

## Exam Review

Day 3:

Chapter 1 (Perfect Squares and Surface Area)

## 1.1 Square Roots of Perfect Squares



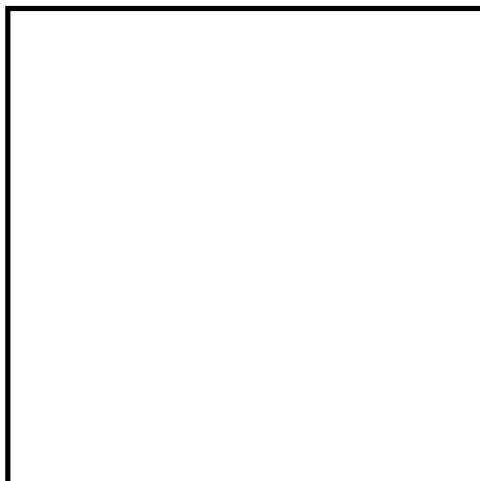
A new parking lot is a square with an area of  $900 \text{ m}^2$ . What is the side length of the square?

Think Area of a Square

Write the area as a **product**

Area = base x height

"Square" THEN...  
Base = Height



Know when to square a number  
or square root a number:

→ The area of a square  
is 9 what is the  
side length  
ans:  $\sqrt{\quad}$

→ side length is 25  
what is the area  
ans:  $(25)^2$

$$\text{Area} = 625 \text{ cm}^2$$

Area of square

side length =

## Perfect Squares

$$1^2 = 1$$

$$2^2 = 4$$

$$3^2 = 9$$

$$4^2 = 16$$

$$5^2 = 25$$

$$6^2 =$$

$$7^2 =$$

$$8^2 =$$

$$9^2 =$$

$$10^2 =$$

$$11^2 =$$

$$12^2 =$$

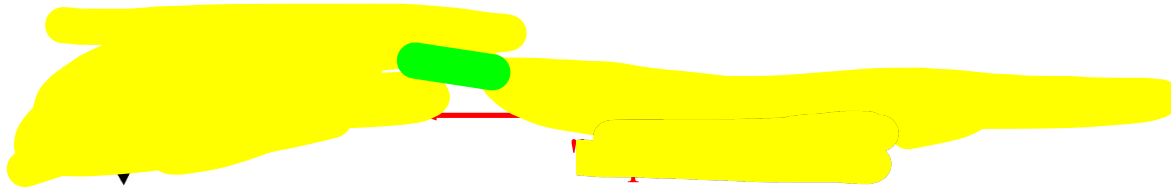
$$13^2 =$$

$$14^2 =$$

$$15^2 =$$

Area of a Square	Side length as a Square Root
9	_____
	___4___
81	_____
	___16___
169	_____
_____	10
_____	_____

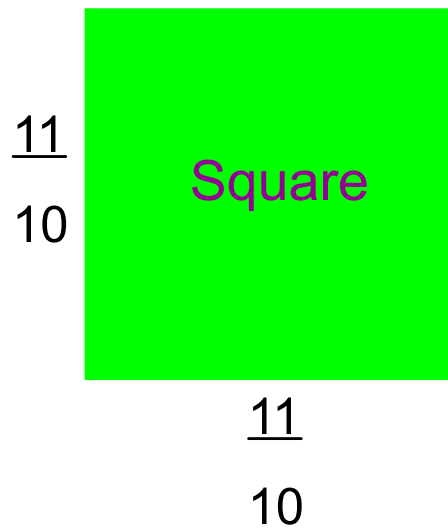
To determine the side length of a square we,  
calculate the "square root" of its area



Area of a square = side length  $\times$  side length

Area of a square =  $s^2$

What is the area of the following

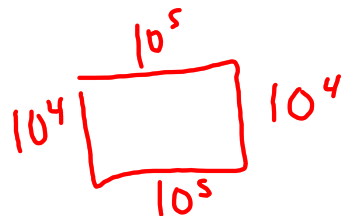


$$\begin{aligned} \text{Area} &= (\text{base}) \times (\text{height}) \\ &= \frac{11}{10} \times \frac{11}{10} \\ &= \frac{121}{100} \end{aligned}$$

same  $\left(\frac{11}{10}\right)^2$

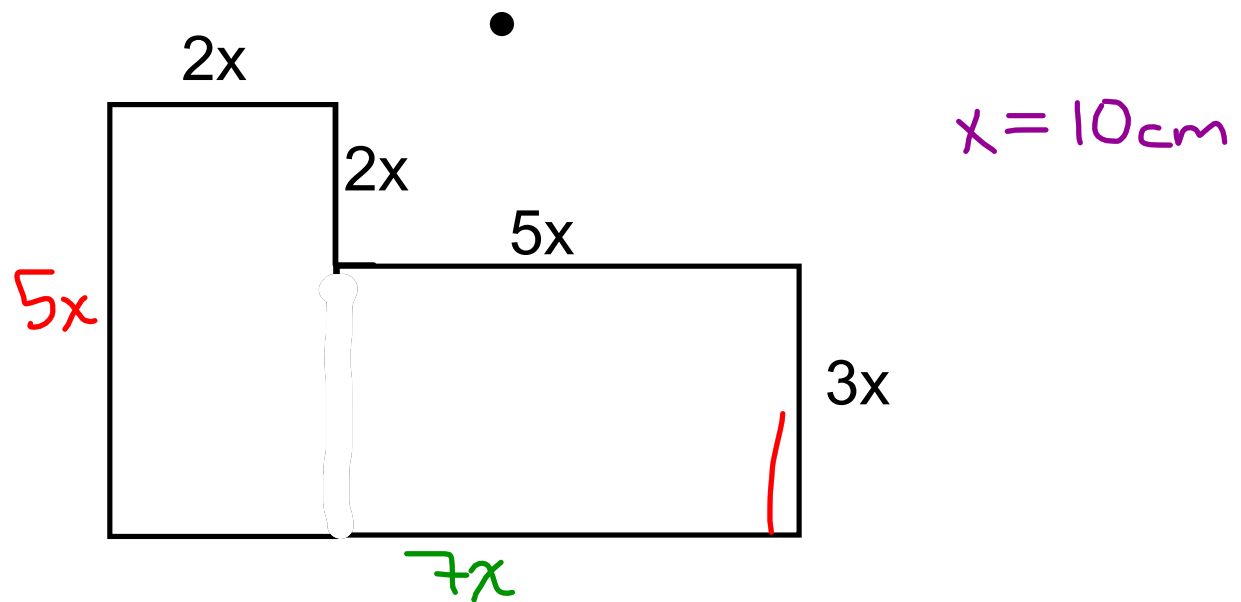
$$\frac{11^2}{10^2} = \frac{121}{100}$$

What is the perimeter?



$$10^5 + 10^5 + 10^4 + 10^4$$



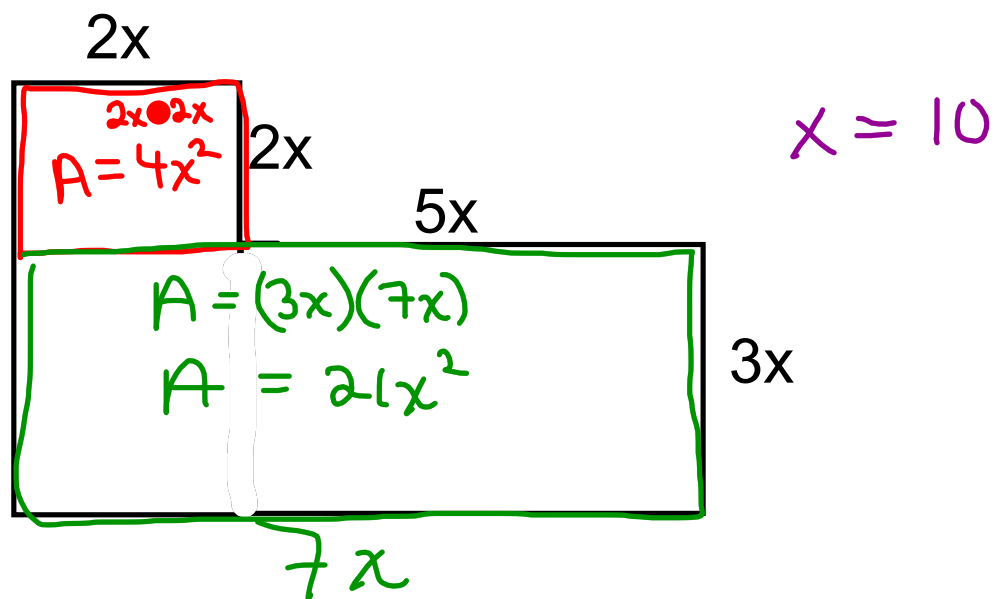


$$P = 2x + 2x + 5x + 3x + 7x + 5x$$

$$P = 24x$$

$$P = 24(10)$$

$$P = 240 \text{ cm}$$



$$\begin{aligned}T_A &= 4x^2 + 21x^2 \\&= 25x^2 \\&= 25(10)^2 \\&= 25(100) \\&= 2500\end{aligned}$$

$$\text{Area of square} = \frac{49}{81}$$

What is the length of the sides?

$$A = (\text{side})^2$$
$$\sqrt{\frac{49}{81}} = \sqrt{(\text{side})^2}$$

$$\frac{\sqrt{49}}{\sqrt{81}} = \text{side}$$

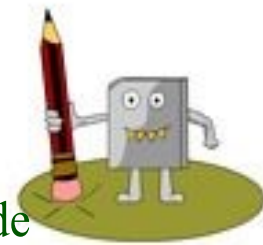
$$\boxed{\frac{7}{9} = \text{side}}$$

What is the perimeter of the square

$$P = \frac{7}{9} + \frac{7}{9} + \frac{7}{9} + \frac{7}{9}$$

$$\boxed{P = \frac{28}{9}}$$

You Try!!!!



For each area of a square find the length of its side

\*\*Find the square root

1)  $\frac{16}{100}$

2)  $\frac{9}{100}$

3)  $\frac{400}{100}$

4)  $\frac{256}{100}$

Calculate the number whose square root is  $\frac{4}{7}$

$$\left(\sqrt{x}\right)^2 = \left(\frac{4}{7}\right)^2$$

$$x = \frac{16}{49}$$



## To Determine if a Fraction is a Perfect Square

**BOTH Numerator and Denominator MUST be Perfect Square Numbers**

\*\*\*Simplify fractions first \*\*\*

$$\frac{75}{48}$$

Is each fraction a perfect square? Explain

$$a) \sqrt{\frac{18}{32}} \stackrel{\div 2}{=} \sqrt{\frac{9}{16}}$$

$$= \frac{3}{4}$$

P.S

$$b) \sqrt{\frac{4}{3}} = \frac{2}{?}$$

Not  
P.S

$$c) \sqrt{\frac{9}{25}} = \frac{3}{5}$$

P.S

## Identifying Decimals that are Perfect Squares

1.44

Method 1

Write the decimal as a fraction

$$1.44 =$$

$$1.44 = \sqrt{\frac{144}{100}}$$
$$\frac{12}{10}$$

THUS 1.44 is a perfect square

Method 2

Use a Calculator.

Use the square root button  $\sqrt{\quad}$

$$\sqrt{1.44} = 1.2$$

Since the square root is a terminating decimal then 1.44 is a perfect square.

$$\sqrt{0.49}$$

$$\sqrt{\frac{49}{100}} = \frac{7}{10} = 0.7$$

$$\sqrt{8.1} = \sqrt{\frac{81}{10}} = \frac{9}{?}$$

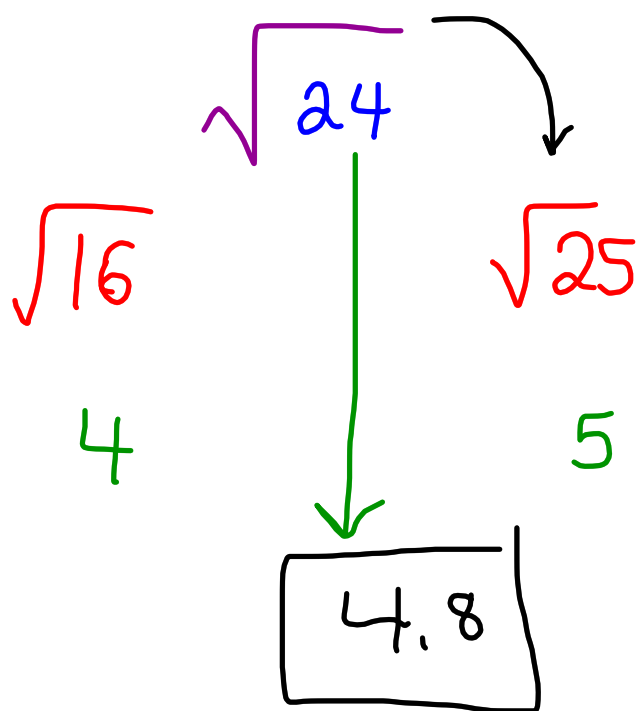


10 = Not

100 = P.S

1000 = Not

10 000 = P.S



$0.39$

$\sqrt{0.36}$

$\sqrt{\frac{36}{100}}$

$\frac{6}{10}$

$0.6$

$\sqrt{0.49}$

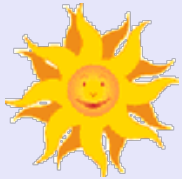
$\frac{49}{100}$

$\frac{7}{10}$

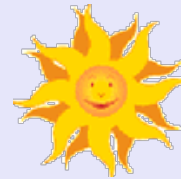
$0.7$

$0.61$

$0.64$



## Warm Up Math 9



1) Find the perfect square whose square root is

a) 0.6

b)  $\frac{3}{5}$

2) Is the following fractions or decimals perfect squares? Explain

a) 0.64

b) 62.5

c)  $\frac{49}{144}$

d)  $\frac{13}{25}$

**THE FIRST 20 PERFECT SQUARES:**

$$1^2 = 1 \times 1 = 1$$

$$2^2 = 2 \times 2 = 4$$

$$3^2 = 3 \times 3 = 9$$

$$4^2 = 4 \times 4 = 16$$

$$5^2 = 5 \times 5 = 25$$

$$6^2 = 6 \times 6 = 36$$

$$7^2 = 7 \times 7 = 49$$

$$8^2 = 8 \times 8 = 64$$

$$9^2 = 9 \times 9 = 81$$

$$10^2 = 10 \times 10 = 100$$

$$11^2 = 11 \times 11 = 121$$

$$12^2 = 12 \times 12 = 144$$

$$13^2 = 13 \times 13 = 169$$

$$14^2 = 14 \times 14 = 196$$

$$15^2 = 15 \times 15 = 225$$

$$16^2 = 16 \times 16 = 256$$

$$17^2 = 17 \times 17 = 289$$

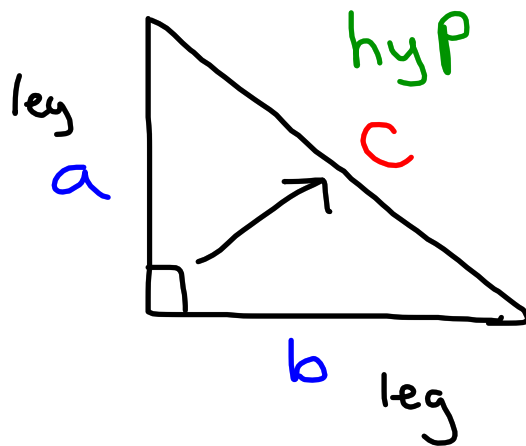
$$18^2 = 18 \times 18 = 324$$

$$19^2 = 19 \times 19 = 361$$

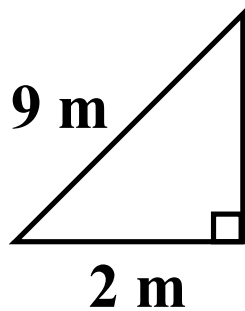
$$20^2 = 20 \times 20 = 400$$

$$c^2 = a^2 + b^2 \quad (\text{hyp})$$

$$a^2 = c^2 - b^2 \quad (\text{leg})$$



**How could you check if the ladder is safe?  
Try to do this without a calculator.**



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

$$a^2 = 9^2 - 2^2$$

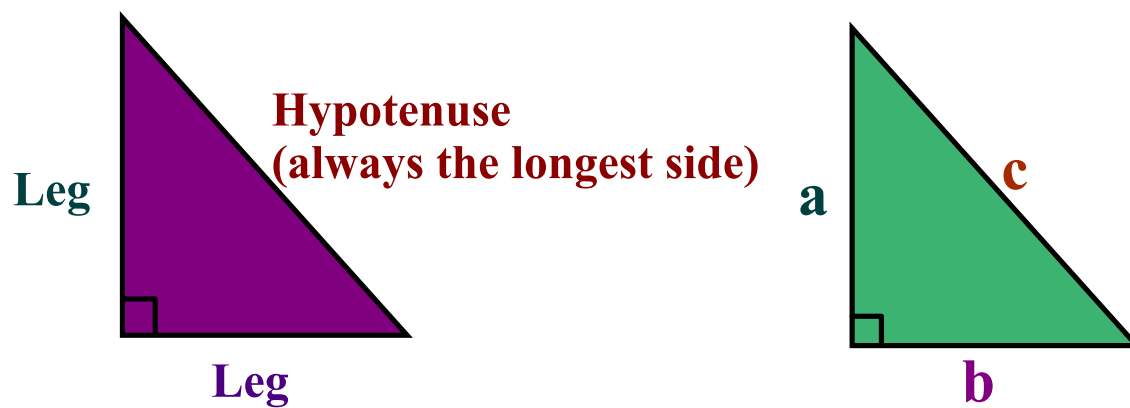
$$a^2 = 81 - 4$$

$$\sqrt{a^2} = \sqrt{77}$$

$$a \doteq 8.78$$

## PYTHAGOREAN THEOREM:

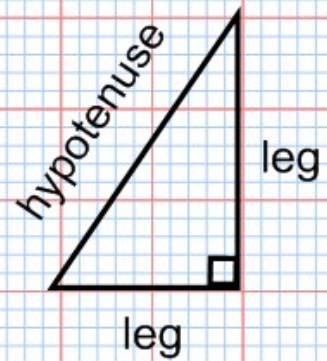
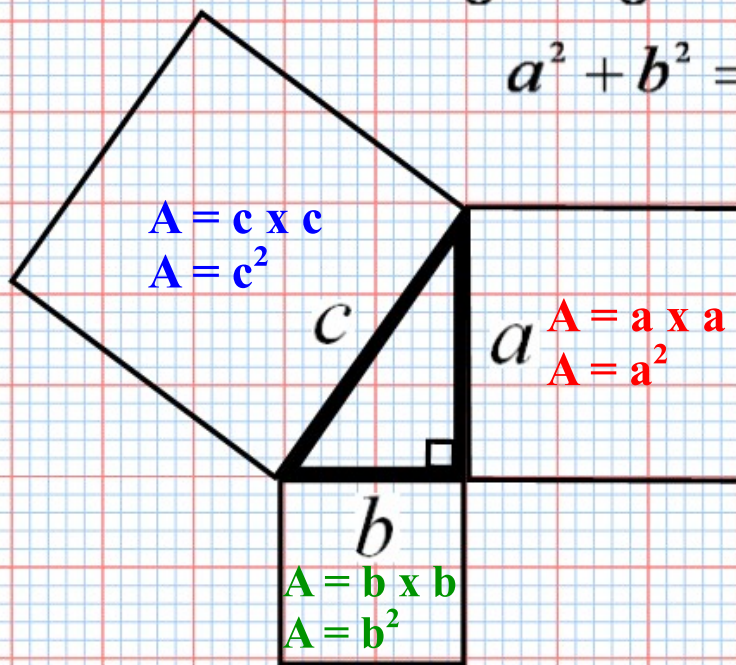
We know that a right triangle is a triangle containing a  $90^\circ$  angle.





Pythagoras found out that when you have a right triangle,  $leg^2 + leg^2 = hypotenuse^2$

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



Perfect Squares...

16  
1 25 9  
144 4 256



Non-Perfect Squares...

8 15  
2 11  
20 167  
19

$$\sqrt{16} = 4$$

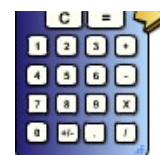
$$\sqrt{8} = 2.8284271\dots$$

Non- perfect Squares cannot be written as  
a product of two equal numbers





# Estimating square roots of non-perfect squares.



Estimate the square root of 7.5.

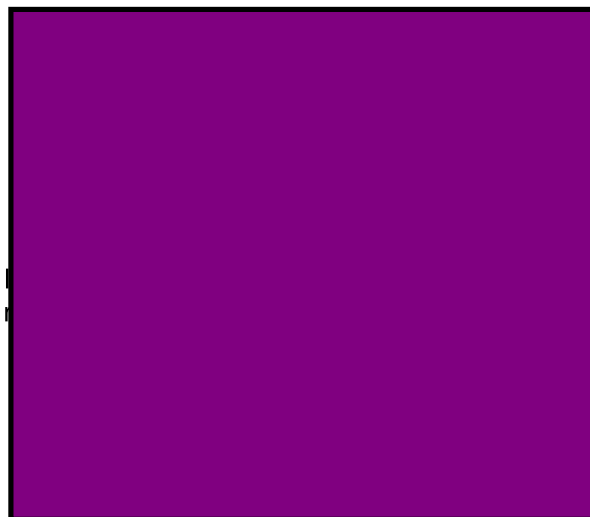
**Method #1**

**Method #2**

**Using Benchmarks:**

Determine what two perfect squares 7.5 is between.

**Using a Calculator:**



Estimate the square root of  $\frac{3}{7}$ .

Method #1

Method #2

1. Find the perfect squares closest to the numerator and denominator

or

or

3 is close to which perfect square? \_\_\_\_\_

7 is close to which perfect square? \_\_\_\_\_

Bench marks

Estimate the square root of 130

Finding a Number with a Square Root          Given         .

Find a decimal  
that has a square root  
between 10 and 11.



Method #1

Method #2

Identify the perfect squares first.

Identify any decimal first.

10

11



10

11



## Intro to High School Math

### Section 1.3: Surface Area of Objects Made from Right Rectangular Prisms

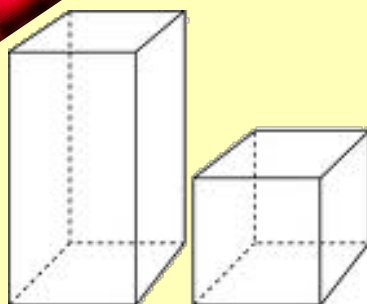
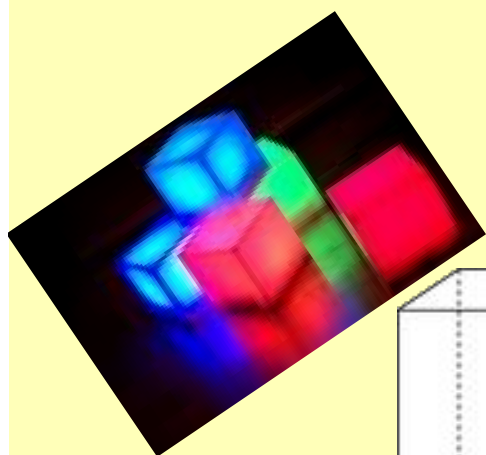
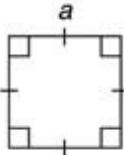

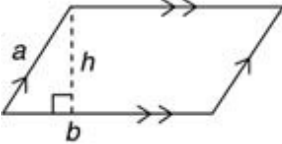
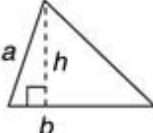
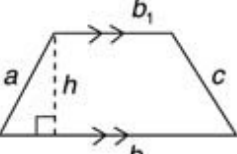
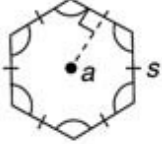
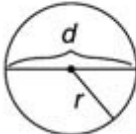
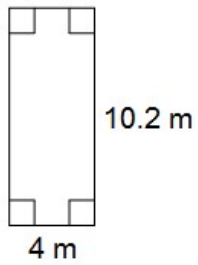


Figure	Name	Perimeter/ Circumference	Area
 <p>(a)</p>	square	$4a$	$a^2$
 <p>(b)</p>	rectangle	$2l + 2w$ or $2(l+w)$	$lw$
 <p>(c)</p>	parallelogram	$2a + 2b$ or $2(a+b)$	$bh$
 <p>(d)</p>	triangle	$a + b + c$	$1/2bh$
 <p>(e)</p>	trapezoid	$a + b_1 + c + b_2$	$1/2(b_1+b_2)h$
 <p>(f)</p>	regular polygon	$ns$ $n = \text{number of sides}$	$1/2ap$ $p = \text{perimeter}$ $a = \text{apothem}$
 <p>(g)</p>	circle	$\pi d$ or $2\pi r$	$\pi r^2$



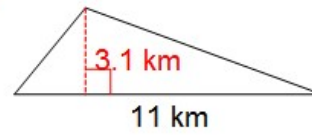
Find the area of each.

1)

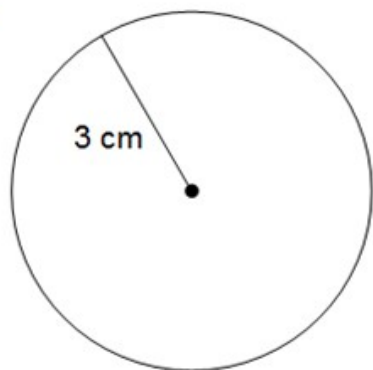


Find the area of each.

2)



8)



$$A = \pi r^2$$

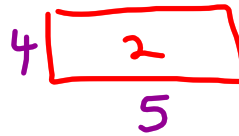
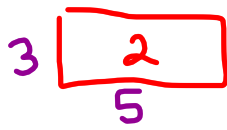
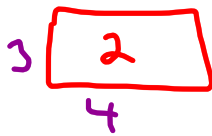
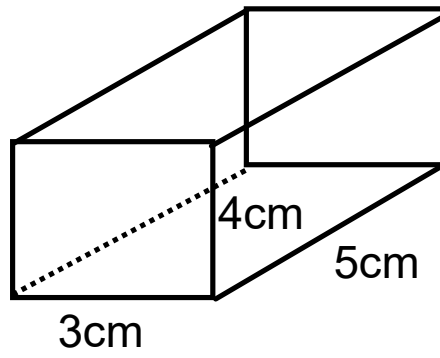
## Surface Area

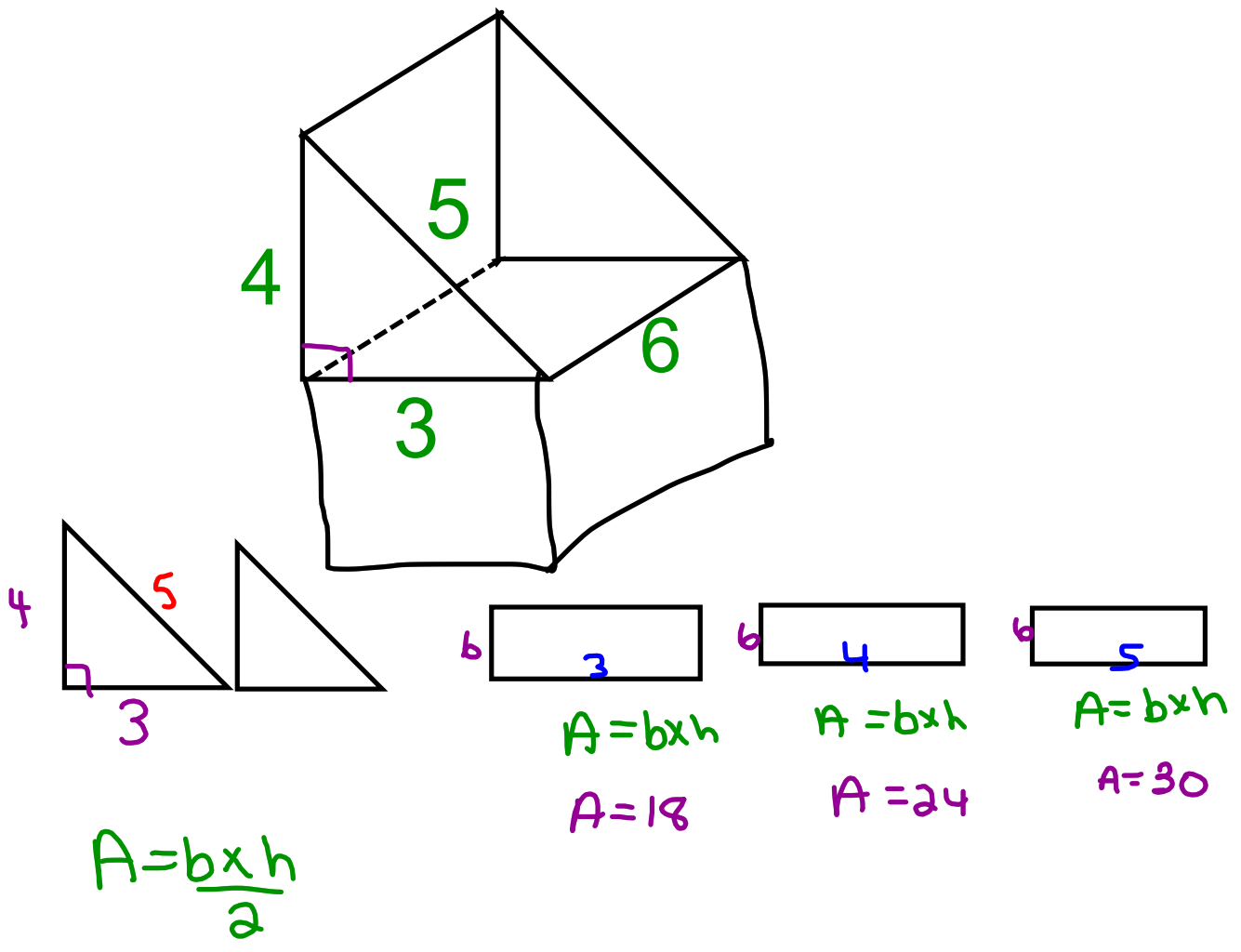
**Surface area** is the total area of all of the faces of the object.

**Steps need to find Surface area are:**

- 1. Draw all of the faces with dimensions displayed on them.**
- 2. Find the area of each face.**
- 3. Then add up the areas of all of the faces.**

3, 4, 5



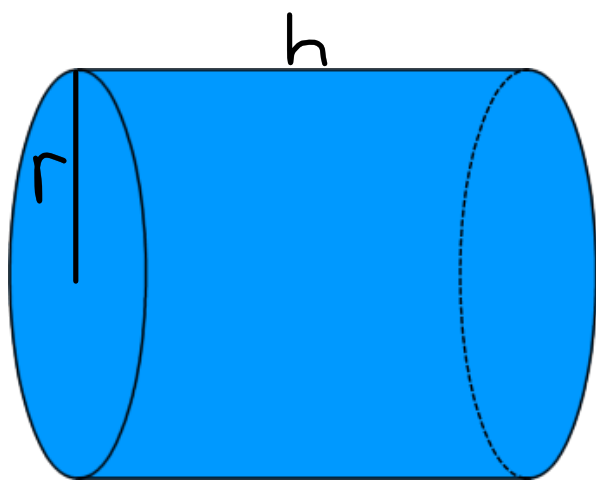


$$A = \frac{b \times h}{2}$$

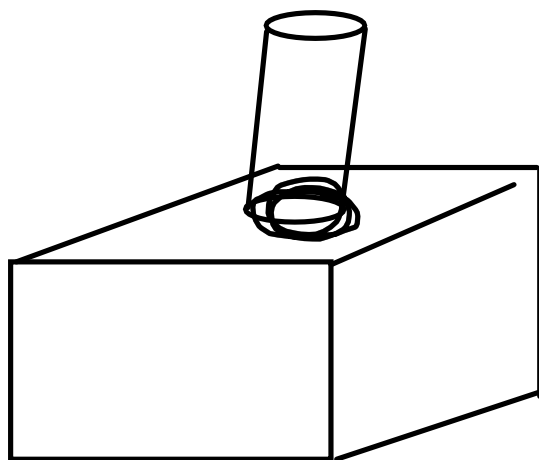
$$A = 6$$

$$2A = 12$$

$$TSA = 84$$



$$S_A = 2\pi r^2 + 2\pi r h$$



Class / Homework

# Review For Test

day 2

## Questions :

Page 40

# 3(bd)

#4(ab)

page 45

#2(a, c, e, g)

#3(a,d,g)

#4(a,d)

#5 (a, c, e)

#6 (a)

Without calculator

Page 46

# 12

#13b

#15(bc)

#16(a)

Use the Calculator



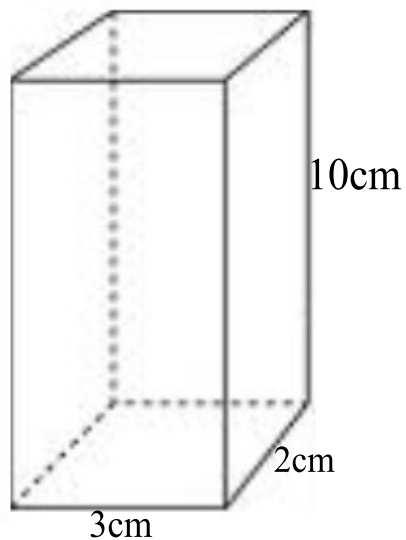
## Surface Area

The surface area is the sum of all the areas of all the "shapes that cover the surface" of the object.

Faces

Find the Surface Area of The Rectangular Prism

a)



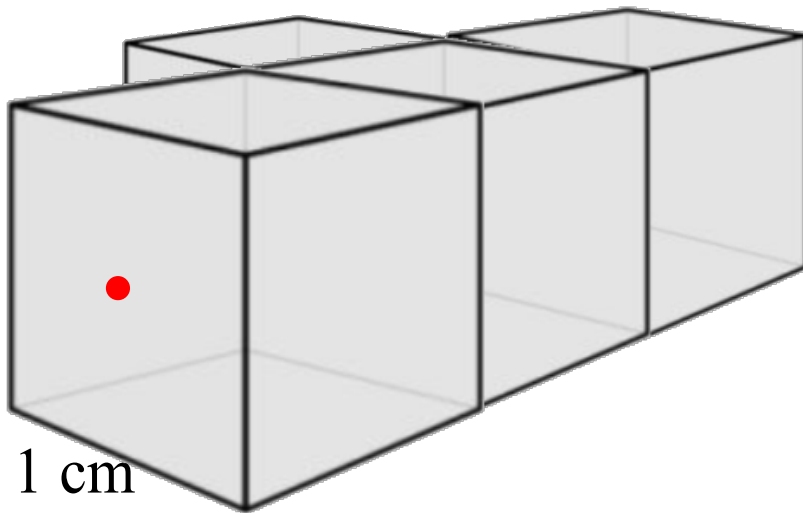
Think in Pairs

Front = Back

Top = Bottom

Side = Side

## Find the Surface Area of the Connected Cubes

Method 1 (Think Individually about each shape)

4 cubes connected

\* each have 6 faces

FIND THE AREA OF EACH FACE

$$4 \times 6 \text{ faces} = 24 \text{ faces}$$

$$\text{Area} = 24 (1\text{cm}^2) \\ = 24\text{cm}^2$$

But have overlap

BUT

WHAT HAPPENS WHEN YOU JOIN FACES?

overlaps

Do you have to count where they join in "surface area"? NO

With every connected cube 2 faces disappear

overlaps

3 (2)

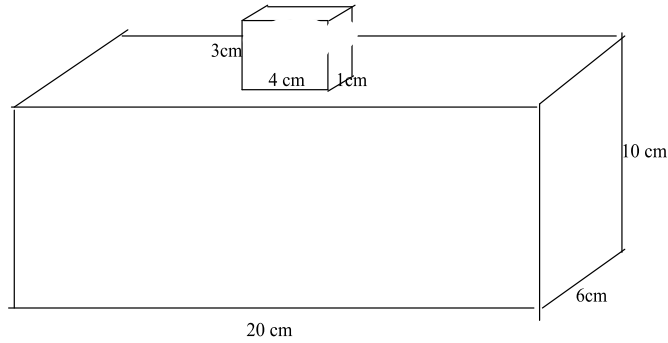
$$\text{Total surface Area} = 24\text{cm}^2 - 6\text{cm}^2 \\ = 18\text{cm}^2$$

3 overlaps so 6 faces disappear

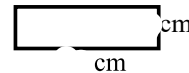
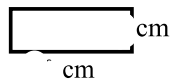
Determine the surface area of the composite object.

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

\*count bottom

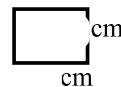
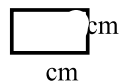


STEP 1: You can calculate all of the surface areas of the larger rectangular prism



180 cm<sup>2</sup>

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



36

Step 3: Is there an overlap? SO must subtract the "overlapped AREAs"  
recall overlap involves "two faces"

subtract 2 x (overlap area)

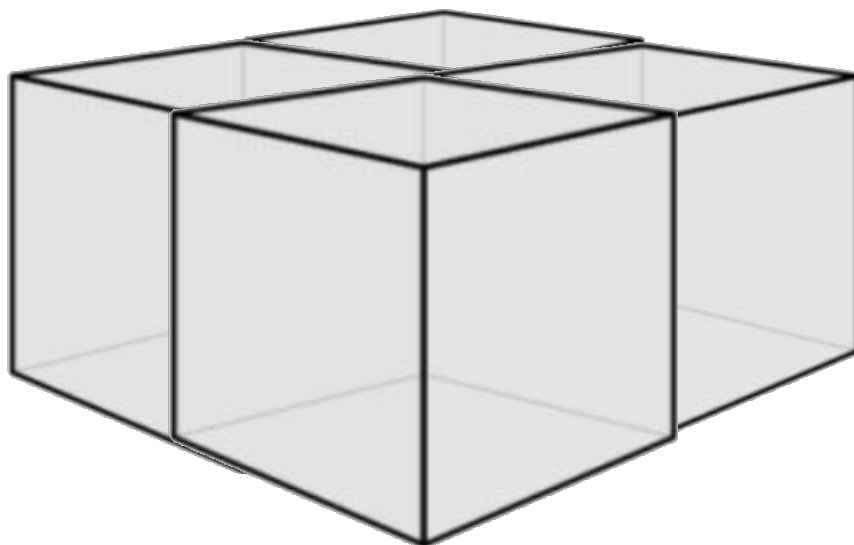
790 cm<sup>2</sup>



## Warm Up Grade 9



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



Homework Solutions  
Page 31

8 a)

Overlapped Faces  
2 face involved

Area of one face =  $2\text{ cm} \times 1\text{ cm}$   
=  $2\text{ cm}^2$

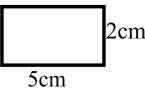


BUT 2 faces involved for each overlap  
THUS must multiply by 2 to get total overlapped area

Area of overlap =  $2(2\text{ cm}^2)$   
=  $4\text{ cm}^2$

this is the 2(overlap area)

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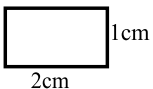

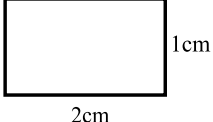
BIG Prism (if alone)

front/back 	side/side 	top/bottom 
$A = l \times w$ = $5\text{ cm} \times 2\text{ cm}$ = $10\text{ cm}^2$	$A = l \times w$ = $3\text{ cm} \times 2\text{ cm}$ = $6\text{ cm}^2$	$A = l \times w$ = $3\text{ cm} \times 5\text{ cm}$ = $15\text{ cm}^2$

$$\begin{aligned} \text{Total SA of BIG} &= 2(10\text{ cm}^2) + 2(6\text{ cm}^2) + 2(15\text{ cm}^2) \\ &= 20\text{ cm}^2 + 12\text{ cm}^2 + 30\text{ cm}^2 \\ &= 62\text{ cm}^2 \end{aligned}$$


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Small Prism (if alone)

front/back 	side/side 	top/bottom 
$A = l \times w$ = $2\text{ cm} \times 1\text{ cm}$ = $2\text{ cm}^2$	$A = l \times w$ = $1\text{ cm} \times 1\text{ cm}$ = $1\text{ cm}^2$	$A = l \times w$ = $2\text{ cm} \times 1\text{ cm}$ = $2\text{ cm}^2$

$$\begin{aligned} \text{Total SA of Small} &= 2(2\text{ cm}^2) + 2(1\text{ cm}^2) + 2(2\text{ cm}^2) \\ &= 4\text{ cm}^2 + 2\text{ cm}^2 + 4\text{ cm}^2 \\ &= 10\text{ cm}^2 \end{aligned}$$

Area of overlap =  $2(2\text{ cm}^2)$  Remember from above  
=  $4\text{ cm}^2$

$$\begin{aligned} \text{Surface area of object} &= \text{Big area} + \text{Small area} - 2(\text{overlap area}) \\ &= 62\text{ cm}^2 + 10\text{ cm}^2 - 4\text{ cm}^2 \\ &= 68\text{ cm}^2 \end{aligned}$$

Homework Solutions  
Page 31

8b)

Overlapped Faces  
2 face involved

Area of one face =  $2\text{cm} \times 2\text{cm}$   
=  $4\text{cm}^2$

BUT 2 faces involved for each overlap  
THUS must multiply by 2 to get total overlapped area

Area of overlap =  $2(4\text{cm}^2)$   
=  $8\text{cm}^2$

Overlapped Faces  
2 face involved

Area of one face =  $4\text{cm} \times 3\text{cm}$   
=  $12\text{cm}^2$

2 faces involved for each overlap  
THUS must multiply by 2 to get total overlap

Area of overlap =  $2(12\text{cm}^2)$   
=  $24\text{cm}^2$

THEN  
sum of overlap area =  $24\text{cm}^2 + 8\text{cm}^2$   
=  $32\text{cm}^2$

BIG Prism (if alone) BLUE

<p>front/back</p> <p>6cm</p> <p><math>A = l \times w</math> = <math>6\text{cm} \times 3\text{cm}</math> = <math>18\text{cm}^2</math></p>	<p>side/side</p> <p>4cm</p> <p><math>A = l \times w</math> = <math>3\text{cm} \times 4\text{cm}</math> = <math>12\text{cm}^2</math></p>	<p>top/bottom</p> <p>6cm</p> <p><math>A = l \times w</math> = <math>6\text{cm} \times 4\text{cm}</math> = <math>24\text{cm}^2</math></p>
--	---	--

Total SA of BIG =  $2(18\text{cm}^2) + 2(12\text{cm}^2) + 2(24\text{cm}^2)$   
 =  $36\text{cm}^2 + 24\text{cm}^2 + 48\text{cm}^2$   
 =  $108\text{cm}^2$

Middle Prism (if alone) Purple

<p>front/back</p> <p>4cm</p> <p><math>A = l \times w</math> = <math>4\text{cm} \times 2\text{cm}</math> = <math>8\text{cm}^2</math></p>	<p>side/side</p> <p>3cm</p> <p><math>A = l \times w</math> = <math>3\text{cm} \times 2\text{cm}</math> = <math>6\text{cm}^2</math></p>	<p>top/bottom</p> <p>4cm</p> <p><math>A = l \times w</math> = <math>3\text{cm} \times 4\text{cm}</math> = <math>12\text{cm}^2</math></p>
---	--	--

Total SA of Middle =  $2(8\text{cm}^2) + 2(6\text{cm}^2) + 2(12\text{cm}^2)$   
 =  $16\text{cm}^2 + 12\text{cm}^2 + 24\text{cm}^2$   
 =  $52\text{cm}^2$

Small Prism (if alone) <sup>Green</sup>

<p>front/back</p> <p>2cm</p> <p><math>A = l \times w</math> = <math>2\text{cm} \times 1\text{cm}</math> = <math>2\text{cm}^2</math></p>	<p>side/side</p> <p>2cm</p> <p><math>A = l \times w</math> = <math>1\text{cm} \times 2\text{cm}</math> = <math>2\text{cm}^2</math></p>	<p>top/bottom</p> <p>2cm</p> <p><math>A = l \times w</math> = <math>2\text{cm} \times 2\text{cm}</math> = <math>4\text{cm}^2</math></p>
---	--	---

Total SA of small =  $2(2\text{cm}^2) + 2(2\text{cm}^2) + 2(4\text{cm}^2)$   
 =  $4\text{cm}^2 + 4\text{cm}^2 + 8\text{cm}^2$   
 =  $16\text{cm}^2$

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

c)

Overlapped Faces  
2 face involved

Area of one face =  $1.5\text{cm} \times 3.5\text{cm}$   
=  $5.25\text{cm}^2$

BUT 4 faces involved for each overlap  
THUS must multiply by 4 to get total overlapped area

Area of overlap =  $4(5.25\text{cm}^2)$   
=  $21\text{cm}^2$

BIG Prism (if alone) Purple

<p>front/back</p> <p>2.5cm 6.5cm</p> <p><math>A = l \times w</math> = <math>2.5\text{cm} \times 6.5\text{cm}</math> = <math>16.25\text{cm}^2</math></p>	<p>side/side</p> <p>5.5cm 6.5cm</p> <p><math>A = l \times w</math> = <math>5.5\text{cm} \times 6.5\text{cm}</math> = <math>35.75\text{cm}^2</math></p>	<p>top/bottom</p> <p>2.5cm 5.5cm</p> <p><math>A = l \times w</math> = <math>2.5\text{cm} \times 5.5\text{cm}</math> = <math>13.75\text{cm}^2</math></p>
---	--	---

$\text{Total SA of BIG} = 2(16.25\text{cm}^2) + 2(35.75\text{cm}^2) + 2(13.75\text{cm}^2)$   
 $= 32.5\text{cm}^2 + 71.5\text{cm}^2 + 27.5\text{cm}^2$   
 $= 131.5\text{cm}^2$

Middle Prism (if alone) Brown

<p>front/back</p> <p>2.5cm 5.5cm</p> <p><math>A = l \times w</math> = <math>2.5\text{cm} \times 5.5\text{cm}</math> = <math>13.75\text{cm}^2</math></p>	<p>side/side</p> <p>4.5cm 5.5cm</p> <p><math>A = l \times w</math> = <math>4.5\text{cm} \times 5.5\text{cm}</math> = <math>24.75\text{cm}^2</math></p>	<p>top/bottom</p> <p>2.5cm 4.5cm</p> <p><math>A = l \times w</math> = <math>2.5\text{cm} \times 4.5\text{cm}</math> = <math>11.25\text{cm}^2</math></p>
---	--	---

$\text{Total SA of Middle} = 2(13.75\text{cm}^2) + 2(24.75\text{cm}^2) + 2(11.25\text{cm}^2)$   
 $= 27.5\text{cm}^2 + 49.5\text{cm}^2 + 22.5\text{cm}^2$   
 $= 99.5\text{cm}^2$

Small Prism (if alone) Brown

<p>front/back</p> <p>1.5cm 3.5cm</p> <p><math>A = l \times w</math> = <math>1.5\text{cm} \times 3.5\text{cm}</math> = <math>5.25\text{cm}^2</math></p>	<p>side/side</p> <p>1.5cm 3.5cm</p> <p><math>A = l \times w</math> = <math>1.5\text{cm} \times 3.5\text{cm}</math> = <math>5.25\text{cm}^2</math></p>	<p>top/bottom</p> <p>3.5cm 3.5cm</p> <p><math>A = l \times w</math> = <math>2.5\text{cm} \times 4.5\text{cm}</math> = <math>12.25\text{cm}^2</math></p>
--	---	---

$\text{Total SA of Middle} = 2(5.25\text{cm}^2) + 2(5.25\text{cm}^2) + 2(12.25\text{cm}^2)$   
 $= 10.5\text{cm}^2 + 10.5\text{cm}^2 + 24.5\text{cm}^2$   
 $= 45.5\text{cm}^2$

$\text{Surface area of object} = \text{Big area} + \text{Middle area} + \text{Small area} - \text{overlap area}$   
 $= 131.5\text{cm}^2 + 99.5\text{cm}^2 + 45.5\text{cm}^2 - 21\text{cm}^2$   
 $= 255.5\text{cm}^2$



## Section 1.4

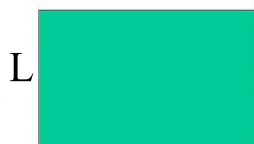
# Surface Area Of Other Composite Objects



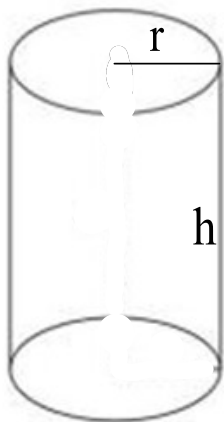
# Area of Shapes

## Area of a Rectangle

A = length x width



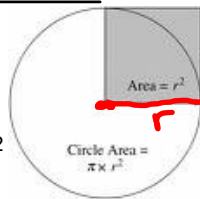
W



## Area of a Circle

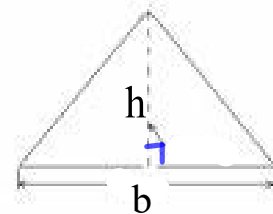
$$A = \pi r^2$$

$$= (3.14) (r)^2$$



## Area of Triangle

$$A = \frac{(\text{base} \times \text{height})}{2}$$

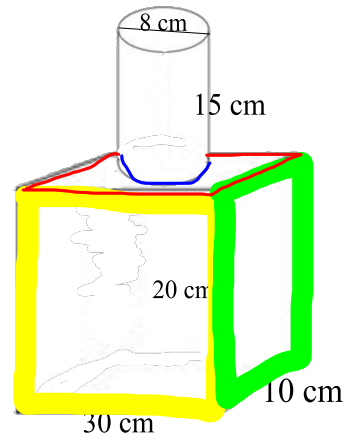


2 circles + rectangle

$$\text{Area of Cylinder} = 2\pi r^2 + 2\pi rh$$

$$= 2(3.14) (\text{ })^2 + 2(3.14) (\text{ }) (\text{ })$$

How much paint is needed to cover the following shape?



You try!!!

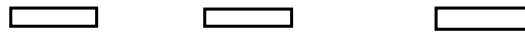
Overlap

Cylinder

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

=  
 =  
 =   
 =  
 =

Rectangular Prism



A = <sup>Top</sup>  
 =  
 A =  
 =  
 A =  
 =

Total SA small =  $2\text{Top} + 2\text{Side} + 2\text{Front}$   
 =  $2(300\text{cm})$   
 =  $600\text{cm}^2$   
 =  $2200\text{cm}^2$

Overlap Area =

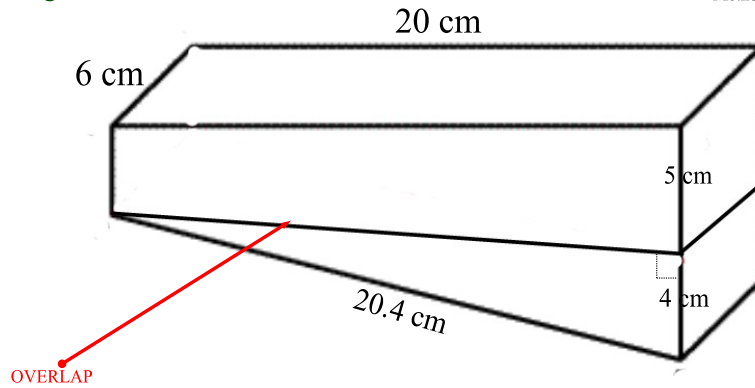
=  
 =  
 =

Total Surface Area = **cylinder + Prism - 2(Overlap area)**

=  
 =  
 =  
 =  
 =

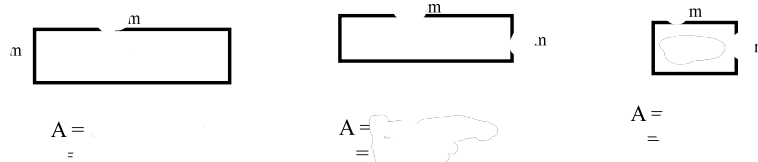
Calculate the surface area

Method 1)



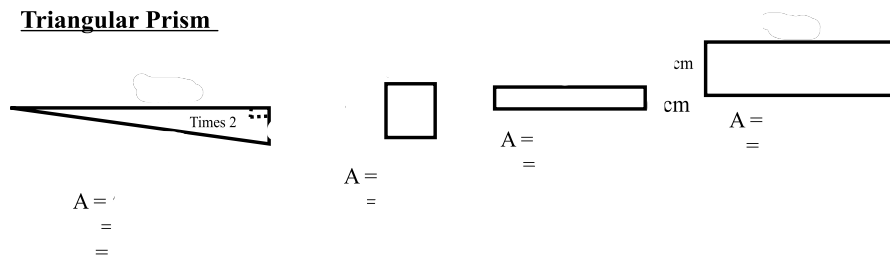
Step 1) Calculate the Surface area of each Prism INDIVIDUALLY

**Rectangular prism (Surface )**



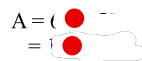
Area of rectangular prims =  
= 500 cm<sup>2</sup>

**Triangular Prism**



Area of triangular prism =  
= 80cm<sup>2</sup> + 24 cm<sup>2</sup>  
= 346.4cm<sup>2</sup>

Step 3) Calculate the overlap area BUT remember 2 faces are involved

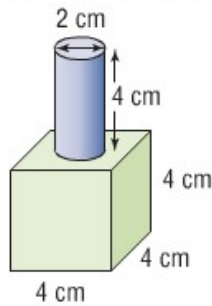


Total Surface Area = Rectangular prism + Triangular Prism - 2(OVERLAP)  
= ( 500cm<sup>2</sup> ) + ( 346.4 cm<sup>2</sup> ) - 2( 4 cm<sup>2</sup> )  
= ( 500cm<sup>2</sup> ) + ( 346.4 cm<sup>2</sup> ) - 8 cm<sup>2</sup>  
=

## Homework solutions

page 40

3 a) cylinder on a cube

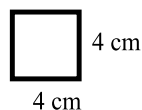


Overlap:

$$\begin{aligned}
 \text{Area of circle} &= \pi r^2 \\
 &= (3.14)(1 \text{ cm})^2 \\
 &= (3.14) 1 \text{ cm}^2 \\
 &= 3.14 \text{ cm}^2 \\
 &\quad \times 2 \text{ since 2 faces} \\
 &\quad \hline
 &\quad 6.28 \text{ cm}^2 \text{ involved}
 \end{aligned}$$

$$\begin{aligned}
 \text{Area of cylinder} &= 2\pi r^2 + 2\pi rh \\
 &= 2(3.14)(1 \text{ cm})^2 + 2(3.14)(1 \text{ cm})(4 \text{ cm}) \\
 &= 2(3.14)(1 \text{ cm}) + 2(3.14)(1 \text{ cm})(4 \text{ cm}) \\
 &= 6.28 \text{ cm}^2 + 25.12 \text{ cm}^2 \\
 &= 31.4 \text{ cm}^2
 \end{aligned}$$

Rectangular Cube

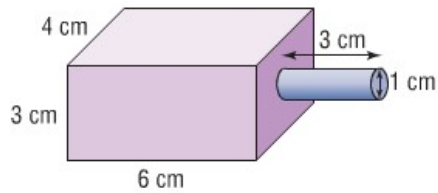


$$\begin{aligned}
 \text{area} &= 4 \text{ cm} \times 4 \text{ cm} \\
 &= 16 \text{ cm}^2
 \end{aligned}$$

$$\begin{aligned}
 \text{Area} &= 6 \text{ faces} \times (\text{area of one face}) \\
 &= 6 \times (16 \text{ cm}^2) \\
 &= 96 \text{ cm}^2
 \end{aligned}$$

$$\begin{aligned}
 \text{Total SA} &= \text{Cylinder} + \text{Cube} - \text{Overlap} \\
 &= 31.4 \text{ cm}^2 + 96 \text{ cm}^2 - 6.28 \text{ cm}^2 \\
 &= 121.12 \text{ cm}^2 \\
 &= 121 \text{ cm}^2
 \end{aligned}$$

3 b) cylinder on a rectangular prism

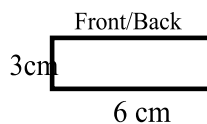


Overlap:

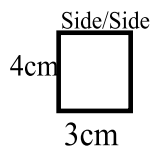
$$\begin{aligned}
 \text{Area of circle} &= \pi r^2 \\
 &= (3.14) (0.5 \text{ cm})^2 \\
 &= (3.14) 0.25 \text{ cm}^2 \\
 &= 0.785 \text{ cm}^2 \\
 &\quad \times 2 \text{ since 2 faces} \\
 &\quad \text{involved} \\
 &= 1.57 \text{ cm}^2
 \end{aligned}$$

$$\begin{aligned}
 \text{Area of cylinder} &= 2\pi r^2 + 2\pi rh \\
 &= 2(3.14)(0.5 \text{ cm})^2 + 2(3.14)(0.5 \text{ cm})(3 \text{ cm}) \\
 &= 2(3.14)(0.25 \text{ cm}^2) + 2(3.14)(0.5 \text{ cm})(3 \text{ cm}) \\
 &= 1.57 \text{ cm}^2 + 9.42 \text{ cm}^2 \\
 &= 10.99 \text{ cm}^2
 \end{aligned}$$

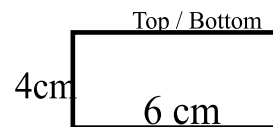
Rectangular Prism



$$\begin{aligned}
 A &= 3 \text{ cm} \times 6 \text{ cm} \\
 &= 18 \text{ cm}^2
 \end{aligned}$$



$$\begin{aligned}
 A &= 3 \text{ cm} \times 4 \text{ cm} \\
 &= 12 \text{ cm}^2
 \end{aligned}$$



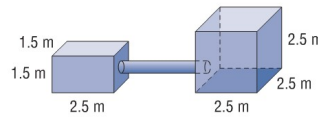
$$\begin{aligned}
 A &= 4 \text{ cm} \times 6 \text{ cm} \\
 &= 24 \text{ cm}^2
 \end{aligned}$$

$$\begin{aligned}
 \text{Rectangular Prism SA} &= 2(18 \text{ cm}^2) + 2(12 \text{ cm}^2) + 2(24 \text{ cm}^2) \\
 &= 36 \text{ cm}^2 + 24 \text{ cm}^2 + 48 \text{ cm}^2 \\
 &= 108 \text{ cm}^2
 \end{aligned}$$

$$\begin{aligned}
 \text{Total SA} &= \text{Cylinder} + \text{Rect Prism} - \text{Overlap} \\
 &= 10.99 \text{ cm}^2 + 108 \text{ cm}^2 - 1.57 \text{ cm}^2 \\
 &= 117.42 \text{ cm}^2 \\
 &= 117 \text{ cm}^2
 \end{aligned}$$

Solutions Homework solutions

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



overlap 1

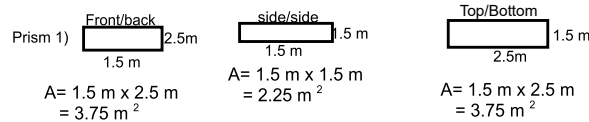
$$\begin{aligned}
 A &= \pi r^2 \\
 &= (3.14) (0.25\text{m})^2 \\
 &= (3.14) (0.0625\text{m}) \\
 &= 0.19625\text{m}^2 \\
 &\quad \underline{\times 2 \text{ for face involved}} \\
 &= 0.3925\text{m}^2
 \end{aligned}$$

Overlap 2

$$\begin{aligned}
 A &= \pi r^2 \\
 &= (3.14) (0.25\text{m})^2 \\
 &= (3.14) (0.0625\text{m}) \\
 &= 0.19625\text{m}^2 \\
 &\quad \underline{\times 2 \text{ for face involved}} \\
 &= 0.3925\text{m}^2
 \end{aligned}$$

$$\begin{aligned}
 \text{total overlap} &= \text{overlap 1} + \text{overlap 2} \\
 &= 0.3925\text{m}^2 + 0.3925\text{m}^2 \\
 &= 0.785\text{m}^2
 \end{aligned}$$

$$\begin{aligned}
 \text{Area of cylinder} &= 2\pi r^2 + 2\pi rh \\
 &= 2(3.14)(0.25\text{m})^2 + 2(3.14)(0.25\text{m})(3.5\text{m}) \\
 &= 2(3.14)(0.0625\text{m}^2) + 2(3.14)(0.25\text{m})(3.5\text{m}) \\
 &= 0.3925\text{m}^2 + 5.495\text{m}^2 \\
 &= 5.8875\text{m}^2
 \end{aligned}$$



$$\begin{aligned}
 A &= 1.5\text{m} \times 2.5\text{m} \\
 &= 3.75\text{m}^2
 \end{aligned}$$

$$\begin{aligned}
 A &= 1.5\text{m} \times 1.5\text{m} \\
 &= 2.25\text{m}^2
 \end{aligned}$$

$$\begin{aligned}
 A &= 1.5\text{m} \times 2.5\text{m} \\
 &= 3.75\text{m}^2
 \end{aligned}$$

$$\begin{aligned}
 \text{SA Prism 1} &= 2(3.75\text{m}^2) + 2(2.25\text{m}^2) + 2(3.75\text{m}^2) \\
 &= 7.5\text{m}^2 + 4.5\text{m}^2 + 7.5\text{m}^2 \\
 &= 19.5\text{m}^2
 \end{aligned}$$

Cube)

$$\begin{aligned}
 \text{Surface area of 1 face} &= 2.5\text{m} \times 2.5\text{m} \\
 &= 6.25\text{m}^2
 \end{aligned}$$

$$\begin{aligned}
 &\quad \underline{\times 6 \leftarrow 6 \text{ equal faces}} \\
 &= 37.5\text{m}^2
 \end{aligned}$$

---


$$\begin{aligned}
 \text{Total SA} &= \text{Rectangular Prism} + \text{Cube} + \text{Cylinder} - \text{Total Overlap} \\
 &= 19.5\text{m}^2 + 37.5\text{m}^2 + 5.8875\text{m}^2 - 0.785\text{m}^2 \\
 &= 61.6025\text{m}^2
 \end{aligned}$$

Or if you rounded to the nearest tenth

$$\begin{aligned}
 \text{Total SA} &= \text{Rectangular Prism} + \text{Cube} + \text{Cylinder} - \text{Total Overlap} \\
 &= 19.5\text{m}^2 + 37.5\text{m}^2 + 5.8875\text{m}^2 - 0.785\text{m}^2 \\
 &= 19.5\text{m}^2 + 37.5\text{m}^2 + 5.9\text{m}^2 - 0.8\text{m}^2 \\
 &= 62.1\text{m}^2
 \end{aligned}$$