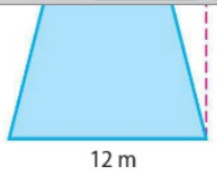
$A = bh$

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

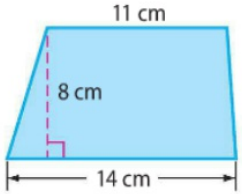


n 12.

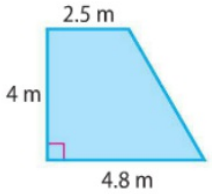
are meters.

Got It? Do these problems to find out.

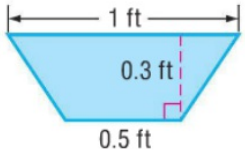
a.



b.



c.



(a) $\frac{(11+14)8}{2}$

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

$= \frac{200}{2}$

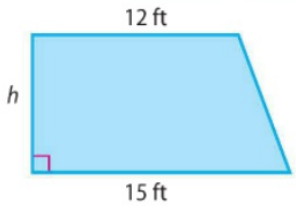
Show your work.

a. 100 cm^2

b. 14.6 m^2

c. 0.225 ft^2

3. **The trapezoid has an area of 108 square feet. Find the height.**



$h = \frac{2A}{b_1 + b_2}$ Height of a trapezoid

$h = \frac{2(108)}{12 + 15}$ Replace A with 108, b_1 with 12, and b_2 with 15.

$h = \frac{216}{27}$ Multiply 2 and 108. Add 12 and 15.

$h = 8$ Divide.

So, the height of the trapezoid is 8 feet.

Got It? **Do these problems to find out.**

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

e. $A = 21\ \text{yd}^2$
$b_1 = 2\ \text{yd}$
$b_2 = 5\ \text{yd}$
$h = ?$

Be Precise
Check your answer by using the formula for the area of a trapezoid.

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

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

d. 3 cm

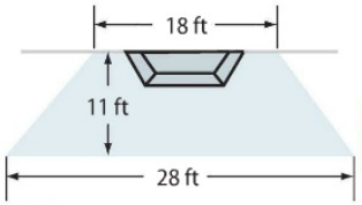
$24 = \frac{16h}{2}$

e. 6 yd

$24 = 8h$

6 feet, what is the height of the trapezoid? (Example 3) **3 feet**

4. In the National Hockey League, goaltenders can play the puck behind the goal line only in a trapezoid-shaped area, as shown at the right. Find the area of the trapezoid. (Example 4) **253 ft²**



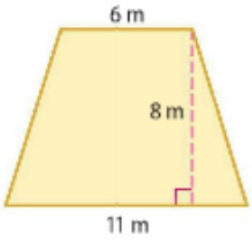
$$= \frac{(b_1 + b_2)h}{2}$$
$$= \frac{(18+28)11}{2}$$
$$= \frac{(46)11}{2}$$
$$= (23)(11) = 253$$

5. **Building on the Essential Question** How is the formula for the area of a trapezoid related to the formula for the area of a parallelogram? **Sample answer: A parallelogram can be decomposed into two congruent trapezoids. So the area of each trapezoid is one half the area of the parallelogram.**

Guided Practice

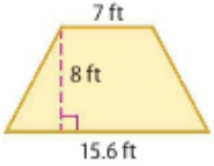
Find the area of each trapezoid. Round to the nearest tenth if necessary. (Examples 1 and 2)

1. **68 m²**



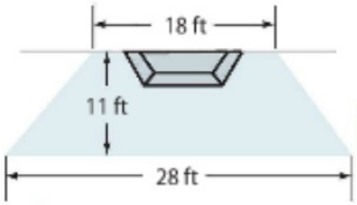
Show your work.

2. **90.4 ft²**



3. A trapezoid has an area of 15 square feet. If the bases are 4 feet and 6 feet, what is the height of the trapezoid? (Example 3) **3 feet**

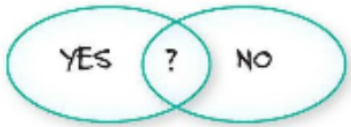
4. In the National Hockey League, goaltenders can play the puck behind the goal line only in a trapezoid-shaped area, as shown at the right. Find the area of the trapezoid. (Example 4) **253 ft²**



5. **Building on the Essential Question** How is the formula for the area of a trapezoid related to the formula for the area of a parallelogram? **Sample answer: A parallelogram can be decomposed into two congruent trapezoids. So the area of each trapezoid is one half the area of the parallelogram.**

Rate Yourself!

Are you ready to move on? Shade the section that applies.



For more help, go online to access a Personal Tutor. Tutor

FOLDABLES Time to update your Foldable!

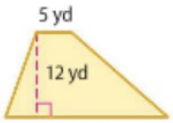
Independent Practice

Go online for Step-by-Step Solutions

eHelp

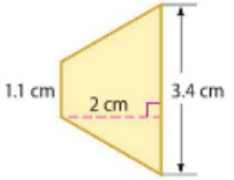
Find the area of each trapezoid. Round to the nearest tenth if necessary. (Examples 1 and 2)

1. $168\ yd^2$

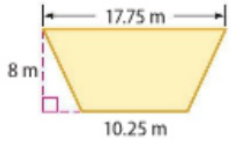


Show your work.

2. $4.5\ cm^2$



3. $112\ m^2$



4. A trapezoid has an area of 150 square meters. If the bases are 14 meters and 16 meters, what is the height of the trapezoid? (Example 3)

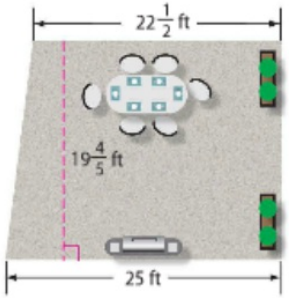
10 m

5. A trapezoid has an area of 400 square millimeters. The bases are 14 millimeters and 36 millimeters. What is the height of the trapezoid? (Example 3)

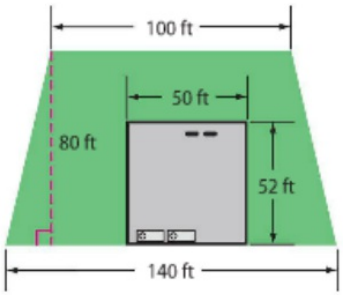
16 mm

6. Find the area of the patio shown. (Example 4)

$470\frac{1}{4}\ ft^2$



7 Use the diagram that shows the lawn that surrounds an office building.



a. What is the area of the lawn? **7,000 ft²**

b. If one bag of grass seed covers 2,000 square feet, how many bags are needed to seed the lawn?

4 bags

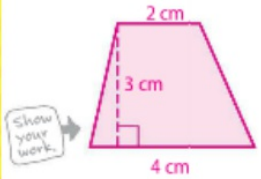
8. CCSS **Reason Abstractly** Tiles are being placed in front of a fireplace to create a trapezoidal hearth. The hearth will have a height of 24 inches and bases that are 48 inches and 60 inches. If the tiles cover 16 square inches, how many tiles will be needed?

81 tiles

Draw and label each figure. Then find the area. **Sample answers: 9–13**

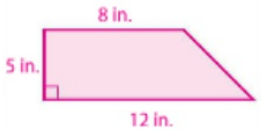
9. a trapezoid with no right angles and an area less than 12 square centimeters

$A = 9$ cm²

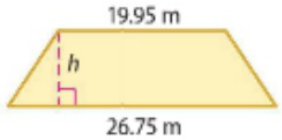


10. a trapezoid with a right angle and an area greater than 40 square inches

$A = 50$ in²



11. **Persevere with Problems** Apply what you know about rounding to explain how to estimate the height h of the trapezoid shown if the area is 235.5 m^2.



The lengths of the bases can be rounded to 20 m and 30 m, respectively. The area can be rounded to 250 m^2. Divide 250 by (20 + 30), or 50, and then multiply by 2. The height h is about 10 m.

12. **Identify Repeated Reasoning** Find two possible lengths of the bases of a trapezoid with a height of 1 foot and an area of 9 square feet. Explain how you found your answer. **Since $9 = \frac{1}{2}(1)(b_1 + b_2)$, the possible lengths have a sum of 18; Sample answers: 2 ft and 16 ft, or 8 ft and 10 ft**

13. **Reason Abstractly** How can you use the formula for area of a parallelogram to determine the area of a trapezoid if you forgot the formula for area of a trapezoid? **By knowing the formula for the area of a parallelogram is $A = bh$, I can draw two congruent trapezoids and rotate one so they create a parallelogram. After multiplying the base and height, I can divide by 2 to find the area of the trapezoid.**

14. **Reason Inductively** The area of a trapezoid is 36 square inches. The height is 4 inches and one base is twice the length of the other base. What are the lengths of the bases? **6 in. and 12 in.**