Lesson 1 Homework Practice

Area of Parallelograms

Find the area of each parallelogram.

1. [Diagram of a parallelogram with grid]
2. [Diagram of a parallelogram with grid]
3. [Diagram of a parallelogram with labeled dimensions]

4. [Diagram of a parallelogram with labeled dimensions]
5. [Diagram of a parallelogram with labeled dimensions]
6. [Diagram of a parallelogram with labeled dimensions]

Find the area of the shaded region in each figure.

7. [Diagram of a parallelogram with shaded region labeled]
8. [Diagram of a parallelogram with shaded region labeled]

9. Find the base of a parallelogram with height $6\frac{5}{8}$ feet and area $26\frac{1}{2}$ square feet.

10. Find the height of a parallelogram with base 9.44 meters and area 70.8 square meters.

11. **FLAGS** Find the area of the shaded region of the flag of the Republic of the Congo.

12. **GARDENING** Liam is preparing a 78 square foot plot for a garden. The plot will be in the shape of a parallelogram that has a height of 6 feet. What will be the length of the base of the parallelogram? Explain your reasoning.
Lesson 1 Skills Practice

Area of Parallelograms

Find the area of each parallelogram.

1. 

2. 

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12. 

13. Find the base of a parallelogram with an area of 18 square inches and a height of 2 inches.

14. Find the height of a parallelogram with an area of 63 square yards and base 9 yards.

15. Find the height of a parallelogram with an area of 41 square meters and base 8.2 meters.
Lesson 1 Extra Practice

Area of Parallelograms

Find the area of each parallelogram.

1. \[ \text{base} = 3 \text{ ft}, \text{height} = 7 \text{ ft} \]

2. \[ \text{base} = 34 \text{ cm}, \text{height} = 40 \text{ cm} \]

3. \[ \text{base} = 4.7 \text{ m}, \text{height} = 5.6 \text{ m} \]

4. \[ \text{base} = 40 \text{ in.}, \text{height} = 73 \text{ in.} \]

5. \[ \text{base} = 23\frac{1}{4} \text{ in.}, \text{height} = 50\frac{1}{2} \text{ in.} \]

6. \[ \text{base} = 3 \text{ mm}, \text{height} = 9 \text{ mm} \]

Find the missing measure of each parallelogram.

7. base, 7 m  
   area, 49 m²

8. base, 20 ft  
   area, 120 ft²

9. height, 3 mm  
   area, 13.5 mm²

10. height, 5.6 yd  
    area, 13.44 yd²
Lesson 1 Problem-Solving Practice

Area of Parallelograms

1. SUNFLOWERS  Manu is a sunflower farmer. His farm is in the shape of a parallelogram with a height measuring 3.5 kilometers and a base measuring 4.25 kilometers. What is the total land area Manu uses?

2. VOLLEYBALL  Tara and Veronica are in charge of making a banner for the volleyball game this Saturday. How much poster paper will they need for a parallelogram-shaped banner with height $3\frac{1}{2}$ feet and base $6\frac{1}{4}$ feet?

3. FLAGS  Joseph is painting the flag of Brunei (a country in Southeast Asia) for a geography project at school. How many square inches will he cover with white paint?

4. FLAGS  Use the flag from Exercise 3. How many square inches will Joseph cover with black paint?

5. QUILTING  The pattern shows the dimensions of a quilting square that Nakida will use to make a quilt. How much blue fabric will she need? Explain how you found your answer.

6. QUILTING  Use the quilting pattern from Exercise 5. There are 18 square inches of pink fabric. Find the height and base of the parallelogram labeled pink.
You Can Count On It!

How many triangles are there in the figure at the right? How many parallelograms?

When counting shapes in a figure like this, you usually have to think of different sizes.

There are four small triangles. There is one large triangle. There are five triangles in all.

You also have to think of different positions.

There are three parallelograms in all.

1. Now it's your turn. How many triangles are in the figure below? How many parallelograms? Use the space at the right to organize your counting.

2. A trapezoid is a quadrilateral with only one pair of sides parallel, as shown at the right. How many trapezoids are in the figure in Exercise 1?

3. **CHALLENGE** How many triangles, parallelograms, and trapezoids are in the figure at the right?
Lesson 2 Homework Practice

Area of Triangles

Find the area of each triangle.

1. [Triangle grid]

2. [Triangle grid]

3. [Triangle with dimensions 12 mm and 10 mm]

4. [Triangle with dimensions 14 in. and 34 in.]

5. [Triangle with dimensions 9 1/2 yd and 19 1/4 yd]

6. [Triangle with dimensions 4.9 m and 23.7 m]

Find the missing dimension.

7. height: 15 ft
   area: 285 ft²

8. base: 17 cm
   area: 18.7 cm²

9. height: 12 1/4 in.
   area: 128 5/8 in²

10. PENNANT Tameeka is in charge of designing a school pennant for spirit week. She wants the base to be 3 1/2 feet and the height to be 6 1/2 feet. She has 20 square feet of paper available. Does she have enough paper? Explain.

11. FLAGS What is the area of the triangle on the flag of Bosnia and Herzegovina?

12. MURALS Aubrey is painting a mural of an ocean scene. The triangular sail on a sailboat has a base of 4 feet and a height of 6 feet. Aubrey will paint the sail using a special white paint. A can of this paint covers 10 square feet. How many cans of white paint will Aubrey need?
Lesson 2 Skills Practice

Area of Triangles

Find the area of each triangle.

1. \[ \text{base: } 4 \text{ in. } \quad \text{area: } 22 \text{ in}^2 \]

2. \[ \text{base: } 5 \text{ in. } \quad \text{area: } 2.5 \text{ in}^2 \]

3. \[ \text{base: } 5 \text{ ft } \quad \text{area: } \frac{5}{6} \text{ ft}^2 \]

Find the missing dimension.

13. base: 4 in.  
   area: 22 in\(^2\) 

14. height: 1 yd  
   area: 2.5 yd\(^2\) 

15. base: 5 ft  
   area: \(\frac{5}{6}\) ft\(^2\)
Lesson 2 Extra Practice

Area of Triangles

Find the area of each triangle.

1. \[ \frac{1}{2} \times 22 \text{ cm} \times 3 \text{ cm} = 33 \text{ cm}^2 \]

2. \[ \frac{1}{2} \times 18 \text{ m} \times 3 \text{ m} = 27 \text{ m}^2 \]

3. \[ \frac{1}{2} \times 2 \text{ ft} \times 8 \text{ ft} = 8.25 \text{ ft}^2 \]

4. \[ \frac{1}{2} \times 25 \text{ m} \times 24.6 \text{ m} = 315 \text{ m}^2 \]

5. \[ \frac{1}{2} \times 14 \text{ yd} \times 21 \text{ yd} = 147 \text{ yd}^2 \]

6. \[ \frac{1}{2} \times 4 \text{ mm} \times 3.5 \text{ mm} = 7 \text{ mm}^2 \]

Find the missing measure of each triangle.

7. \( \text{base}, 6 \text{ ft} \)
   \( \text{area}, 9 \text{ ft}^2 \)

8. \( \text{base}, 4 \text{ in.} \)
   \( \text{area}, 14 \text{ in}^2 \)

9. \( \text{height}, 7 \text{ m} \)
   \( \text{area}, 31.5 \text{ m}^2 \)

10. \( \text{height}, 16 \text{ cm} \)
    \( \text{area}, 104 \text{ cm}^2 \)
Lesson 2 Problem-Solving Practice

**Area of Triangles**

<table>
<thead>
<tr>
<th>1. CARPETING</th>
<th>Courtney wants to carpet part of her bedroom that is shaped like a right triangle with base 4.8 meters and height 5.2 meters. How much carpet will she need?</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. LAWN</td>
<td>Mrs. Giuntini’s lawn is triangle-shaped with a base of 25 feet and a height of 10 feet. What is the area of Mrs. Giuntini’s lawn? Explain how you found your answer.</td>
</tr>
<tr>
<td>3. BUILDING</td>
<td>Norma has an A-frame cabin. The back is shown below. How many square feet of paint will she need to cover the back of the cabin?</td>
</tr>
<tr>
<td>4. SNACKS</td>
<td>The dough that will be used to make a crescent roll is shown below. What is the area of the dough? Explain how you found your answer.</td>
</tr>
<tr>
<td>5. SAILING</td>
<td>Ahmad just bought a used sailboat with two sails that need replacing. How much sail fabric will Ahmad need if he replaces sail A?</td>
</tr>
<tr>
<td>6. SAILING</td>
<td>Use the picture from Exercise 5. The previous owner recalled that the area of sail B was 108 square feet. What is the length of the base of sail B?</td>
</tr>
</tbody>
</table>
Heron’s Formula

A formula named after Heron of Alexandria, Egypt, can be used to find the area of a triangle given the lengths of its sides.

Heron’s formula states that the area \( A \) of a triangle whose sides measure \( a, b, \) and \( c \) is given by

\[
A = \sqrt{s(s-a)(s-b)(s-c)},
\]

where \( s \) is the semiperimeter:

\[
s = \frac{a + b + c}{2}.
\]

Estimate the area of each triangle by finding the mean of the inner and outer measures. Then use Heron’s Formula to compute a more exact area. Give each answer to the nearest tenth of a square unit.

1. Estimated area:
   Computed area:

2. Estimated area:
   Computed area:

3. Estimated area:
   Computed area:

4. Estimated area:
   Computed area:

5. Estimated area:
   Computed area:

6. Estimated area:
   Computed area:
Lesson 3 Homework Practice

Area of Trapezoids

Find the area of each figure. Round to the nearest tenth if necessary.

1.  
   ![](figure1)
   
   \[ \frac{1}{2} \times (7 + 11) \times 7 = \frac{1}{2} \times 18 \times 7 = 63 \text{ ft}^2 \]

2.  
   ![](figure2)
   
   \[ \frac{1}{2} \times (6 + 7.5) \times 5 = \frac{1}{2} \times 13.5 \times 5 = 33.75 \text{ in}^2 \]

3.  
   ![](figure3)
   
   \[ \frac{1}{2} \times (4 + 6.3) \times 3.6 = \frac{1}{2} \times 10.3 \times 3.6 = 18.54 \text{ m}^2 \]

4.  
   ![](figure4)
   
   \[ \frac{1}{2} \times (12 + 14.3) \times 9 = \frac{1}{2} \times 26.3 \times 9 = 113.95 \text{ cm}^2 \]

5.  
   ![](figure5)
   
   \[ \frac{1}{2} \times (5 + 4) \times 9 = \frac{1}{2} \times 9 \times 9 = 40.5 \text{ yd}^2 \]

6.  
   ![](figure6)
   
   \[ \frac{1}{2} \times (7 + 10.1) \times 8 = \frac{1}{2} \times 17.1 \times 8 = 68.4 \text{ mm}^2 \]

7. GEOGRAPHY The shape of Arkansas is roughly trapezoidal with bases of 475 kilometers and 300 kilometers and a height of 400 kilometers. What is the approximate area of Arkansas?

   \[ \frac{1}{2} \times (475 + 300) \times 400 = \frac{1}{2} \times 775 \times 400 = 155,000 \text{ km}^2 \]

8. Find the area of the figure. It is formed by two congruent trapezoids.

   \[ \frac{1}{2} \times (9 + 3) \times 8 = \frac{1}{2} \times 12 \times 8 = 48 \text{ m}^2 \]

Draw and label each figure. Then find the area.

9. a trapezoid with a right angle and an area greater than 50 square feet

   \[ \frac{1}{2} \times (9 + 3) \times 8 = \frac{1}{2} \times 12 \times 8 = 48 \text{ m}^2 \]

10. a trapezoid with no right angles and an area greater than 75 square meters

   \[ \frac{1}{2} \times (9 + 3) \times 8 = \frac{1}{2} \times 12 \times 8 = 48 \text{ m}^2 \]
Lesson 3 Skills Practice

Area of Trapezoids

Find the area of each figure. Round to the nearest tenth if necessary.

1. \[\text{Area} = \frac{(10 + 12) \times 9}{2} = 108 \text{ cm}^2\]

2. \[\text{Area} = \frac{(1.5 + 3) \times 2}{2} = 3.0 \text{ ft}^2\]

3. \[\text{Area} = \frac{(12 + 18) \times 10}{2} = 150 \text{ mm}^2\]

4. \[\text{Area} = \frac{(3 + 6.5) \times 4}{2} = 20.5 \text{ ft}^2\]

5. \[\text{Area} = \frac{(9.2 + 2) \times 7}{2} = 38.9 \text{ cm}^2\]

6. \[\text{Area} = \frac{24 \times 8}{2} = 96 \text{ mm}^2\]

7. \[\text{Area} = \frac{(20.1 + 12) \times 25}{2} = 291.3 \text{ ft}^2\]

8. \[\text{Area} = \frac{(3.2 + 6.9) \times 5.6}{2} = 23.35 \text{ in.}^2\]

9. \[\text{Area} = \frac{(4.5 + 12.2) \times 7.5}{2} = 51.125 \text{ cm}^2\]

10. \[\text{Area} = \frac{15.3 \times 3.8}{2} = 29.49 \text{ mm}^2\]

11. trapezoid: bases 22.8 mm and 19.7 mm, height 36 mm
12. trapezoid: bases 5 ft and 3.5 ft, height 7 ft
13. DESKS What is the area of the top of the desk shown at right?
Lesson 3 Extra Practice

Area of Trapezoids

Find the area of each trapezoid.

1. \( \text{Area} = \frac{1}{2} \times (12 + 18) \times 24 \)

2. \( \text{Area} = \frac{1}{2} \times (14 + 20) \times 14 \)

3. \( \text{Area} = \frac{1}{2} \times (4 + 6) \times 3 \)

4. \( \text{Area} = \frac{1}{2} \times (8 + 10) \times 6 \)

5. \( \text{Area} = \frac{1}{2} \times (13 + 11) \times 17 \)

6. \( \text{Area} = \frac{1}{2} \times (24 + 20) \times 30 \)

7. A trapezoid has an area of 13.5 square inches. If the bases are 3 inches and 6 inches, what is the height of the trapezoid?

8. A trapezoid has an area of 95 square meters. If the bases are 7 meters and 12 meters, what is the height of the trapezoid?

9. A trapezoid has an area of 329 square feet. If the bases are 30 feet and 17 feet, what is the height of the trapezoid?
**Lesson 3 Problem-Solving Practice**

### Area of Trapezoids

1. **GEOGRAPHY** Missouri has a shape that is similar to a trapezoid with bases of about 198 miles and 276 miles and a height of about 270 miles. Estimate the area of the state.

2. **PATIOS** Greta is making a patio with the dimensions given in the figure. What is the area of the patio?

3. **FLAGS** Malila wants to make the International Marine Signal flag shown. What is the area of the flag?

4. **SIGNS** Ciro made a sign in the shape of a trapezoid. The parallel sides measured 18 inches and 35 inches. The distance between these sides was 19 inches. What was the area of Ciro’s sign?

5. **TRAY** A tray in a school cafeteria has the dimensions shown. Find the area of the tray.

6. **GARDENING** Kinu wants to buy topsoil for a section of her garden that has the dimensions shown in the figure. Each bag covers 2 square yards. How many bags of topsoil should Kinu buy?
Trapped in a Trapezoid

Ants are very strong for their size. (Some ants can carry 50 times their own body weight.) Suppose that an ant is trapped inside a trapezoid with the dimensions shown below.

The area of the trapezoid is ________.

The ant can change the dimensions by pushing on the sides of the trapezoid. This will have an effect on the area.

1. Suppose the ant pushes the left side of the trapezoid so that the length of the top base doubles. Draw the figure and find its area.

2. Determine how the area would be different if the ant changed the trapezoid so that the length of the bottom base doubled instead.

3. Suppose the ant only pushes along the bases so that the height doubles, while the lengths of the bases remain unchanged. What would be the area of the trapezoid?

4. Suppose the ant triples one of the dimensions so that the area of the new trapezoid is 110 square inches. Which dimension would this be?

5. Suppose the ant doubles one dimension and triples another so that the area of the new trapezoid is 180 square inches. Tell which dimensions changed, and by what amount.
Homework Practice

Problem-Solving Investigation: Draw a Diagram

Use the draw a diagram strategy to solve Exercises 1 and 2.

1. QUILTING Ms. Mosely is sewing together blocks of fabric in a pattern of small squares and triangles to make a quilt that is 3 feet square. How many small squares will she need? How many small triangles will she need?

2. DISPLAY Anaba is stacking cereal boxes in a pyramid-shaped display. The bottom layer has 10 boxes. There are two fewer boxes in each layer than the layer below. How many boxes are in the display?

Use any strategy to solve Exercises 3–6.

3. PATTERNS Draw the next figure.

4. ART Kris folded a piece of construction paper into thirds and then in half. He punched a hole through all layers. How many holes will there be when he unfolds the paper?

5. LOANS Mr. Kartini bought a boat on credit. His loan, including interest, is $9,860. If he makes monthly payments of $85, how many years will it take him to pay off the loan?

6. MUSIC Refer to the graph. How many fewer girls took band class in 2010 than in 2009?
Skills Practice

Problem-Solving Investigation: Draw a Diagram

Use the draw a diagram strategy to solve.

1. PATIO Jarnail has 24 square brick pavers to arrange for a small patio to place his grill. He wants to place them in a rectangular shape with the least perimeter possible. How many bricks will be in each row?

2. CRAFTS Nyah is making a collage of her friend’s school pictures on a poster board. Each picture is 2 inches by 3 inches and the poster board is 8 inches by 16 inches. What are the most pictures that Nyah can fit on the poster board if none of them overlap and all the pictures are facing the same direction?

3. BOOKS A bookstore arranges its best-seller books in the front window. In how many different ways can four best-seller books be arranged in a row?

4. BASEBALLS A sports store owner is making a display with 200 baseballs. He is placing them in the shape of a square pyramid. The bottom layer has 64 baseballs placed in the shape of a square. For each consecutive layer of baseballs, one baseball is placed where 4 baseballs meet. How many layers will be in the pyramid? How many baseballs will be left over?
### Problem-Solving Practice

**Problem-Solving Investigation: Draw a Diagram**

1. **VIDEO GAMES** The table shows the prices of 4 different video games. If Jaleesa got $50 for her birthday and she wants to buy 2 video games with the money, what are two possible games she can buy?

<table>
<thead>
<tr>
<th>Video Game Prices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Super Hero</td>
</tr>
<tr>
<td>$24.60</td>
</tr>
<tr>
<td>Princess Castle</td>
</tr>
<tr>
<td>$32.20</td>
</tr>
<tr>
<td>Batter-Up Baseball</td>
</tr>
<tr>
<td>$18.75</td>
</tr>
<tr>
<td>Money for Nothing</td>
</tr>
<tr>
<td>$28.50</td>
</tr>
</tbody>
</table>

2. **ROLLER COASTERS** The list below shows how many roller coaster rides 20 kids rode at an amusement park.

```
5 10 0 12 8 7 2 6 1 4
0 6 3 11 5 9 13 8 14 3
```

How many more kids rode roller coasters 5 to 9 times than 10 to 14 times?

3. **SHOPPING** How many hats can be purchased with $90 if the hats can only be bought in pairs?

![Hat Image]

2 for $18.50

4. **MONEY** Lorenzo bought a CD player for $9 less than the regular price. If he paid $32, what was the regular price?

5. **MONEY** Brady collected $2 from each student to buy a gift for their teacher. If 27 people contributed, how much money was collected?

6. **GEOMETRY** Hai’s math problem requires her to draw a rectangle with an area of 60 square units and a perimeter between 30 and 40 units. List three possibilities Hai can use for the dimensions.
Lesson 4 Homework Practice

Changes in Dimension

Refer to the figures at the right for Exercises 1–4. Justify your answers.

1. Describe the change in the perimeter from Figure A to Figure B.

![Figure A](image1)

![Figure B](image2)

2. Describe the change in the area from Figure A to Figure B.

![Figure C](image3)

![Figure D](image4)

3. Describe the change in the perimeter from Figure C to Figure D.

4. Describe the change in the area from Figure C to Figure D.

5. A photo album contains small and large photographs. Each large photograph has side lengths that are twice the side lengths of each small photograph. The area of each small photograph is 24 square inches. What is the area of each large photograph? Explain.
Lesson 4 Skills Practice

Changes in Dimension

For Exercises 1 and 2, each side length in the figure at the right is doubled. Justify your answers.

1. Describe the change in the perimeter.

2. Describe the change in the area.

For Exercises 3 and 4, each side length in the figure at the right is multiplied by 5. Justify your answers.

3. Describe the change in the perimeter.

4. Describe the change in the area.

5. A photo album contains small and large photographs. Each large photograph has side lengths that are twice the side lengths of each small photograph. The area of each small photograph is 24 square inches. What is the area of each large photograph? Explain.
Lesson 4 Extra Practice

Changes in Dimension

1. Each side length of the rectangle at the right is multiplied by 3. Describe the change in the perimeter. Justify your answer.

2. The base and height of the triangle at the right is multiplied by 4. Describe the change in the area. Justify your answer.

3. Each side length of the parallelogram at the right is multiplied by $\frac{1}{2}$. Describe the change in the area. Justify your answer.

4. Different sizes of triangles are used in a company logo. Each small triangle has a base length of 4 inches and an area of 22 square inches. Each large triangle has a base length of 8 inches. What is the area of each large triangle?
Lesson 4 Problem-Solving Practice

Changes in Dimension

Solve.

1. A classroom bulletin board in the shape of a regular hexagon is shown below. The dimensions of a hallway bulletin board are tripled. What is the perimeter of the hallway bulletin board?

   ![Hexagon Diagram](2 ft)

2. Refer to Exercise 1. Suppose the classroom bulletin board has an area of about 10.75 square feet. What is the approximate area of the hallway bulletin board?

3. Mrs. Willis is making a dress from fabric with two different sizes of squares. A side of the larger square is twice the length of a side of the smaller square. What is the perimeter of the larger square if the perimeter of the smaller square is 32 centimeters?

4. Refer to Exercise 3. Suppose the area of the larger square is 100 square centimeters. What is the area of the smaller square?

5. A design for a triangular-shaped T-shirt logo has dimensions $\frac{1}{3}$ the size of the T-shirt logo. The sides of the T-shirt logo are 6 inches, 12 inches, and 15 inches. What is the perimeter of the design?

6. Refer to Exercise 5. Suppose the area of the T-shirt logo is about 34.2 square inches. What is the approximate area of the design?
Volumes of Similar Solids

If two figures are similar with a scale factor of \( \frac{a}{b} \), then the perimeters of the two figures have a ratio of \( \frac{a}{b} \). If two figures are similar with a scale factor of \( \frac{a}{b} \), then the areas of the two figures have a ratio of \( \left( \frac{a}{b} \right)^2 \).

What about the ratio of volumes of similar solids?
The volume of the first rectangular prism shown is 2 inches \( \times \) 3 inches \( \times \) 4 inches = 24 cubic inches.
The volume of the second rectangular prism is 4 inches \( \times \) 6 inches \( \times \) 8 inches = 192 cubic inches.

The lengths of the sides of the second rectangular solid are twice those of the first rectangular solid and the volume of the second rectangular solid is 8 times that of the first rectangular solid.
The scale factor of the first rectangular solid to the second rectangular solid is \( \frac{1}{2} \) and the volume of the first rectangular solid to the second rectangular solid is \( \frac{1}{8} \), which is the scale factor cubed, \( \left( \frac{1}{2} \right)^3 = \frac{1}{8} \).

Exercises

1. Draw a rectangular solid that is similar to the one shown that has a scale factor of \( \frac{1}{3} \). Label the dimensions. Find the volume of the larger rectangular solid.

2. The lengths of the sides of two similar solids have a scale factor of \( \frac{2}{3} \). Find the ratio of the volumes of the two solids.

3. Chad found the volume of two similar solids to be in the ratio \( \frac{8}{125} \). Find the scale factor of the lengths of the sides.
Lesson 5 Homework Practice

Polygons on the Coordinate Plane

Graph each figure and classify it. Then find the area.

1. \(A(3, 6), B(9, 3), C(5, 3)\)

2. \(D(-1, -1), E(-1, 3), F(2, 4), G(2, -3)\)

Graph each rectangle with the given vertices. Then find the perimeter of each rectangle.

3. \(H(3, 0), I(3, 7), J(6, 7), K(6, 0)\)

4. \(L(-3, -2), M(-3, 2), N(2, 2), O(2, -2)\)

5. PARKS Anika is hiking on a rectangular trail at the national park. There are four resting spots along the corners of the trail. On the map, they are marked with coordinates of \((-2, 2), (1, 2), (1, -2),\) and \((-2, -2)\). If each unit represents 1 mile, find the perimeter of the trail in miles, using the coordinates
Lesson 5 Skills Practice

Polygons on the Coordinate Plane

Use the coordinates to find the length of each side of the rectangle. Then find the perimeter.

1. $E(1,7), F(3,7), G(3,4), H(1,4)$
2. $W(2,7), X(2,0), Y(6,0), Z(6,7)$

Find the area of each figure in square units.

3. 
4. 
5. 
6.
Lesson 5 Extra Practice

*Polygons on the Coordinate Plane*

Use the coordinates to find the length of each side of the rectangle. Then find the perimeter.

1. \( A(3, 4), B(7, 4), C(7, 1), D(3, 1) \)
2. \( R(1, 8), S(7, 8), T(7, 5), U(1, 5) \)

Find the area of each figure in square units.

3. \( 35 \) square units
4. \( 34 \) square units

Graph each figure and classify it. Then find the area.

5. \( A(-4, 4), B(2, 1), C(2, -1), D(-4, -1) \)
6. \( M(-2, 2), N(4, 2), P(4, 0) \)
Lesson 5 Problem-Solving Practice

**Polygons on the Coordinate Plane**

Solve.

| 1. Mrs. Palmer is placing a retaining wall around a garden. The coordinates of the vertices of the garden are (1, 1), (1, 5), (6, 5), and (1, 6). If each grid square has a length of 2 feet, find the perimeter of the garden. |
| 2. Melinda is building a rectangular border around her bedroom window. The coordinates of the vertices of the border are (2, 3), (4, 3), (4, 7), and (2, 7). Each grid square has a length of 12 inches. Find the perimeter of the rectangle. |
| 3. David is spreading mulch on a triangular area of his flower bed. The coordinates of the vertices of the area are (1, 3), (9, 3), and (4, 6). What is the area of the triangle if each square has an area of 3 square feet? |
| 4. The Clayton family’s pool has vertices at the coordinates (0, 2), (0, 5), (2, 5), (2, 6), (5, 6), (5, 1), (2, 1), and (2, 2). If each grid square has an area of 9 square feet, what is the area of the pool? |
| 5. Janice is creating a scrapbook page with vertices (2, 1), (7, 1), (7, 7), and (2, 7). What is the area of the page she will be covering if each grid represents 4 square inches? |
| 6. Refer to Exercise 5. What is the perimeter of the page she is creating if each grid square has a length of 2 inches? |
Getting From Here to There

At the right, you see a rectangle on a grid of squares. The rectangle is 4 units wide and 7 units long. The diagonal path of this rectangle crosses 10 squares of the grid.

For each rectangle, record the width, the length, and the diagonal path.

1. 
2. 
3. 
4. 

5. Refer to your answers to Exercises 1–4. What is the pattern?

Now record the width, length, and diagonal path for each of these rectangles.

6. 
7. 
8. 

9. Refer to your answers to Exercises 6–8. Does the pattern that you found in Exercise 5 still hold?

10. What is the difference between the rectangles in Exercises 1–4 and the rectangles in Exercises 6–8?

Predict the diagonal path for each rectangle.

11. 4 units by 9 units
12. 10 units by 21 units
13. 20 units by 30 units
14. 20 units by 24 units
Lesson 6 Homework Practice

Area of Composite Figures

Find the area of each figure. Round to the nearest tenth if necessary.

1. \[ \text{Area} = \frac{1}{2} \times \text{base} \times \text{height} \]
   \[ \text{Area} = \frac{1}{2} \times 4 \text{ in.} \times 6 \text{ in.} \]
   \[ \text{Area} = 12 \text{ sq. in.} \]

2. \[ \text{Area} = \text{length} \times \text{width} \]
   \[ \text{Area} = 6 \text{ ft} \times 8 \text{ ft} \]
   \[ \text{Area} = 48 \text{ sq. ft.} \]

3. \[ \text{Area} = \frac{1}{2} \times \text{base} \times \text{height} \]
   \[ \text{Area} = \frac{1}{2} \times 9.3 \text{ mm} \times 7.8 \text{ mm} \]
   \[ \text{Area} = 35.97 \text{ sq. mm} \]

4. \[ \text{Area} = \text{length} \times \text{width} \]
   \[ \text{Area} = 12 \text{ yd} \times 10 \text{ yd} \]
   \[ \text{Area} = 120 \text{ sq. yd.} \]

5. \[ \text{Area} = \text{length} \times \text{width} \]
   \[ \text{Area} = 12 \text{ cm} \times 9 \text{ cm} \]
   \[ \text{Area} = 108 \text{ sq. cm} \]

6. \[ \text{Area} = \text{length} \times \text{width} \]
   \[ \text{Area} = 6.5 \text{ m} \times 3.2 \text{ m} \]
   \[ \text{Area} = 20.8 \text{ sq. m} \]

In each diagram below, one square unit represents 5 square meters. Find the area of each figure.

7. \[ \text{Area} = 25 \times 5 \]
   \[ \text{Area} = 125 \text{ sq. m} \]

8. \[ \text{Area} = 40 \times 5 \]
   \[ \text{Area} = 200 \text{ sq. m} \]

9. **AUDITORIUM** The diagram at the right gives the dimensions of an auditorium. If new carpet is needed for the auditorium, what will be the area of the carpet? Round to the nearest square yard.

   \[ \text{Area} = 65 \times 55 \]
   \[ \text{Area} = 3,575 \text{ sq. yd.} \]

10. **SIDING** Use the diagram that shows one end of a cottage.
    
    a. Each end of the cottage needs new siding. Find the total area that needs new siding.
    
    b. The siding material costs $75 for a bundle of siding that covers an area of 100 square feet. What will be the total cost to put siding on both ends of the cottage? Justify your answer.

    \[ \text{Area} = 28 \times 12.5 \]
    \[ \text{Area} = 350 \text{ sq. ft.} \]
    
    \[ \text{Cost} = \frac{\text{Area}}{100} \times 75 \]
    \[ \text{Cost} = \frac{350}{100} \times 75 \]
    \[ \text{Cost} = 3 \times 75 \]
    \[ \text{Cost} = 225 \text{ dollars} \]
Lesson 6 Skills Practice

Area of Composite Figures

Find the area of each figure. Round to the nearest tenth if necessary.

1. 

2. 

3. 

4. 

5. 

6. 

7. 

8. 

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Lesson 6 Extra Practice

Area of Composite Figures

Find the area of each figure. Round to the nearest tenth if necessary.

1. \[ \text{Area} = \frac{1}{2} \times 8 \times 16 + 8 \times 3 = 64 + 24 = 88 \text{ ft}^2 \]

2. \[ \text{Area} = 12 \times 12 - 4 \times 4 = 144 - 16 = 128 \text{ m}^2 \]

3. \[ \text{Area} = 10 \times 25 + 20 \times 5 + 20 \times 15 = 250 + 100 + 300 = 650 \text{ in}^2 \]

4. \[ \text{Area} = 42 \times 8 - 7 \times 14 - 4 \times 8 - 7 \times 14 = 336 - 98 - 32 - 98 = 158 \text{ cm}^2 \]

5. \[ \text{Area} = 8 \times 5.5 + 8 \times 3 = 44 + 24 = 68 \text{ ft}^2 \]

6. \[ \text{Area} = 2.1 \times 4.8 + 6.4 \times 3.2 = 9.96 + 20.48 = 30.44 \text{ yd}^2 \]

7. \[ \text{Area} = 17 \times 9 + 8 \times 10 + 8 \times 5 = 153 + 80 + 40 = 273 \text{ ft}^2 \]

8. \[ \text{Area} = 20 \times 10 + 5 \times 10 + 5 \times 5 = 200 + 50 + 25 = 275 \text{ ft}^2 \]
Lesson 6 Problem-Solving Practice

Area of Composite Figures

ARCHITECTURE For Exercises 1–6 use Jaco’s preliminary design of his vacation house at the right. Round to the nearest tenth if necessary.

1. What type of figure is bedroom 1? Find the area of bedroom 1.

2. What is the area of the bedroom 2? What figures did you use to find the area?

3. What is the area of the bathroom? What are the dimensions of the figures you used to find this area?

4. What is the area of the living room? How many figures did you use to find this area?

5. What would the area of the den be if the semicircular window were removed and replaced with a flat window?

6. What is the area of the kitchen? If Jaco adds a rectangular cooking island in the middle of the kitchen with dimensions 6 feet by 4 feet, how many square feet of space will be left?
Extending the Pythagorean Theorem

The Pythagorean Theorem says that the sum of the areas of the two smaller shapes is equal to the area of the largest square. Show that the Pythagorean Theorem can be extended to include other shapes on the sides of a triangle. To do so, find the areas of the two smaller shapes. Then, check that their sum equals the area of the largest shape. Round each answer to the nearest tenth.

1. area of smallest shape:
   area of middle shape:
   area of largest shape:

2. area of smallest shape:
   area of middle shape:
   area of largest shape:

3. area of smallest shape:
   area of middle shape:
   area of largest shape:

4. area of smallest shape:
   area of middle shape:
   area of largest shape: