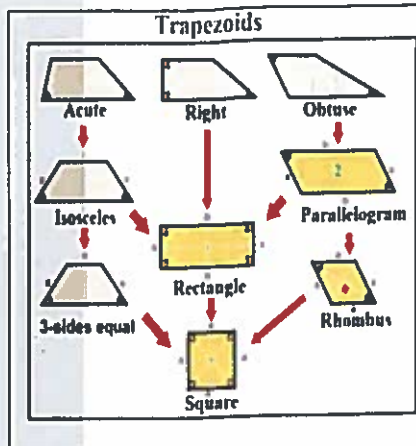


$$A = \frac{1}{2}h(b_1 + b_2)$$

Chapter 9

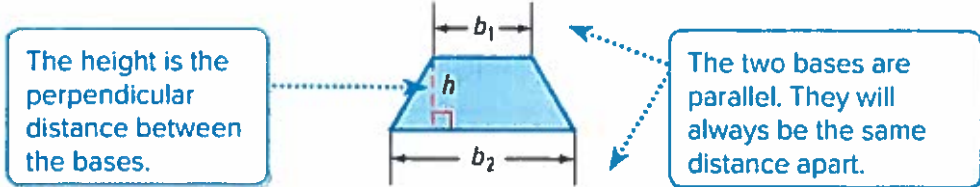
Lesson 3: Area of Trapezoids

Trapezoid- a quadrilateral with only ONE pair of parallel sides.

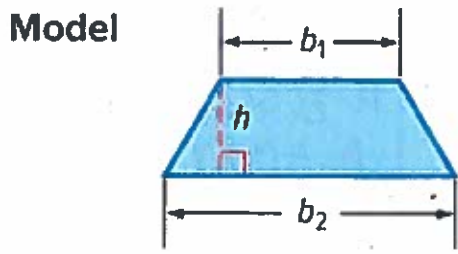


Notice how trapezoids are different from rectangles, parallelograms, squares and rhombus.

A trapezoid has two bases, b_1 and b_2 . The height of a trapezoid is the distance between the bases.

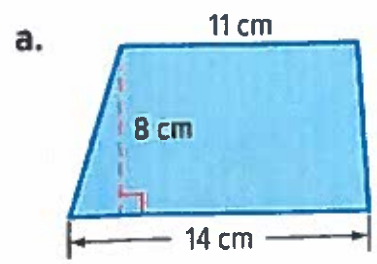


Words The area A of a trapezoid is one half the product of the height h and the sum of the bases b_1 and b_2 .



Symbols $A = \frac{1}{2}h(b_1 + b_2)$

EXAMPLES:



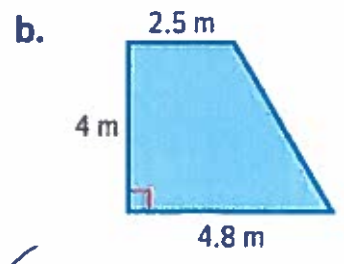
$$A = \frac{1}{2}h(b_1 + b_2)$$

$$A = \frac{1}{2}(8)(14 + 11)$$

$$A = \frac{1}{2}(8)(25)$$

$$A = 4(25)$$

$$A = 100 \text{ cm}^2$$



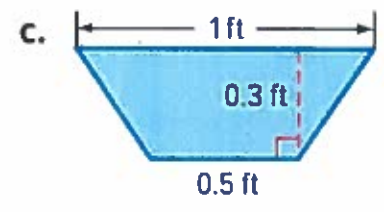
$$A = \frac{1}{2}h(b_1 + b_2)$$

$$A = \frac{1}{2}(4)(4.8 + 2.5)$$

$$A = \frac{1}{2}(4)(7.3)$$

$$A = 2(7.3)$$

$$A = 14.6 \text{ m}^2$$



$$A = \frac{1}{2}h(b_1 + b_2)$$

$$A = \frac{1}{2}(0.3)(0.5 + 1)$$

$$A = \frac{1}{2}(0.3)(1.5)$$

$$A = (0.15)(1.5)$$

$$A = 0.225 \text{ ft}^2$$

Find the missing height:

Use the related formula $h = \frac{2A}{b_1 + b_2}$ to find the height of a trapezoid.

EXAMPLES:

d. $A = 24 \text{ cm}^2$ $h = \frac{2A}{b_1 + b_2}$
 $b_1 = 4 \text{ cm}$
 $b_2 = 12 \text{ cm}$
 $h = ?$

$$h = \frac{2 \cdot 24}{4 + 12}$$

$$h = \frac{48}{16}$$

$h = 3 \text{ cm}$

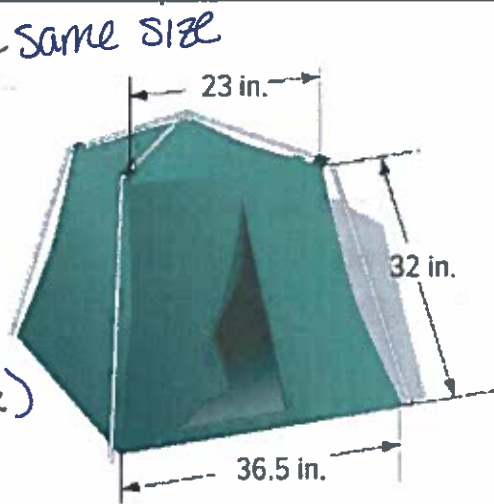
e. $A = 21 \text{ yd}^2$ $A = \frac{1}{2}h(b_1 + b_2)$
 $b_1 = 2 \text{ yd}$ $21 = \frac{1}{2}h(2 + 5)$
 $b_2 = 5 \text{ yd}$ $21 = \frac{1}{2}h(7)$
 $h = ?$ $21 = \frac{7}{2}h$
 $\frac{21}{3.5} = \frac{3.5h}{3.5}$
 $6 = h$

$6 \text{ yds} = h$

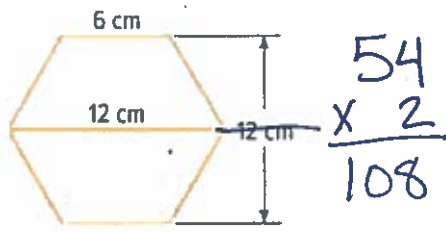
A play tent is shown. How much fabric was used to make the front and the back of the play tent?

$A = \frac{1}{2}h(b_1 + b_2)$
 $A = \frac{1}{2}(32)(23 + 36.5)$
 $A = \frac{1}{2}(32)(59.5)$
 $A = 16(59.5)$
 $A = 952 \text{ in}^2 \times 2 \text{ (front + back)}$

1904 in^2 of fabric



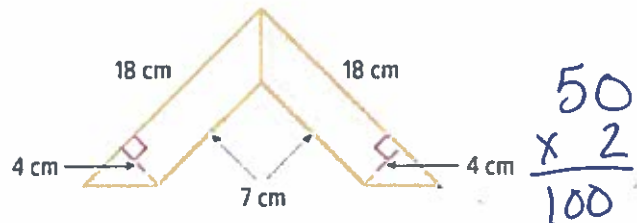
Each figure below is made up of congruent trapezoids. Find the area of each figure.



54
 $\times 2$
 108

$A = \frac{1}{2}h(b_1 + b_2)$
 $A = \frac{1}{2}(6)(12 + 6)$
 $A = \frac{1}{2}(6)(18)$
 $A = 3 \cdot 18$
 $A = 54$

$A = 108 \text{ cm}^2$



50
 $\times 2$
 100

$A = \frac{1}{2}h(b_1 + b_2)$
 $A = \frac{1}{2}(4)(7 + 18)$
 $A = \frac{1}{2}(4)(25)$
 $A = 2 \cdot 25$
 $A = 50$

$A = 100 \text{ cm}^2$