**NOVEMBER 2, 2018**

# UNIT 3: SQUARE ROOTS AND SURFACE AREA

## SECTION 1.4: SURFACE AREAS OF OTHER COMPOSITE OBJECTS

**K. SEARS**
***MATH 9***

## WHAT'S THE POINT OF TODAY'S LESSON?

**We will continue working on the Math 9 Specific Curriculum Outcome (SCO) "Shape and Space 2" OR "SS2" which states:**

**SS2: "Determine the surface area of composite 3-D objects to solve problems."**

# What does THAT mean???

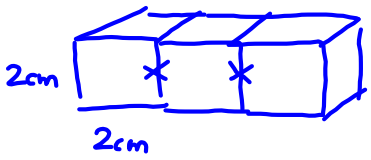
**SCO SS2 means that we will stack two or more 3-D objects (right rectangular prisms, right triangular prisms, right cylinders) on top of each other. We will find the area of each face (side) of each object then add them all up to find the total surface area of the object. We will also have to subtract any overlapping sides from the total.**

**You STILL only need to remember 5 formulas in the surface area section of this unit which you already knew before grade 9:**

1. **Area of a rectangle/square:** $bh$
2. **Area of a triangle:** $\frac{bh}{2}$
3. **Area of a circle:** $\pi r^2$
4. **Circumference of a circle:** $2\pi r$ **OR** $\pi d$
5. **The Pythagorean Theorem:** $a^2 + b^2 = c^2$

# Surface area of cubes.

1.




A(1 face) = 2x2
= 4cm²

A(1 cube) = 4x6
= 24cm²

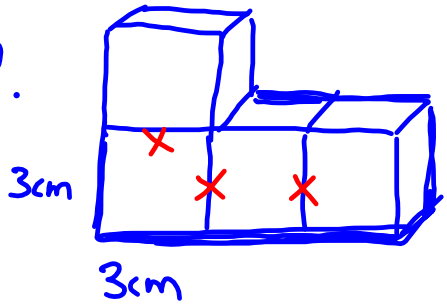
or 14 faces x 4 = 56cm²

A(3 cubes seperated) = 24x3
= 72 cm²

Overlap = 4x4
= 16cm²

A(3 cubes connected) = 72-16
= 56cm²

2.




A(1 face) = 3x3
= 9cm²

A cube = 9x6
= 54cm²

or. 18 faces x 9 = 162cm²

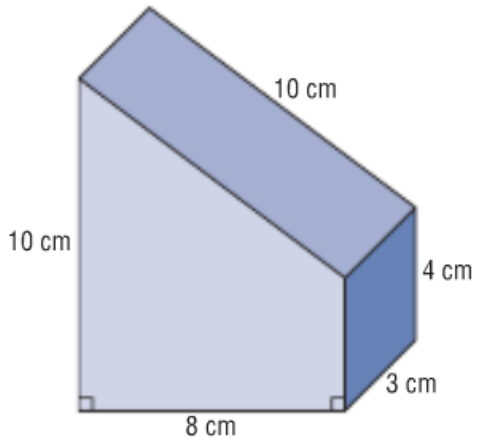
A 4 cubes seperated = 54x4
= 216cm²

Overlap = 6x9
= 54

A 4 cubes attached = 216-54
= 162cm²

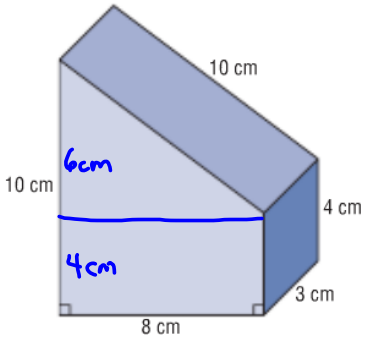
# Page 34, Example 1:

Determine the surface area of this object.




## Page 34, Example 1:

Determine the surface area of this object.




Top

$A_{triangle} = \frac{bh}{2}$

$= \frac{(8)(6)}{2} \times 2$

$= 48 cm^2$

$A_{front} = bh$

$= (10)(3)$

$= 30 cm^2$

$A_{back} = bh$

$= (6)(3)$

$= 18 cm^2$

Bottom

$A_{front/back} = bh$

$= (8)(4) \times 2$

$= 64 cm^2$

$A_{ends} = bh$

$= (3)(4) \times 2$

$= 24 cm^2$

$A_{bottom} = bh$

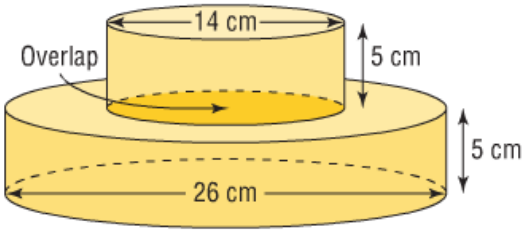
$= (8)(3)$

$= 24 cm^2$

$A_{total} = 48 + 30 + 18 + 64 + 24 + 24$

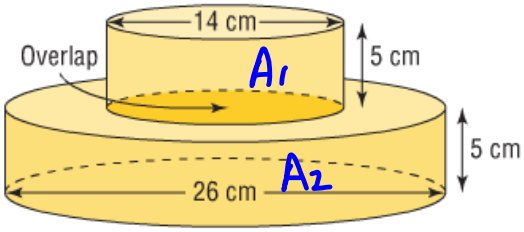
$= 208 cm^2$

# Page 36, Example 2:




**NOTE: NO icing underneath bottom layer or in between layers.**

# Page 36, Example 2:




$A_1 = 2\pi r^2 + 2\pi rh$
$= 2\pi(7)^2 + 2\pi(7)(5)$
$= 98\pi + 70\pi$
$= 168\pi$

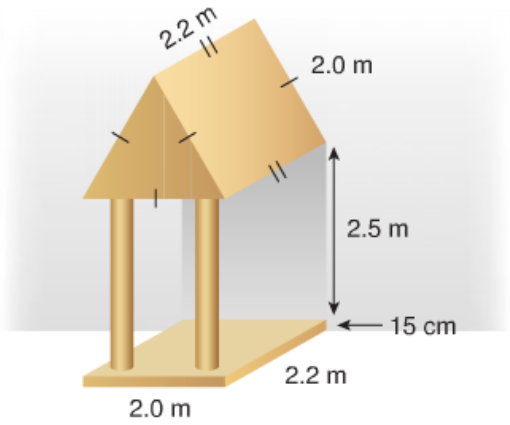
$A_2 = 2\pi r^2 + 2\pi rh$
$= 2\pi(13)^2 + 2\pi(13)(5)$
$= 338\pi + 130\pi$
$= 468\pi$

overlap $= 98\pi + 169\pi$
$= 267\pi$

$A_{total} = 168\pi + 468\pi - 267\pi$
$= 369\pi \text{ cm}^2$
$\doteq 1159.25 \text{ cm}^2$

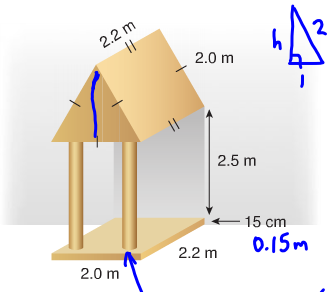
# Page 38, Example 3:

The roof, columns, and base of this porch are to be painted.
The radius of each column is 20 cm.
What is the area to be painted, to the nearest square metre?




## Page 38, Example 3:

The roof, columns, and base of this porch are to be painted.
The radius of each column is 20 cm. 0.20
What is the area to be painted, to the nearest square metre?




Top

$A_{triangle} = \frac{bh}{2}$

$= \frac{(2)(1.7)}{2}$

$= 1.7\ m^2$

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

$h^2 = 2^2 - 1^2$

$= 4 - 1$

$= 3$

$h = \sqrt{3}$

$= 1.7m$

$A_{rectangles} = bh \times 3$

$= (2.0)(2.2) \times 3$

$= 13.2\ m^2$

$r = 0.20$

$A_{columns} = (2\pi r^2 + 2\pi rh) \times 2$

$= 2\pi rh \times 2$

$= 2\pi (0.20)(2.5) \times 2$

$= 2\pi$

Base

$A = A_{front} + A_{sides} + A_{top}$

$= (2.0)(0.15) + 2.2(0.15)(2) + (2.2)(2)$

$= 0.3 + 0.66 + 4.4$

$= 5.36\ m^2$

$overlap = \pi r^2 \times 4$

$= \pi (0.20)^2 \times 4$

$= 0.16\pi$

$A_{total} = 1.7 + 13.2 + 5.36 + 2\pi - 0.16\pi$

$= 20.26 + 1.84\pi$

$= 26.04\ m^2$

## Homework

page 40

3. a, b

3.a) $A_{cylinder} = 2\pi r^2 + 2\pi rh$

$= 2\pi(1)^2 + 2\pi(1)(4)$

$= 2\pi + 8\pi$

$= 10\pi \text{ cm}^2$

$A_{cube} = bh \times 6$

$= 4 \times 4 \times 6$

$= 96 \text{ cm}^2$

$\text{overlap} = 2\pi r^2$

$= 2\pi$

$A_{total} = 10\pi + 96 - 2\pi$

$= 8\pi + 96$

$\doteq 121.1 \text{ cm}^2$