A = 120 \text{ cm}^2$$



$$A = b \times h$$

$$A = 20 \times 10$$

$$A = 200$$

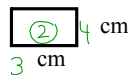
$$2A = 400 \text{ cm}^2$$

$$SA_{big} = 240 + 120 + 400$$

$$= 760 \text{ cm}^2$$

Step 2: Then calculate all of the surface areas of the smaller rectangular prisms

3, 4, 1



$$A = b \times h$$

$$A = 3 \times 4$$

$$A = 12 \text{ cm}^2$$

$$2A = 24 \text{ cm}^2$$

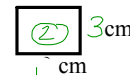


~~$$A = b \times h$$

$$A = 4 \times 1$$

$$A = 4$$

$$2A = 8 \text{ cm}^2$$~~



$$A = b \times h$$

$$A = 3 \times 1$$

$$A = 3$$

$$2A = 6 \text{ cm}^2$$

$$SA_{sm} = 24 + 6 + 8$$

$$= 38 \text{ cm}^2$$

Step 3: Is there an overlap? SO must subtract the "overlapped Areas"

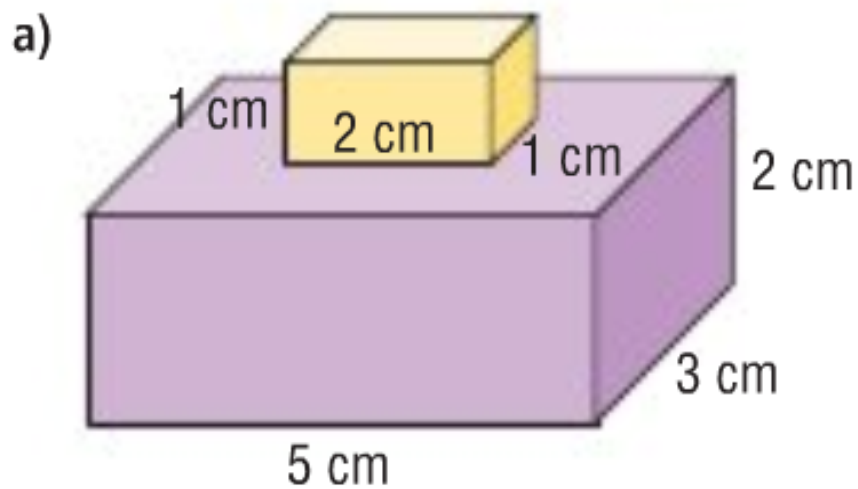
recall overlap involves "two faces"

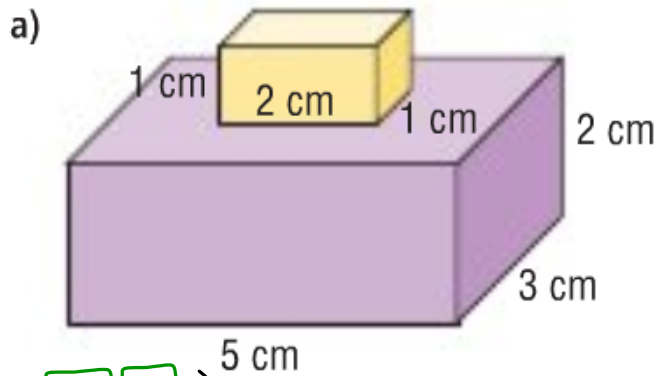
subtract 2 x (overlap area)

$$TSA = SA_{big} + SA_{sm} - \text{overlap}$$

$$= 760 + 38 - 8$$

$$= 790 \text{ cm}^2$$





Big :  $(5, 3, 2)$

$$\begin{array}{|c} \hline 2 \\ \hline 5 \\ \hline \end{array} \begin{array}{l} 3 \\ \\ \end{array}$$

$$\begin{aligned} A &= b \times h \\ A &= 5 \times 3 \\ A &= 15 \\ 2A &= 30 \text{ cm}^2 \end{aligned}$$

$$\begin{array}{|c} \hline 2 \\ \hline 3 \\ \hline \end{array} \begin{array}{l} 2 \\ \\ \end{array}$$

$$\begin{aligned} A &= b \times h \\ A &= 3 \times 2 \\ A &= 6 \\ 2A &= 12 \text{ cm}^2 \end{aligned}$$

$$\begin{array}{|c} \hline 2 \\ \hline 5 \\ \hline \end{array} \begin{array}{l} 2 \\ \\ \end{array}$$

$$\begin{aligned} A &= b \times h \\ A &= 5 \times 2 \\ A &= 10 \\ 2A &= 20 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} SA &= 30 + 12 + 20 \\ SA &= 62 \text{ cm}^2 \end{aligned}$$

small :  $(1 \times 2 \times 1)$

$$\begin{array}{|c} \hline 2 \\ \hline 1 \\ \hline \end{array} \begin{array}{l} 2 \\ \\ \end{array}$$

$$\begin{aligned} A &= b \times h \\ A &= 1 \times 2 \\ A &= 2 \\ 2A &= 4 \text{ cm}^2 \end{aligned}$$

$$\begin{array}{|c} \hline 2 \\ \hline 2 \\ \hline \end{array} \begin{array}{l} 1 \\ \\ \end{array}$$

$$\begin{aligned} A &= b \times h \\ A &= 1 \times 2 \\ A &= 2 \\ 2A &= 4 \text{ cm}^2 \end{aligned}$$

$$\begin{array}{|c} \hline 2 \\ \hline 1 \\ \hline \end{array} \begin{array}{l} 1 \\ \\ \end{array}$$

$$\begin{aligned} A &= b \times h \\ A &= 1 \times 1 \\ A &= 1 \\ 2A &= 2 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} SA_2 &= 4 + 4 + 2 \\ &= 10 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} TSA &= SA_1 + SA_2 - \text{overlap} \\ &= 62 + 10 - 4 \\ &= 68 \text{ cm}^2 \end{aligned}$$