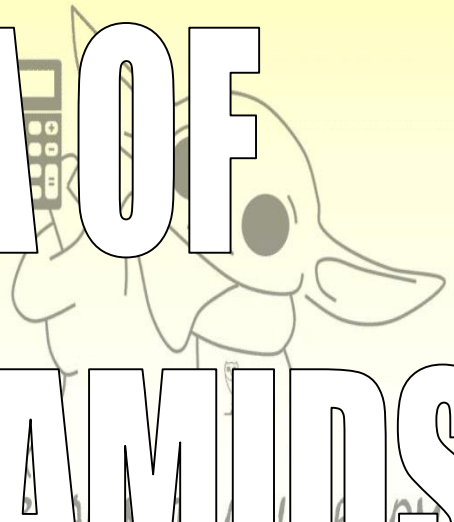
ST. JEAN DE BREBEUF
MATHEMATICS

CHAPTER 9.2

SURFACE AREA OF PRISMS and PYRAMIDS



CHAPTER 9.2 SURFACE AREA OF PRISMS and PYRAMIDS

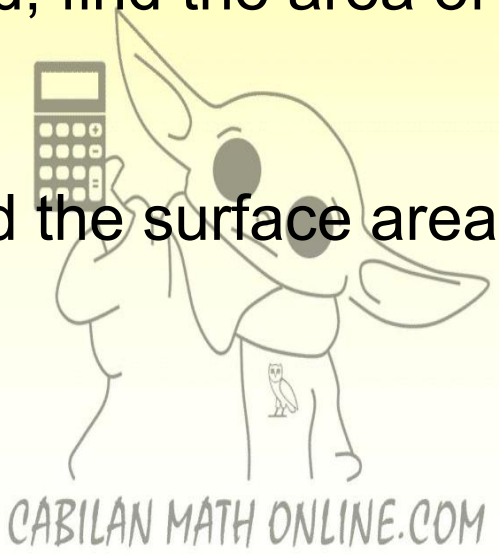
KEY CONCEPTS

The surface area of an object is the **total area of the surface** of the object.

Surface area is measured in square units (ie. cm^2).

To find the surface area of a prism or pyramid, find the area of each face, then add the areas.

There are formulas which can be used to find the surface area of prisms and pyramids



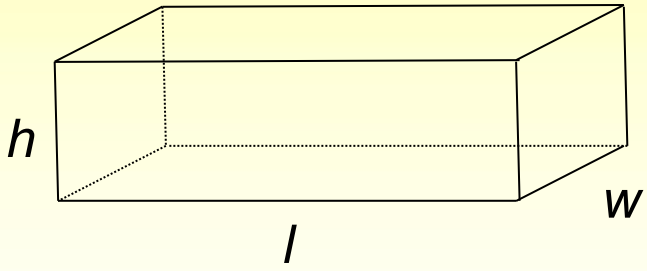
CHAPTER 9.2 SURFACE AREA OF PRISMS and PYRAMIDS

KEY CONCEPTS

FORMULAS

SURFACE AREA OF A RECTANGULAR PRISM

$$SA = 2(lw + lh + wh)$$
$$= 2lw + 2lh + 2wh$$



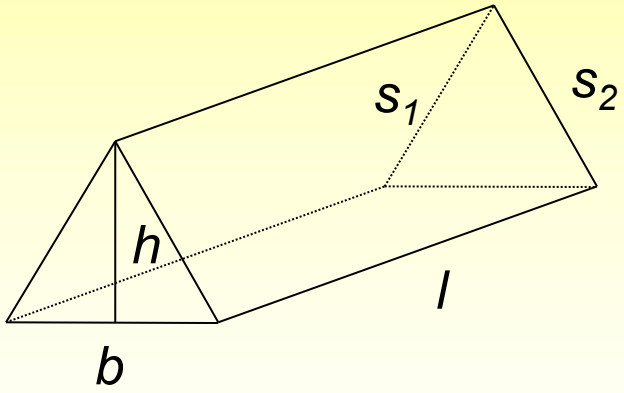
CHAPTER 9.2 SURFACE AREA OF PRISMS and PYRAMIDS

KEY CONCEPTS

FORMULAS

SURFACE AREA OF A TRIANGULAR PRISM

$$SA = bh + l(s_1 + s_2 + b)$$



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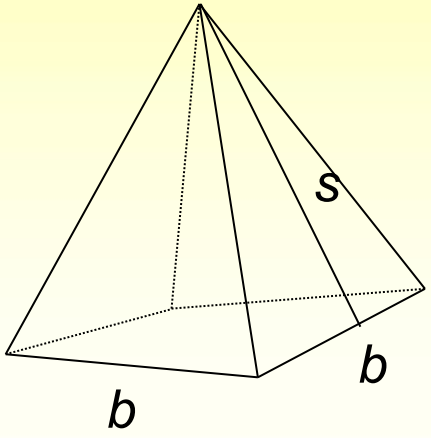
CHAPTER 9.2 SURFACE AREA OF PRISMS and PYRAMIDS

KEY CONCEPTS

FORMULAS

SURFACE AREA OF A SQUARE BASED PYRAMID

Square: $SA = 2bs + b^2$



CHAPTER 9.2 SURFACE AREA OF PRISMS and PYRAMIDS

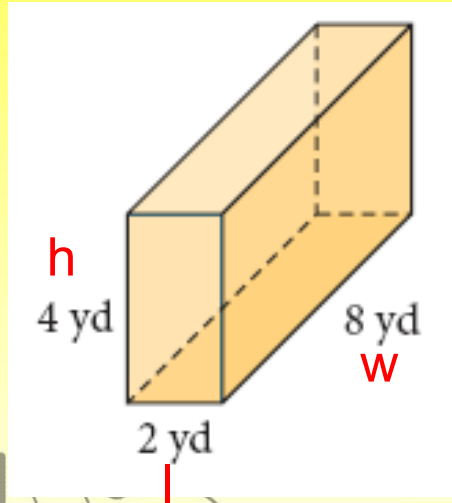
EXAMPLE 1 *Surface Area of a Rectangular Prism*

Find the surface area of the pictured rectangular prism

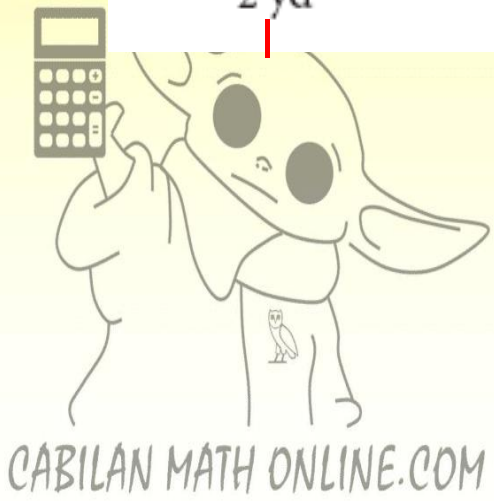
$$SA = 2lw + 2lh + 2wh$$

$$= 2(2)(8) + 2(2)(4) + 2(8)(4)$$

$$= 112\ yd^2$$



The surface area of the rectangular prism is **112 square yards**.

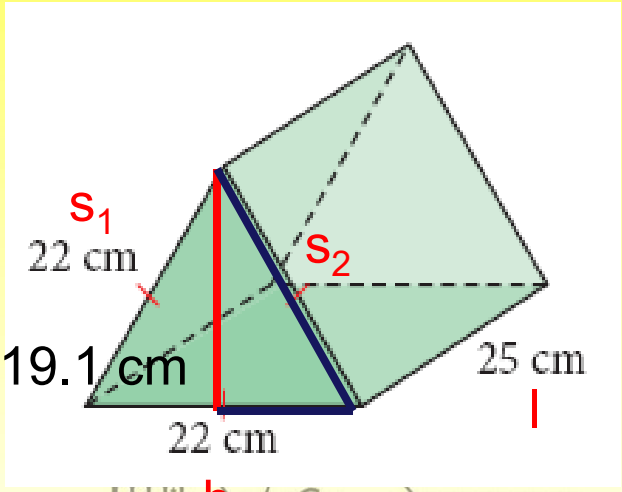


CHAPTER 9.2 SURFACE AREA OF PRISMS and PYRAMIDS

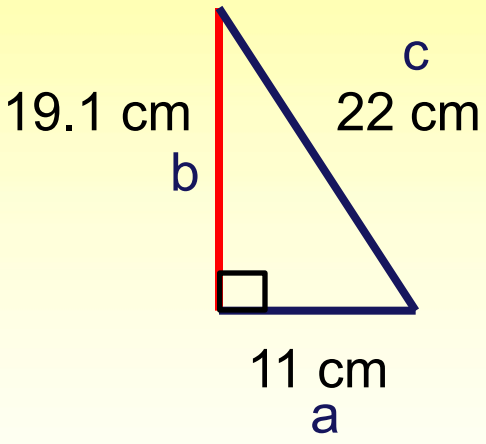
EXAMPLE 2 *Surface Area of a Triangular Prism*

Calculate the surface area of the triangular prism pictured.

We are missing the **height (h)**



Step 1: Calculate the height of the triangle by using the *Pythagorean Theorem* ($c^2 = a^2 + b^2$)



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

$$(22)^2 = (11)^2 + b^2$$

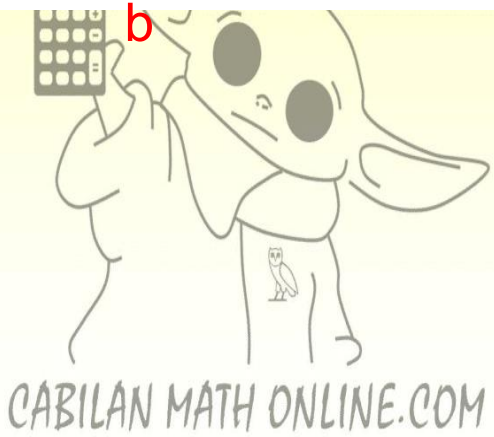
$$484 = 121 + b^2$$

$$484 - 121 = b^2$$

$$363 = b^2$$

$$\sqrt{363} = \sqrt{b^2}$$

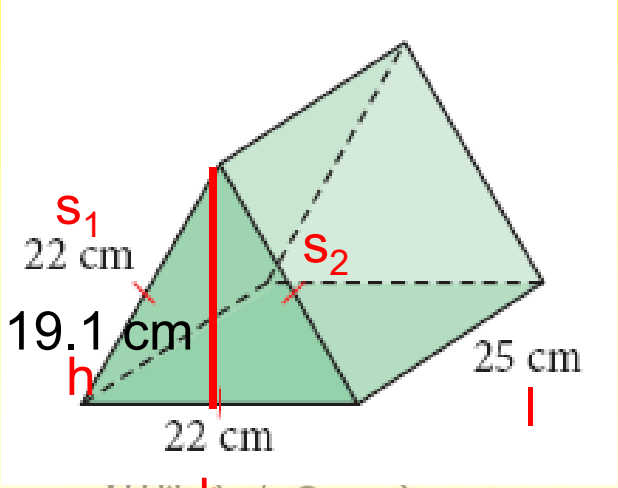
$$\boxed{19.1cm = b}$$



CHAPTER 9.2 SURFACE AREA OF PRISMS and PYRAMIDS

EXAMPLE 2 *Surface Area of a Triangular Prism*

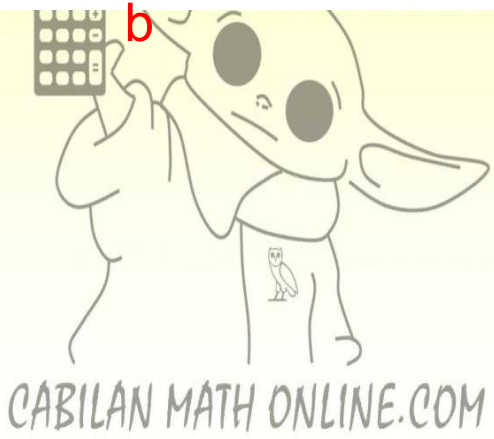
Calculate the surface area of the triangular prism pictured.



Step 2: Calculate the surface area using the formula

$$SA = bh + l(s_1 + s_2 + b)$$
$$= 22(19.1) + 25(22 + 22 + 22)$$
$$= 420.2 + 25(66)$$
$$= 2070.2\,cm^2$$

The surface area of the triangular prism is **2070.2 square centimetre**.

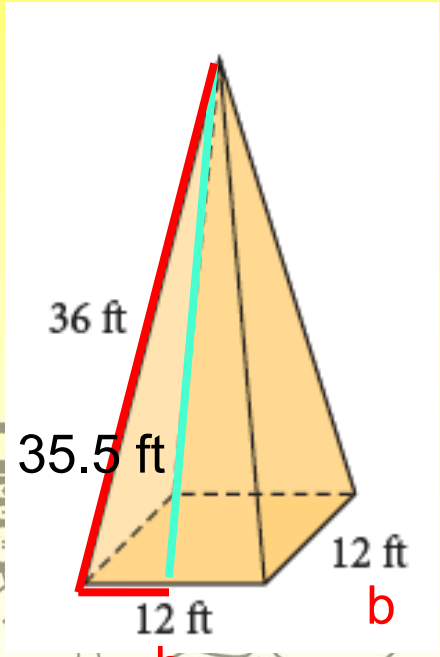


CHAPTER 9.2 SURFACE AREA OF PRISMS and PYRAMIDS

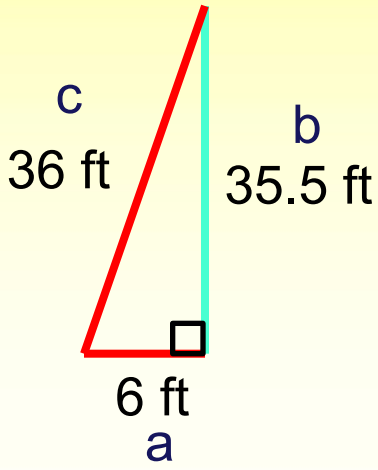
EXAMPLE 3 *Surface Area of a Square Based Pyramid*

Calculate the surface area of the square based pyramid pictured.

We are missing the **slant height (s)**



Step 1: Calculate the slant height of the triangle by using the *Pythagorean Theorem* ($c^2 = a^2 + b^2$)



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

$$(36)^2 = (6)^2 + b^2$$

$$1296 = 36 + b^2$$

$$1296 - 36 = b^2$$

$$1260 = b^2$$

$$\sqrt{1260} = \sqrt{b^2}$$

$$35.5\ ft = b$$

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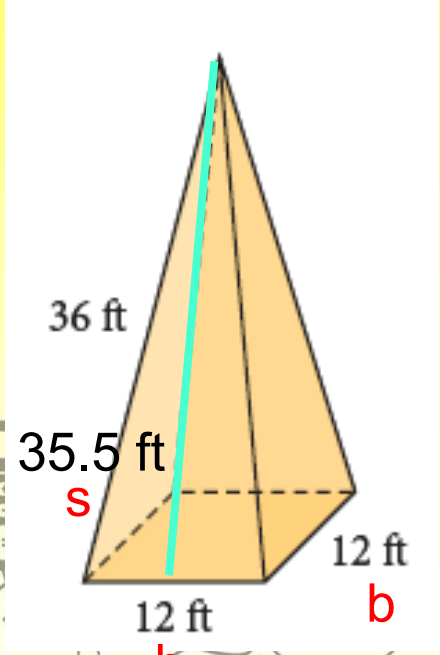
CHAPTER 9.2 SURFACE AREA OF PRISMS and PYRAMIDS

EXAMPLE 3 *Surface Area of a Square Based Pyramid*

Calculate the surface area of the square based pyramid pictured.



Step 2: Calculate the surface area using the formula

$$SA = 2bs + b^2$$
$$= 2(12)(35.5) + (12)^2$$
$$= 996 \ ft^2$$

The surface area of the square based pyramid is **996 square feet**.

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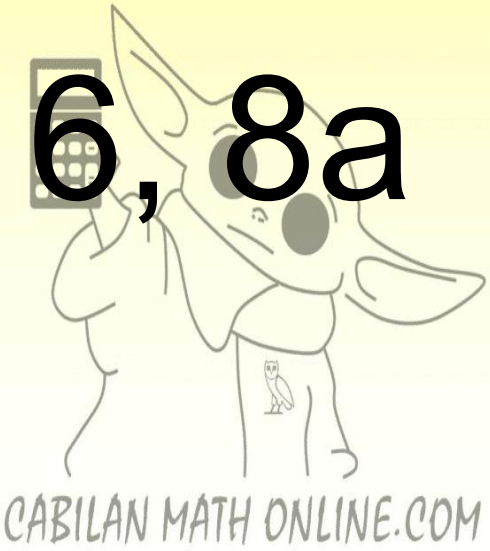
CHAPTER 9.2 SURFACE AREA OF PRISMS and PYRAMIDS

Homework:

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