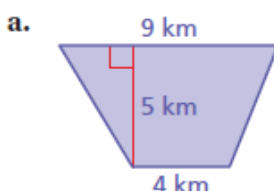


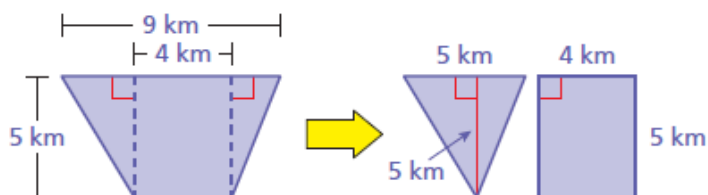
You can use decomposition to find areas of trapezoids and *kites*. A **kite** is a quadrilateral that has two pairs of adjacent sides with the same length and opposite sides with different lengths.

EXAMPLE 1 Finding Areas of Trapezoids and Kites

Find the area of each figure.

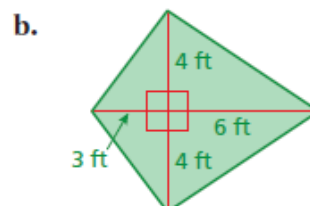


Decompose the trapezoid into a triangle and a rectangle. Find the sum of the areas of the figures.

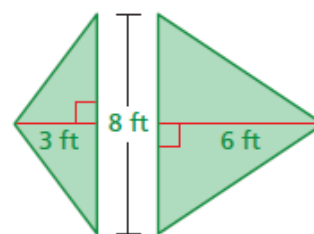


$$\begin{aligned} A &= \frac{1}{2}(5)(5) + 5(4) \\ &= 12\frac{1}{2} + 20 \\ &= 32\frac{1}{2} \end{aligned}$$

► The area of the trapezoid is $32\frac{1}{2}$ square kilometers.



Decompose the kite into two triangles. Find the sum of the areas of the triangles.

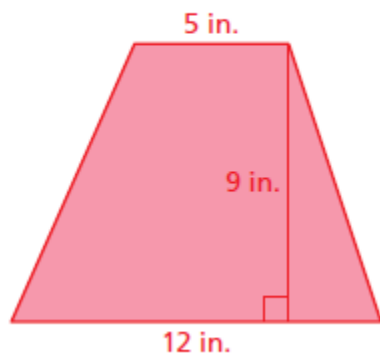


$$\begin{aligned} A &= \frac{1}{2}(8)(3) + \frac{1}{2}(8)(6) \\ &= 12 + 24 \\ &= 36 \end{aligned}$$

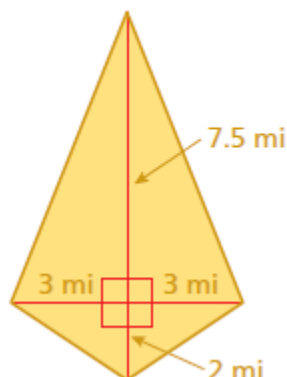
► The area of the kite is 36 square feet.

Try It Find the area of the figure.

1.



2.



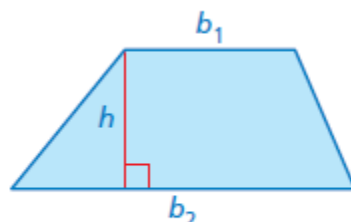
In Example 1(a), you could have used a copy of the trapezoid to form a parallelogram. As you may have discovered in the exploration, this leads to the following formula for the area of a trapezoid.

Key Idea

Area of a Trapezoid

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

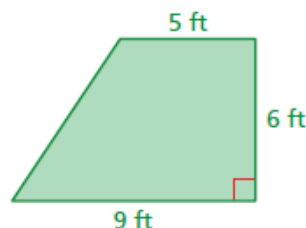
Algebra $A = \frac{1}{2}h(b_1 + b_2)$



EXAMPLE 2 Finding Areas of Trapezoids

Find the area of each trapezoid.

a.



$$\begin{aligned} A &= \frac{1}{2}h(b_1 + b_2) \\ &= \frac{1}{2}(6)(5 + 9) \\ &= \frac{1}{2}(6)(14) \\ &= 42 \end{aligned}$$

Write formula.

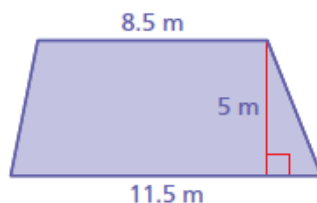
Substitute.

Add.

Multiply.

▶ The area of the trapezoid is 42 square feet.

b.

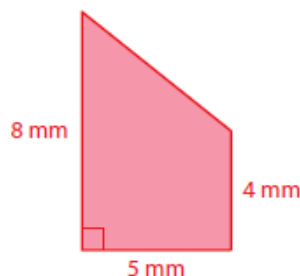


$$\begin{aligned} A &= \frac{1}{2}h(b_1 + b_2) \\ &= \frac{1}{2}(5)(8.5 + 11.5) \\ &= \frac{1}{2}(5)(20) \\ &= 50 \end{aligned}$$

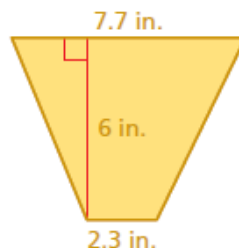
▶ The area of the trapezoid is 50 square meters.

Try It Find the area of the trapezoid.

3.



4.

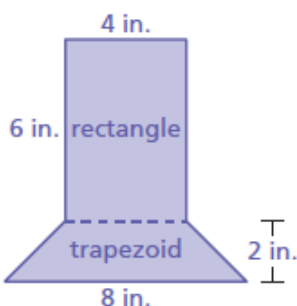


EXAMPLE 3**Finding the Area of a Composite Figure**

There is often more than one way to separate composite figures. In Example 3, you can separate the figure into one rectangle and two triangles.

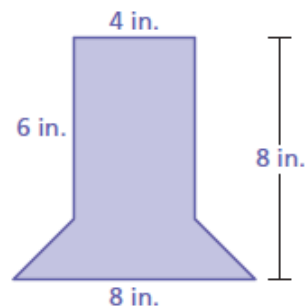
Find the area of the figure.

You can separate the figure into a rectangle and a trapezoid. Identify the height of the trapezoid. Then find the area of each shape.



Area of Rectangle

$$\begin{aligned} A &= \ell w \\ &= 6(4) \\ &= 24 \end{aligned}$$



Area of Trapezoid

$$\begin{aligned} A &= \frac{1}{2}h(b_1 + b_2) \\ &= \frac{1}{2}(2)(4 + 8) \\ &= 12 \end{aligned}$$

► So, the area of the figure is $24 + 12 = 36$ square inches.

Try It Find the area of the figure.

