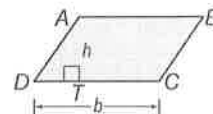


# 11-1 Study Guide and Intervention

## Areas of Parallelograms and Triangles

**Areas of Parallelograms** Any side of a parallelogram can be called a **base**. The **height** of a parallelogram is the perpendicular distance between any two parallel bases. The area of a parallelogram is the product of the base and the height.

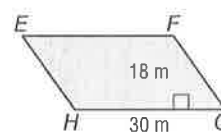
<b>Area of a Parallelogram</b>	If a parallelogram has an area of $A$ square units, a base of $b$ units, and a height of $h$ units, then $A = bh$ .
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**Example**

Find the area of parallelogram  $EFGH$ .

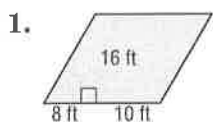
$$\begin{aligned}
 A &= bh && \text{Area of a parallelogram} \\
 &= 30(18) && b = 30, h = 18 \\
 &= 540 && \text{Multiply.}
 \end{aligned}$$



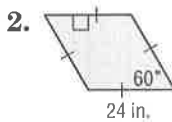
The area is 540 square meters.

### Exercises

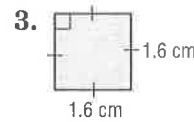
Find the perimeter and area of each parallelogram. Round to the nearest tenth if necessary.



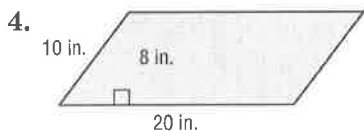
**71.8 ft; 288 ft<sup>2</sup>**



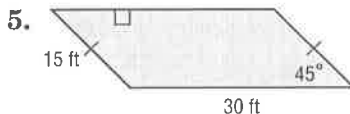
**96 in.; 498.8 in<sup>2</sup>**



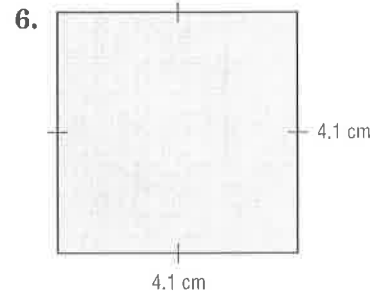
**6.4 cm; 2.56 cm<sup>2</sup>**



**60 in.; 160 in<sup>2</sup>**

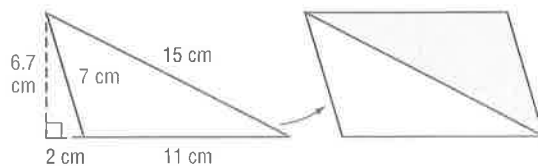


**90 ft; 318.2 ft<sup>2</sup>**



**16.4 cm; 16.8 cm<sup>2</sup>**

7. **TILE FLOOR** A bathroom tile floor is made of black-and-white parallelograms. Each parallelogram is made of two triangles with dimensions as shown. Find the perimeter and area of one parallelogram.



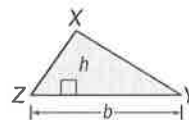
**36 cm; 73.7 cm<sup>2</sup>**

# 11-1 Study Guide and Intervention *(continued)*

## Areas of Parallelograms and Triangles

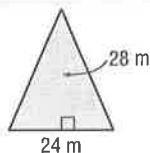
**Areas Of Triangles** The area of a triangle is one half the product of the base and its corresponding height. Like a parallelogram, the base can be any side, and the height is the length of an altitude drawn to a given base.

<b>Area of a Triangle</b>	If a triangle has an area of $A$ square units, a base of $b$ units, and a corresponding height of $h$ units, then $A = \frac{1}{2}bh$ .
---------------------------	---



**Example** Find the area of the triangle.

$$\begin{aligned}
 A &= \frac{1}{2}bh && \text{Area of a triangle} \\
 &= \frac{1}{2}(24)(28) && b = 24, h = 28 \\
 &= 336 && \text{Multiply.}
 \end{aligned}$$

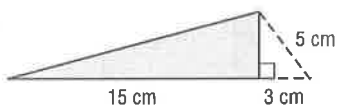


The area is 336 square meters.

### Exercises

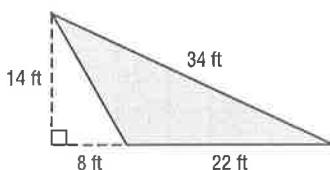
Find the perimeter and area of each triangle. Round to the nearest tenth if necessary.

1.



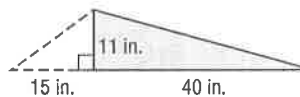
34.5 cm; 30 cm<sup>2</sup>

2.



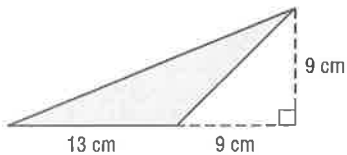
73.9 ft; 176 ft<sup>2</sup>

3.



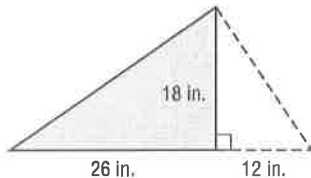
92.5 in.; 220 in<sup>2</sup>

4.



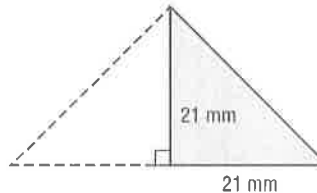
49.5 cm; 58.5 cm<sup>2</sup>

5.



75.6 in.; 234 in<sup>2</sup>

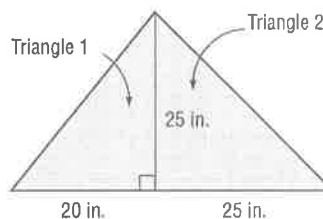
6.



71.7 mm; 220.5 mm<sup>2</sup>

7. **LOGO** The logo for an engineering company is on a poster at a job fair. The logo consists of two triangles that have the dimensions shown. What are the perimeter and area of each triangle?

**Triangle 1: 77 in.; 250 in<sup>2</sup>;**  
**Triangle 2: 85.4 in.; 312.5 in<sup>2</sup>**

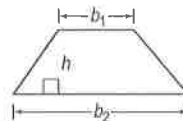


## 11-2 Study Guide and Intervention

### Areas of Trapezoids, Rhombi, and Kites

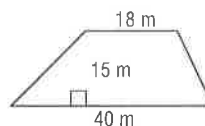
**Areas of Trapezoids** A trapezoid is a quadrilateral with exactly one pair of parallel sides, called bases. The **height of a trapezoid** is the perpendicular distance between the bases. The area of a trapezoid is the product of one half the height and the sum of the lengths of the bases.

<b>Area of a Trapezoid</b>	If a trapezoid has an area of $A$ square units, bases of $b_1$ and $b_2$ units, and a height of $h$ units, then $A = \frac{1}{2}h(b_1 + b_2)$
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**Example** Find the area of the trapezoid.

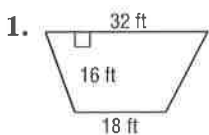
$$\begin{aligned}
 A &= \frac{1}{2}h(b_1 + b_2) && \text{Area of a trapezoid} \\
 &= \frac{1}{2}(15)(18 + 40) && h = 15, b_1 = 18, \text{ and } b_2 = 40 \\
 &= 435 && \text{Simplify.}
 \end{aligned}$$



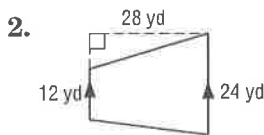
The area of the trapezoid is 435 square meters.

### Exercises

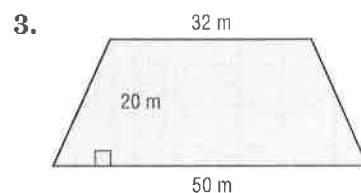
Find the area of each trapezoid.



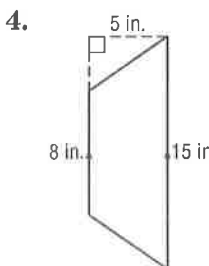
**400 ft<sup>2</sup>**



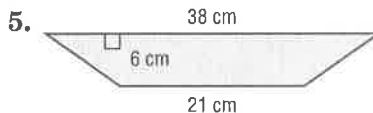
**504 yd<sup>2</sup>**



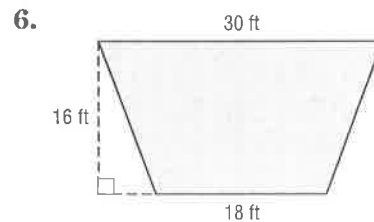
**820 m<sup>2</sup>**



**57.5 in<sup>2</sup>**



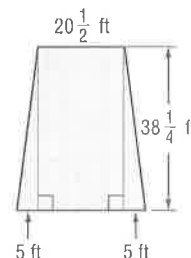
**177 cm<sup>2</sup>**



**384 ft<sup>2</sup>**

7. **OPEN ENDED** Ryan runs a landscaping business. A new customer has a trapezoidal shaped backyard, shown at the right. How many square feet of grass will Ryan have to mow?

**975  $\frac{3}{8}$  ft<sup>2</sup>**

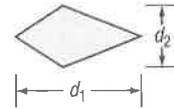
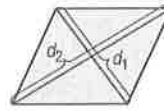


## 11-2 Study Guide and Intervention *(continued)*

### Areas of Trapezoids, Rhombi, and Kites

**Areas of Rhombi and Kites** A rhombus is a parallelogram with all four sides congruent. A kite is a quadrilateral with exactly two pairs of consecutive sides congruent.

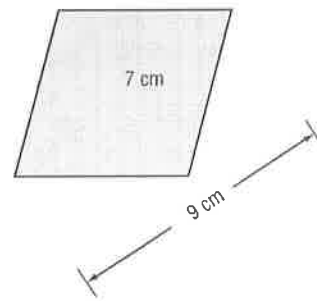
<p><b>Area of Rhombus or Kite</b></p>	<p>If a rhombus or kite has an area of <math>A</math> square units, and diagonals of <math>d_1</math> and <math>d_2</math> units, then <math>A = \frac{1}{2} d_1 \cdot d_2</math>.</p>
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**Example** Find the area of the rhombus.

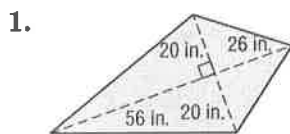
$$\begin{aligned}
 A &= \frac{1}{2} d_1 d_2 && \text{Area of rhombus} \\
 &= \frac{1}{2} (7)(9) && d_1 = 7, \text{ and } d_2 = 9 \\
 &= 31.5 && \text{Simplify.}
 \end{aligned}$$

The area is 31.5 square meters.



### Exercises

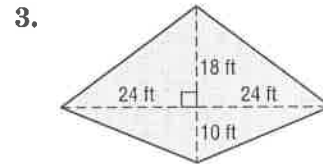
Find the area of each rhombus or kite.



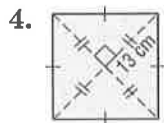
**1640 in<sup>2</sup>**



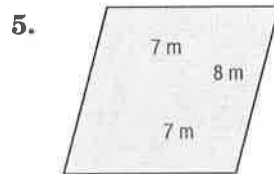
**400 cm<sup>2</sup>**



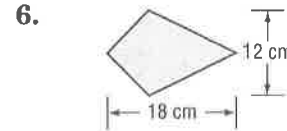
**672 ft<sup>2</sup>**



**338 cm<sup>2</sup>**



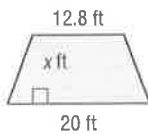
**112 m<sup>2</sup>**



**108 cm<sup>2</sup>**

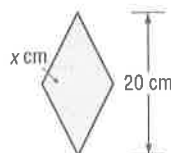
**ALGEBRA** Find  $x$ .

7.  $A = 164 \text{ ft}^2$



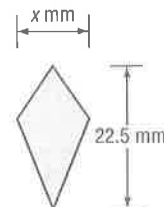
**$x = 10 \text{ ft}$**

8.  $A = 340 \text{ cm}^2$



**$x = 17 \text{ cm}$**

9.  $A = 247.5 \text{ mm}^2$



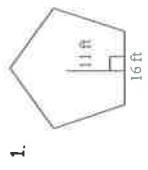
**$x = 22 \text{ mm}$**

# T11-3 Area of Reg Polygons Retake WS

ANSWERS T11-3

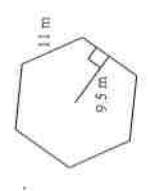
Geometry  
Worksheet: Area of Regular Polygons

Name: key Date: \_\_\_\_\_ Period: \_\_\_\_\_



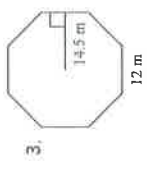
1.  $440 \text{ ft}^2$

Formula:  $A = \frac{sna}{2}$   
 $A = \frac{16 \cdot 5 \cdot 11}{2}$



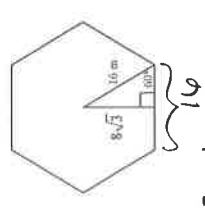
2.  $313.5 \text{ m}^2$

Formula:  $A = \frac{11 \cdot 6 \cdot 9.5}{2}$



3.  $A = 696 \text{ m}^2$

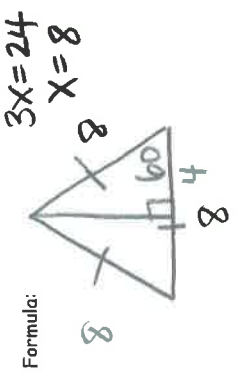
Formula:  $A = \frac{12 \cdot 8 \cdot (14.5)}{2}$



Formula:  $A = \frac{16 \cdot 6 \cdot (8\sqrt{3})}{2}$

$96\sqrt{3} \approx 301.6 \text{ m}^2$

5. Find the area of an equilateral triangle with a perimeter of 24 in.



$4\sqrt{3} \approx 6.9$

6. A regular pentagon has side lengths of 10 cm and an apothem 7 cm in length. What is the area of the pentagon?

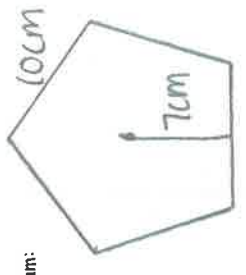


Diagram: \_\_\_\_\_  
 Formula:  $A = \frac{10 \cdot 5 \cdot 7}{2}$   
 $= 175 \text{ cm}^2$

7. A regular nonagon has side lengths 4 cm and an apothem of 5.49 cm. What is the area of this polygon to the nearest tenth of a square centimeter?

Diagram: \_\_\_\_\_  
 Formula:  $A = \frac{4 \cdot 9 \cdot (5.49)}{2}$   
 $= 98.8 \text{ cm}^2$

8. A regular decagon has a perimeter of 150 in. and an apothem of 23.1. What is the area of this polygon to the nearest tenth of a square inch?

Formula:

$$A = \frac{150 \cdot 10 \cdot (23.1)}{2} = 1732.5 \text{ in}^2$$

Diagram:

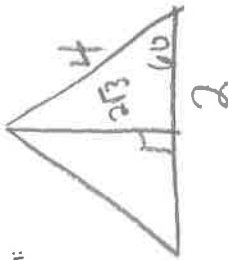
$$\frac{150}{10} = 15$$

9. What is the area of a regular triangle with sides of length 4?

Formula:

$$A = \frac{1}{2}(2)(2\sqrt{3}) = 2\sqrt{3} \text{ in}^2 \approx 2.8 \text{ in}^2$$

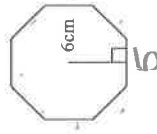
Diagram:



10. Find the perimeter of a regular octagon with an apothem of 6cm and area of 120cm<sup>2</sup>.

Formula:

$$120 = \frac{X \cdot 8 \cdot 6}{2} \quad X = 5$$



$$P = 8s = 5(8) = 40 \text{ cm}$$

11. A lawn is shaped like a parallelogram with a base of 30 feet and a height of 12 feet. Covering the lawn with grass will cost \$2.60 per square foot. How much money will it cost to cover the lawn with grass?

Formula:

$$A = b \cdot h$$

$$A = 30(12)$$

$$A = 360$$

Diagram:



$$360(2.6) = \$936.00$$

12. Jake's square backyard covers an area of 104 square meters. How can Jake best determine the length of each side of his backyard?

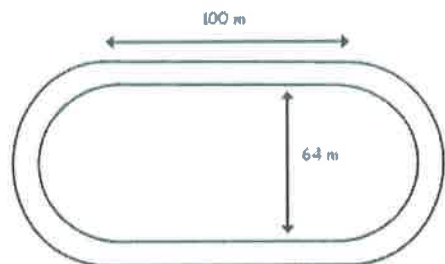
- F. Divide the area by the number of sides  
 G. Square the area  
 H. Find the square root of the area  
 J. Divide the area in half

$$\sqrt{104} \approx 10.2$$



Answers

4. Here is a diagram of the track King's is thinking of adding around the new field. It consists of two parallel lines and a semicircle at each end. The track is 10 meters wide.



a) If someone runs one lap on the inside of the track, how far will they have run?

b) If someone runs one lap on the outside of the track, how far will they have run?

c) Find the difference between the distances of running on the inside or outside of the track.

T11-4

**Answers:**

1) a)  $104 \text{ m}^2$  b)  $174 \text{ m}^2$  c)  $321.5 \text{ cm}^2$  d)  $20 \text{ m}^2$  e)  $370 \text{ mm}^2$  f)  $30.3 \text{ cm}^2$

2) a) 52 m b) 28.9 cm c) 54 m d) 24.4 cm

3) a) 62.5 m b)  $232 \text{ m}^2$

4) a) 401.1 m b) 463.9 m c) 62.8 m