

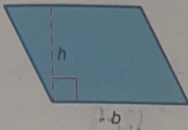
Area of Composite Figures

I Can... find areas of composite figures by decomposing the figures into known shapes, and then adding the areas of those shapes.

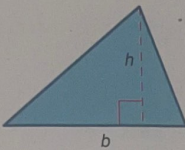
Learn Area of Composite Figures

A **composite figure** is made up of two or more shapes. To find the area of a composite figure, decompose the figure into shapes with areas you know how to find. Then find the sum of those areas.

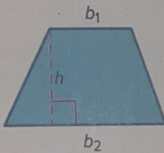
Label each shape with its correct name and corresponding area formula.



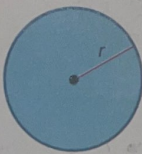
parallelogram
 $A = b \times h$



triangle
 $A = \frac{1}{2}bh$

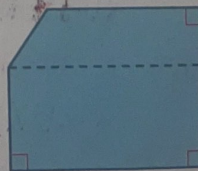


trapezoid
 $A = \frac{b_1 + b_2}{2} \times h$



circle
 $A = \pi r^2$

When analyzing the structure of a composite figure, such as the one shown, look for shapes like the ones above into which you can decompose the composite figure.

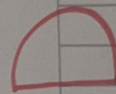


What Vocabulary Will You Learn?
 composite figure

احمد السيد جابر

Mrs Ayah

Rectangle
 $L \times W$



Semi circle

$$= \frac{\pi r^2}{2}$$

$$R = \frac{d}{2}$$

Think About It!

What dimensions/measurements do you need in order to find the area of this composite figure?

The length and width of the rectangle; the base and height of the triangle

Talk About It!

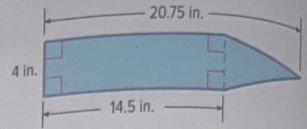
Describe another method you can use to find the area of the composite figure.

I can find the area of larger rectangle and subtract two triangles cut from the right side, assuming

know those dimensions

Example 1 Area of Composite Figures

Ayanna is painting a sign made from a piece of reclaimed wood with the dimensions shown.



What is the area of the sign?

Step 1 Decompose the figure into smaller figures.

The figure is a pentagon that is composed of a rectangle and a triangle.

Step 2 Find the area of each figure.

Complete the steps.

Find the area of the rectangle.	Find the area of the triangle.
$A = \ell \cdot w$	$A = \frac{1}{2}bh$
$= 14.5 \cdot 4$	$= \frac{1}{2} \cdot 4 \cdot 6.25$
$= 58$	$= 12.5$

The area of the rectangle is 58 square inches and the area of the triangle is 12.5 square inches.

Step 3 Find the area of the composite figure.

$58 + 12.5 = 70.5$

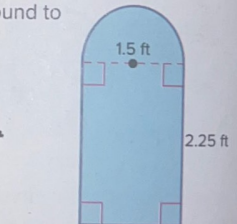
So, the area of the composite figure is about $58 + 12.5$, or 70.5 square inches.

Check

Find the area of the figure. Use 3.14 for π . Round to the nearest hundredth if necessary.

Area of semicircle
 Show your work here
 $A = \pi r^2 \quad \frac{3.14 \times (\frac{1.5}{2})^2}{2}$

~~0.88~~ 0.88
 Area of Rectangle $L \times W$
 $2.25 \times 1.5 = 3.375$



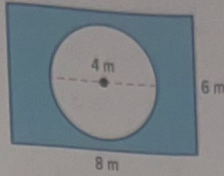
Area = ~~1.775 + 3.375~~
 $= 0.88 + 3.375$
 4.26 ft^2

Go Online You can complete an Extra Example online.

Learn Area of Shaded Regions

Use area formulas to find the area of a shaded region. First find the area of the entire figure. Then subtract to find the area of the shaded region.

Go Online Watch the animation to see how to find the area of shaded regions.



The animation shows the following steps.

Step 1 Find the area of the entire figure.

$$A = \ell w \quad \text{Area of entire figure, a rectangle}$$

$$A = 8 \cdot 6 \quad \text{Replace } \ell \text{ with 8 and } w \text{ with 6.}$$

$$A = \boxed{48} \quad \text{Simplify.}$$

Step 2 Find the area of the unshaded region.

$$A = \pi r^2 \quad \text{Area of unshaded region, a circle}$$

$$A \approx 3.14 \cdot 2^2 \quad \text{Replace } \pi \text{ with 3.14 and } r \text{ with 2.}$$

$$A \approx \boxed{12.6} \quad \text{Simplify.}$$

Step 3 Subtract to find the area of the shaded region.

entire figure – unshaded region = shaded region

$$48 \quad - \quad 12.6 \quad \approx \quad \boxed{35.4} \text{ m}^2$$

The area of the shaded region is about 35.4 square meters.

Pause and Reflect

If the area of the unshaded region was a triangle, what dimensions of the triangle would keep the area of the shaded region about the same?

Record your observations here

Think About It!

Which area formulas will you need to use to solve the problem?

$$A = \pi r^2$$
$$A = s^2$$

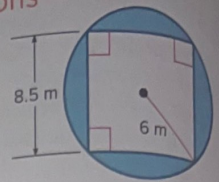
Talk About It!

Why is the side length of the square 8.5 meters and not 12 meters?

12 m is the distance across the square from corner to opposite corner which is the same as side length of the square

Example 2 Area of Shaded Regions

Find the area of the shaded region. Use 3.14 for π . Round to the nearest hundredth if necessary.



Step 1 Find the area of the entire figure.

$$A = \pi r^2$$

$$A \approx 3.14 \cdot 6^2$$

$$A \approx \boxed{113.04}$$

Area of entire figure, a circle
Replace π with 3.14 and r with 6.
Simplify.

The area of the circle is approximately 113.04 square meters.

Step 2 Find the unshaded area.

$$A = s^2$$

$$A = 8.5^2$$

$$A = \boxed{72.25}$$

Area of unshaded region, a square
Replace s with 8.5.
Simplify.

The unshaded area is 72.25 square meters.

Step 3 Find the area of the shaded region.

The area of the circle is about 113.04 square meters. The area of the square is 72.25 square meters. Subtract the area of the square from the area of the circle to find the approximate area of the shaded region.

Because $113.04 - 72.25 = \boxed{40.79}$, the area of the shaded region is approximately 40.79 square meters.

Check

Find the area of the shaded region.

Area of Trapezoid

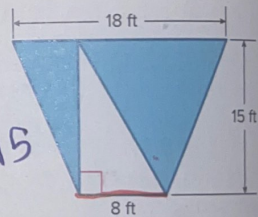
$$\frac{b_1 + b_2}{2} \times h$$

$$\frac{18 + 8}{2} \times 15 = 195$$

Area of Triangle $\frac{1}{2}bh$

$$\frac{18 \times 15}{2} = 60$$

$$\text{Area of Shaded region } 195 - 60 = \boxed{135 \text{ ft}^2}$$



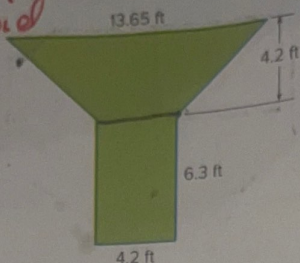
Go Online You can complete an Extra Example online.

Area of Trapezoid

$$\frac{b_1 + b_2}{2} \times h$$

Check

The Jamesons hired a landscaper to create the walkway shown.



If one case of decorative stone costs \$25 and covers 6 square feet, how much will it cost to cover the walkway?

Area of Rectangle

$$= L \times h$$

Area of trapezoid

$$\frac{13.65 + 4.2}{2} \times 4.2 = 37.485$$

Area of rectangle

$$4.2 \times 6.3 = 26.46$$

$$\text{Area of landscaper} = 37.485 + 26.46 = \boxed{63.945}$$

Go Online You can complete an Extra Example online.

Pause and Reflect

How well do you understand the concepts from today's lesson? What questions do you still have? How can you get those questions answered?

$$\frac{\text{square feet}}{\$} =$$

$$\frac{63.945}{25} = ?$$

Record your solutions here

$$\frac{63.945}{6} = 10.6 \approx 11$$

$$11 \times 25 = \$275$$

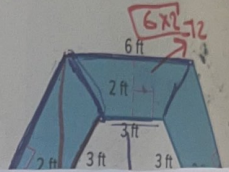
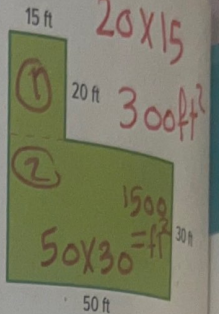
Apply

9. Alonzo needs to sod his backyard. The figure shows the measurements of the area of his yard which he intends to sod. One pallet of sod covers 400 square feet. How many full pallets of sod will Alonzo need to have enough for his entire yard?

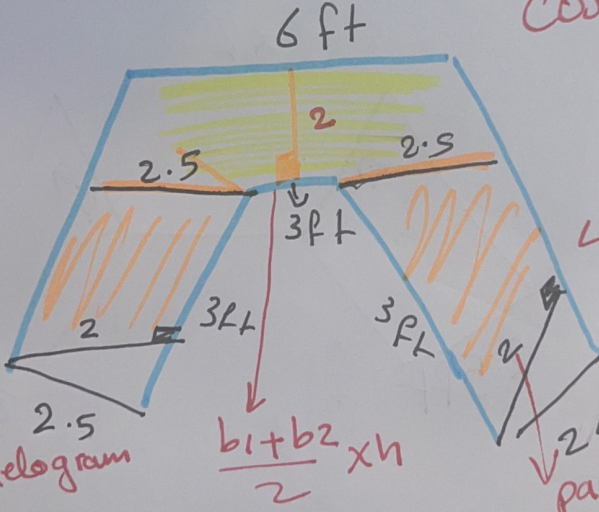
Area₁ + Area₂
 $300 + 1500 = \underline{1800 \text{ ft}^2}$

we need $\frac{1800}{400} = 4.5$
5 Pallet

10. Ward is planning to install a new countertop in his kitchen, as shown in the figure. The new countertop costs \$42.50 per square foot. What will be the cost of the new countertop?



10



cost of 1 square foot

= \$42.50

42.50×26

= \$1105

Parallelogram

(3×2)

6

$\frac{b_1 + b_2}{2} \times h$

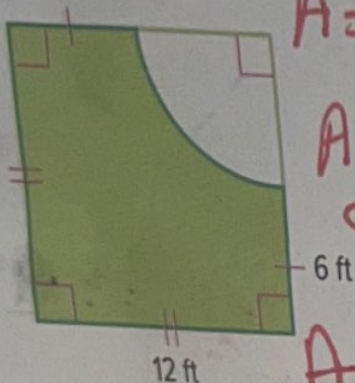
$\frac{(6 + 8) \times 3}{2}$

+ 14 + 6
 = 26 ft²

2x3 parallelogram

(3×2)

Explaining how you can find the area of the shaded figure.



$$A = 12 \times 12 = 144 \text{ ft}^2$$

Area of ~~square~~
quarter circle

$$A = \frac{1}{4} (3.14 \times 6 \times 6)$$

$$= 28.26$$

Subtract the area of quarter
circle from the area
of the square $144 - 28.26 =$

$$115.74$$

13. **MP** Reason Abstractly Suppose a