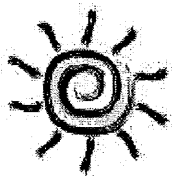


Welcome to Applied Geometry 2022-23



Attached is your summer assignment for next year's course. Please understand that this is not a punishment. In reality, it is an opportunity for you to review selected topics from Geometry you learned in middle school at which your next course assumes you are proficient. The best time to work through your summer assignment is in the second half of the summer so the material will be more fresh in your mind when you return at the end of August.

Your summer assignment:

- ☞ Read the lessons and do the worksheets as outlined in the assignment sheet on page 2. Please read carefully and **check the answers to the On Your Own problems so you know that you are on the right track**. Show marks on your work indicating if your answers were correct or incorrect. For two of the topics, there are websites with videos that can help reteach the material if you need extra assistance after you read through the lesson and sample problems.
- ☞ To get a new copy of this packet, go to nwr7.com, click on High School, then Academics, then Summer Assignments. Once you are on that page, find Applied Geometry. You should have a link to all the same items as in this packet.
- ☞ Make sure you use pencil for the worksheets; **ink will not be accepted! Show all your work!**
- ☞ Your summer assignment with the vocabulary will count for 4 homework checks and will be collected the first day of class.
- ☞ The **fourth day (or so...)** of school, you will have a test on the summer assignment material. It should be all review!!! Two class days is not enough time to re-teach the information in the packet. It is your responsibility to come to school on the first day with only the questions that you could not work out on your own.

For the first day of class:

- 📖 Have your **summer assignment in order**, stapled, and ready to turn in.
- 📖 Solely for Geometry, have a three-ring **binder ready** with 4 dividers, white lined paper and graph paper. A 1½" or 2" binder works well.
- 📖 Bring your **calculator (you cannot use your phone as a calculator!)**. We recommend the TI -84, TI-84 Plus or TI-83 (these are graphing calculators) or the TI 30-X IIS (a less expensive scientific calculator).
- 📖 Bring a protractor, a compass, a ruler, and your **pencils** (and one pen for corrections). You might consider purchasing a pouch to hold your tools, as well. We will be emailing a reminder letter with detailed info about supplies in August to help you get the materials you need.



Enjoy your summer, and make time for this important work that will get us off to a great start in August. Email one or both of us if you have any questions (jgalloway@nwr7.org or nsoundararajan@nwr7.org). We look forward to an awesome, rewarding school year with you!

Mrs. Galloway and Mrs. Soundararajan

June, 2022

Work to complete as you go through the packet:

Area of Rectangles and Triangles (Chapter 4.1-4.3 from Resource Book)

- Read “What You’ve Learned Before” (no page number) and 4.2 Lesson on pages 160-161. Complete the three Try It Yourself problems (area of rectangles) and the four On Your Own Questions within the lesson as you read.
- Check your answers to the seven Try It Yourself/On Your Own questions with the Selected Answers key at the back of this packet. If they are all correct, proceed to the Exercises. If not, reread the examples in the Lesson and rework the problem(s) you missed.
- If needed, watch the Math Antics Video, Area, at

<https://www.youtube.com/watch?v=xCdxURXMdFY&list=PLL1sM9z3kAF7xaKNyImN3RSEeTvWOK8le>

- Do the 4.1 Area of Rectangles Worksheet.
- Do the 4.2 Area of Triangles Matching Worksheet.
- Do the 4.2 Area of Triangles Practice Worksheet.
- Do the 4.3 Area of Compound Figures Practice Worksheet.

Area and Perimeter in a Coordinate Plane (Chapter 4.4 from Resource Book)

- Read 4.4 Lesson on pages 176-177. Complete the six On Your Own Questions within the lesson as you read.
- Check your answers to the six On Your Own questions with the Selected Answers key at the back of this packet. If they are all correct, proceed to the Exercises. If not, reread the examples in the Lesson and rework the problem(s) you missed.
- Do the Ch. 4.4 Area and Perimeter in a Coordinate Plane Worksheet.

Pythagorean Theorem (Chapter 14 from Resource Book)

- Read 14.3 Lesson on pages 640-641. Complete the five On Your Own questions within the lesson as you read.
- Check your answers to the five On Your Own questions with the Selected Answers key at the back of this packet. If they are all correct, proceed to the Exercises. If not, reread the examples in the Lesson and rework the problem(s) you missed.
- If needed, watch the Khan Academy video, Pythagorean Theorem Example, at

<https://www.khanacademy.org/math/cc-eighth-grade-math/cc-8th-geometry/cc-8th-pythagorean-theorem/v/pythagorean-theorem-2>

- Do the 14.3 Pythagorean Theorem Practice Worksheet.

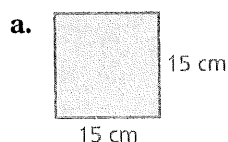
Line Designs

- Read pages 7-8 and look at the examples for how to draw an Astrid and an 8-pointed star design. Try to recreate these designs on the Line Designs page at the end of the packet.

What You Learned Before

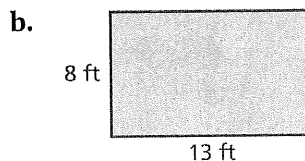
Finding Areas of Squares and Rectangles

Example 1 Find the area of the square or rectangle.



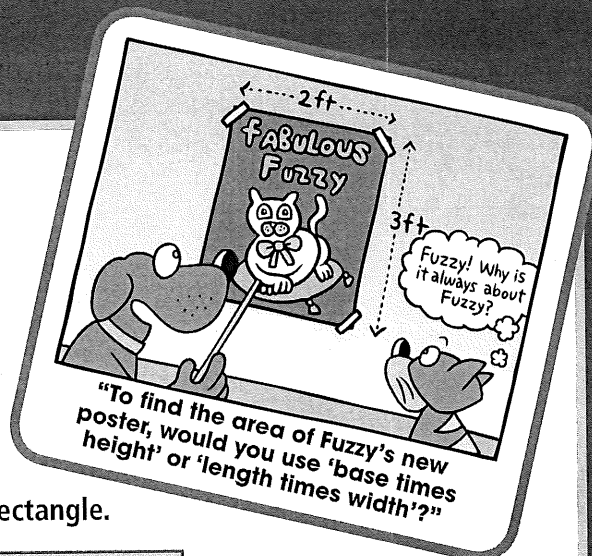
$$\begin{aligned} A &= s^2 && \text{Write formula.} \\ &= 15^2 && \text{Substitute.} \\ &= 225 && \text{Simplify.} \end{aligned}$$

∴ The area of the square is 225 square centimeters.



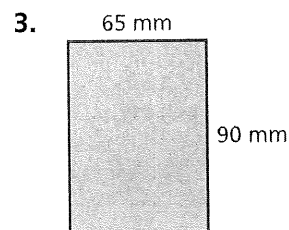
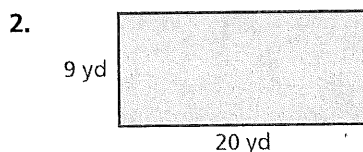
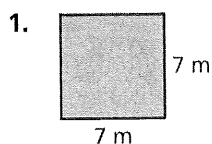
$$\begin{aligned} A &= \ell w \\ &= 13(8) \\ &= 104 \end{aligned}$$

∴ The area of the rectangle is 104 square feet.



Try It Yourself

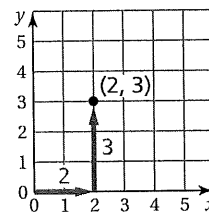
Find the area of the square or rectangle.



Plotting Ordered Pairs

Example 2 Plot (2, 3) in a coordinate plane.

Start at the origin. Move 2 units right and 3 units up. Then plot the point.



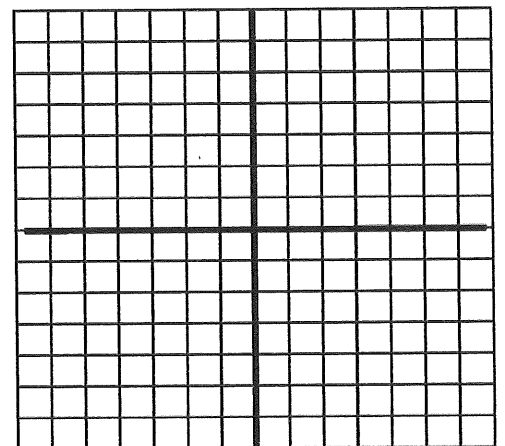
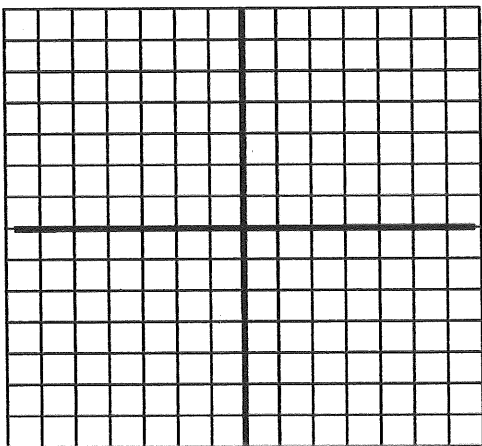
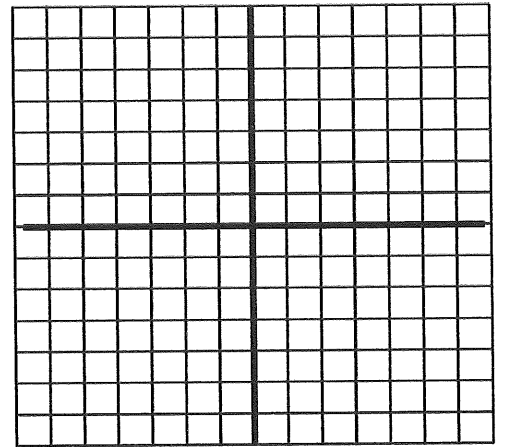
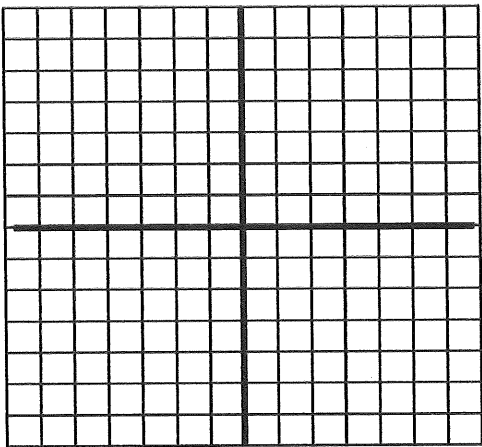
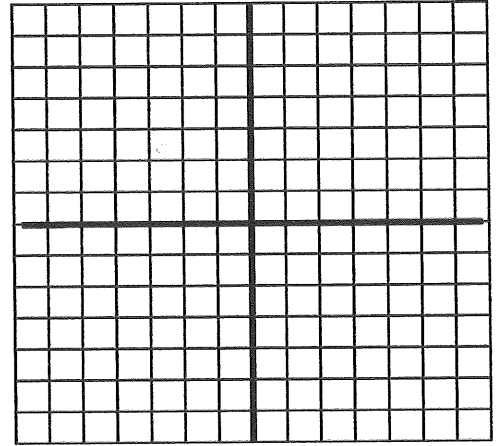
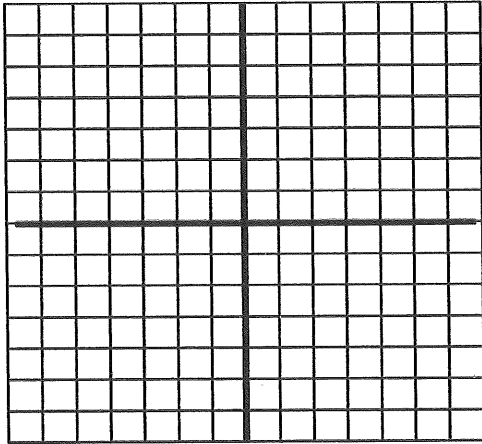
Try It Yourself

Plot the ordered pair in a coordinate plane. Use the grids on the back of this Page.

4. (1, 4)

5. (3, 2)

6. (5, 1)



4.2 Lesson

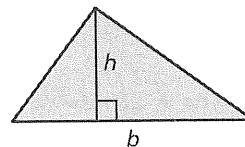
Check It Out
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Key Idea

Area of a Triangle

Words The area A of a triangle is one-half the product of its base b and its height h .

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



EXAMPLE 1 Finding the Area of a Triangle

Find the area of the triangle.

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

Write formula.

$$= \frac{1}{2}(5)(8)$$

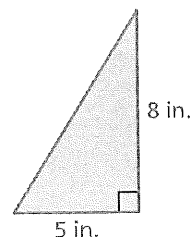
Substitute 5 for b and 8 for h .

$$= \frac{1}{2}(40)$$

Multiply 5 and 8.

$$= 20$$

Multiply $\frac{1}{2}$ and 40.

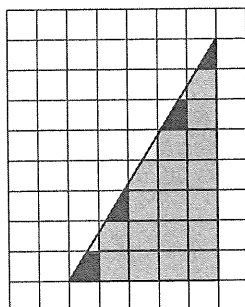


Remember

In Example 1, use the Associative Property of Multiplication to multiply 5 and 8 first.

❖ The area of the triangle is 20 square inches.

Reasonable? Draw the triangle on grid paper and count unit squares. Each square in the grid represents 1 square inch.



Squares full or nearly full: 18

Squares about half full: 4

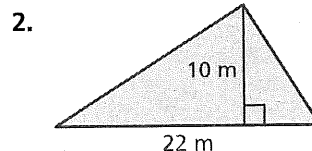
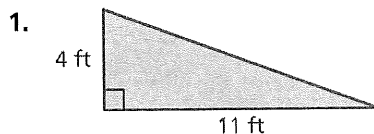
$$\text{The area is } 18(1) + 4\left(\frac{1}{2}\right) = 20 \text{ square inches.}$$

So, the answer is reasonable. ✓

On Your Own

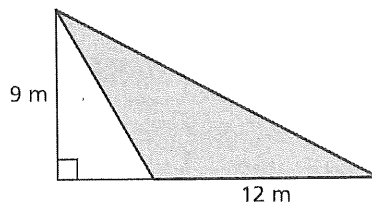
Find the area of the triangle.

Now You're Ready
Exercises 3–8



EXAMPLE 2 Finding the Area of a Triangle

Find the area of the triangle.

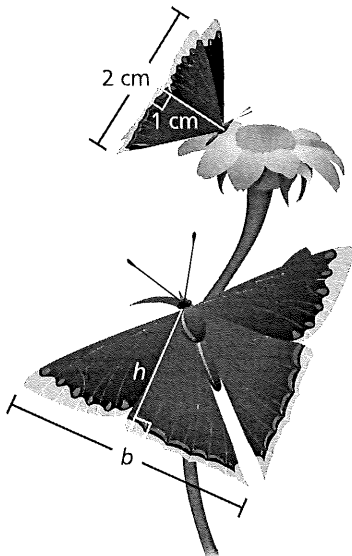


$$\begin{aligned}
 A &= \frac{1}{2}bh && \text{Write formula.} \\
 &= \frac{1}{2}(12)(9) && \text{Substitute 12 for } b \text{ and 9 for } h. \\
 &= 54 && \text{Multiply.}
 \end{aligned}$$

∴ The area of the triangle is 54 square meters.

EXAMPLE 3 Real-Life Application

The base and height of the red butterfly wing are two times greater than the base and height of the blue butterfly wing. How many times greater is the area of the red wing than the area of the blue wing?



Find the area of the blue wing.

$$\begin{aligned}
 A &= \frac{1}{2}bh && \text{Write formula.} \\
 &= \frac{1}{2}(2)(1) && \text{Substitute 2 for } b \text{ and 1 for } h. \\
 &= 1 \text{ cm}^2 && \text{Multiply.}
 \end{aligned}$$

The red wing dimensions are 2 times greater, so the base is $2 \times 2 = 4$ cm and the height is $2 \times 1 = 2$ cm. Find the area of the red wing.

$$\begin{aligned}
 A &= \frac{1}{2}bh && \text{Write formula.} \\
 &= \frac{1}{2}(4)(2) && \text{Substitute 4 for } b \text{ and 2 for } h. \\
 &= 4 \text{ cm}^2 && \text{Multiply.}
 \end{aligned}$$

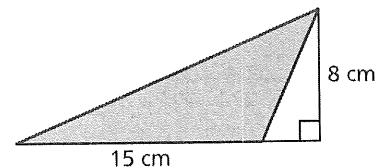
∴ Because $\frac{4 \text{ cm}^2}{1 \text{ cm}^2} = 4$, the area of the red wing is 4 times greater.

On Your Own

Now You're Ready
Exercises 12–14

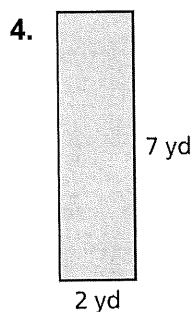
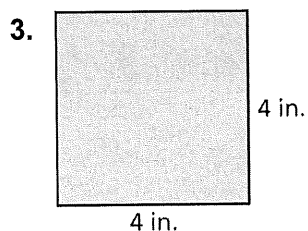
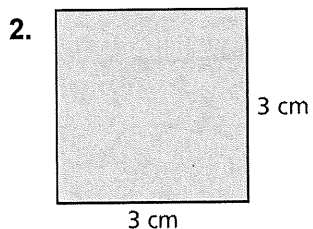
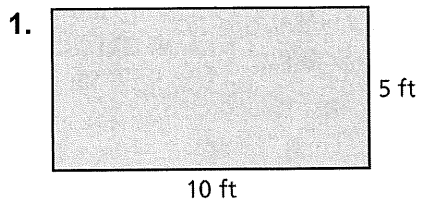
3. Find the area of the triangle.

4. **WHAT IF?** In Example 3, the base and the height of the red butterfly wing are three times greater than those of the blue wing. How many times greater is the area of the red wing?

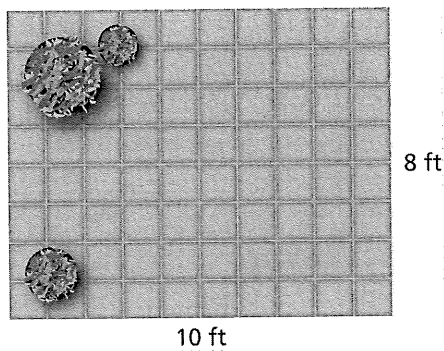


Chapter 4.1 Area of Rectangles

Find the area of each square or rectangle. Show the calculation you used and include appropriate units in your answer.



5. Find the area of the patio.



6. Draw and label two different rectangles whose area is 36 square centimeters.

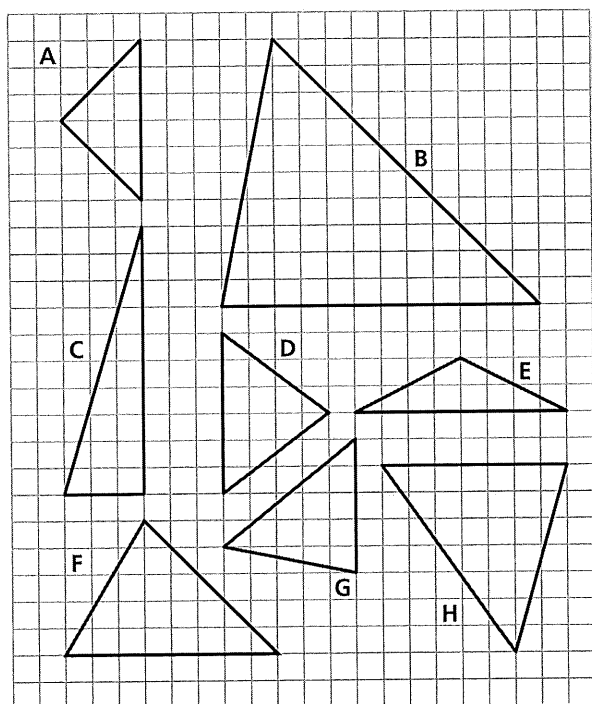
4.2 Areas of Triangles Matching

ACTIVITY: Estimating and Finding the Area of a Triangle

Work with a partner. Each grid square represents 1 square centimeter.

- Use estimation to match each triangle with its area.
- Then check your work by finding the exact area of each triangle.

<i>Area</i>	<i>Estimate Match</i>	<i>Exact Match</i>
a. 15 cm^2	_____	_____
b. 20 cm^2	_____	_____
c. 9 cm^2	_____	_____
d. 12 cm^2	_____	_____
e. 60 cm^2	_____	_____
f. $12\frac{1}{2} \text{ cm}^2$	_____	_____
g. $24\frac{1}{2} \text{ cm}^2$	_____	_____
h. 8 cm^2	_____	_____



Not drawn to scale

4.2

Area of Triangles Practice

For use after Lesson 4.2



Vocabulary and Concept Check

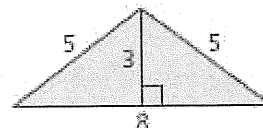
- CRITICAL THINKING** Can *any* side of a triangle be labeled as its base? Explain.
- DIFFERENT WORDS, SAME QUESTION** Which is different? Find "both" answers.

What is the area of the triangle?

What is the distance around the triangle?

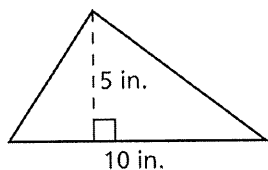
How many unit squares fit in the triangle?

What is one-half the product of the base and the height?

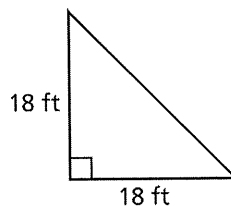


Find the area of each triangle. Show the calculation you used and include appropriate units in your answer.

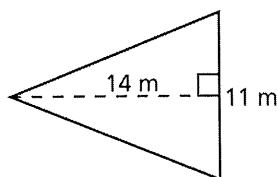
3.



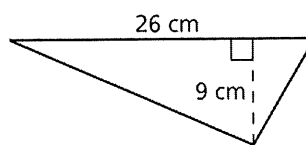
4.



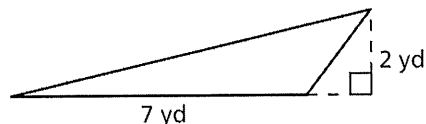
5.



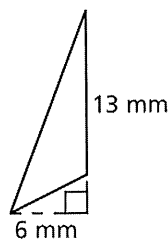
6.



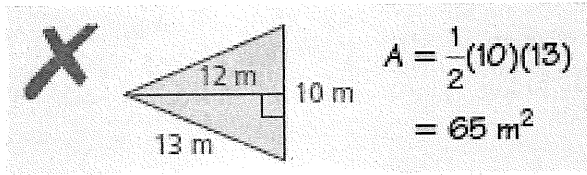
7.



8.



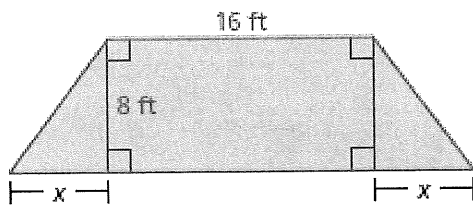
9. **ERROR ANALYSIS** Describe and correct the error in finding the area of the triangle.



10. Draw and label two different triangles whose area is 24 square cm.

11. **CORNER SHELF** A shelf has the shape of a triangle. The base of the shelf is 36 cm, and the height is 18 cm. Draw a picture to represent the shelf and then find its area.

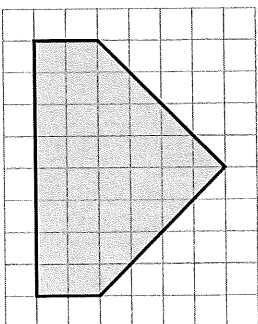
12. The total area of the polygon is 176 square feet. Find the value of x .



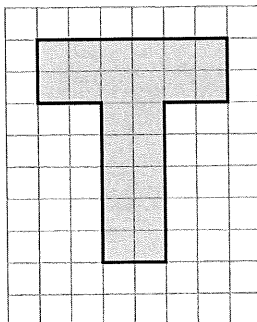
Extension
4.3 **Area of Compound Figures Practice**

Find the area of the shaded figure.

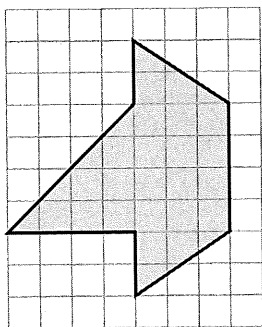
1.



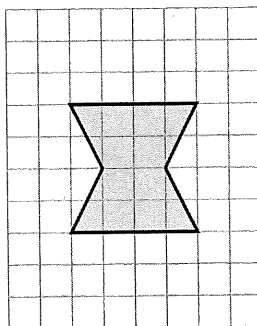
2.



3.

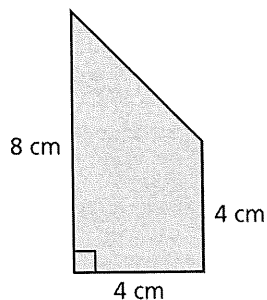


4.

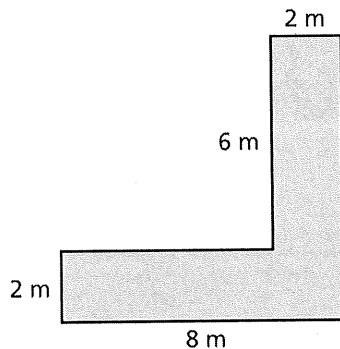


Find the area of each figure. Show your calculations and include appropriate units in your answer.

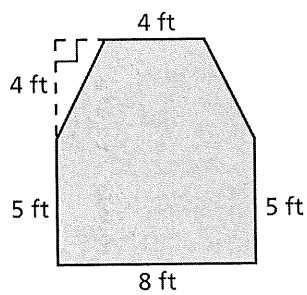
5.



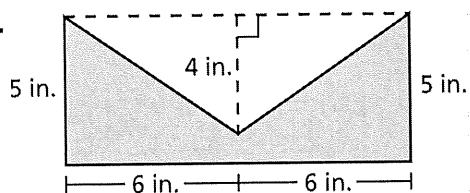
6.



7.



8.



9. You add a 4-foot-by-4-foot section of land to a 6-foot-by-8-foot garden. Find the area of the new garden.

4.4 Lesson

Check It Out
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BigIdeasMath.com

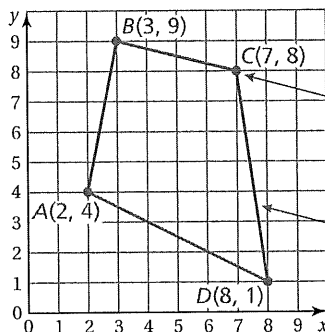
You can use ordered pairs to represent vertices of polygons. To draw a polygon in a coordinate plane, plot and connect the ordered pairs.

EXAMPLE 1 Drawing a Polygon in a Coordinate Plane

The vertices of a quadrilateral are $A(2, 4)$, $B(3, 9)$, $C(7, 8)$, and $D(8, 1)$. Draw the quadrilateral in a coordinate plane.

Study Tip

After you plot the vertices, connect them *in order* to draw the polygon.



Plot and label the vertices.

Connect the points to form the quadrilateral.

On Your Own

Now You're Ready
Exercises 6–11

Draw the polygon with the given vertices in a coordinate plane. Use the grids on the following page.

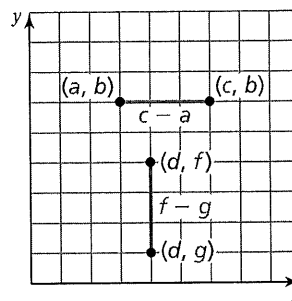
- $A(0, 0)$, $B(5, 7)$, $C(7, 4)$
- $W(4, 4)$, $X(7, 4)$, $Y(7, 1)$, $Z(4, 1)$
- $F(1, 3)$, $G(3, 6)$, $H(5, 6)$, $J(3, 3)$
- $P(1, 4)$, $Q(3, 5)$, $R(7, 3)$, $S(6, \frac{1}{2})$, $T(2, \frac{1}{2})$

Key Idea

Finding Distances in the First Quadrant

You can find the length of a horizontal or vertical line segment in a coordinate plane by using the coordinates of the endpoints.

- When the x -coordinates are the same, the vertical distance between the points is the difference of the y -coordinates.
- When the y -coordinates are the same, the horizontal distance between the points is the difference of the x -coordinates.



Be sure to subtract the lesser coordinate from the greater coordinate.

EXAMPLE 2 Finding a Perimeter

The vertices of a rectangle are $F(1, 6)$, $G(7, 6)$, $H(7, 2)$, and $J(1, 2)$. Draw the rectangle in a coordinate plane and find its perimeter.

Draw the rectangle and use the vertices to find its dimensions.

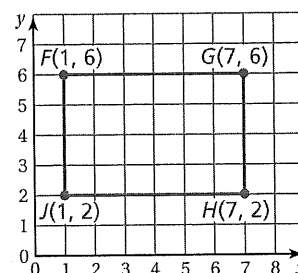
The length is the horizontal distance between $F(1, 6)$ and $G(7, 6)$, which is the difference of the x -coordinates.

$$\text{length} = 7 - 1 = 6 \text{ units}$$

The width is the vertical distance between $G(7, 6)$ and $H(7, 2)$, which is the difference of the y -coordinates.

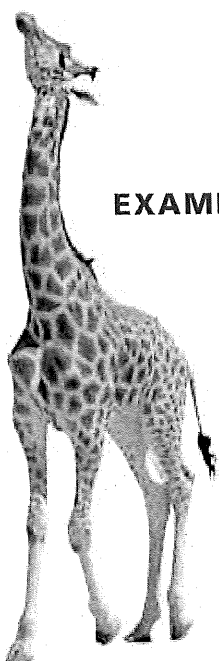
$$\text{width} = 6 - 2 = 4 \text{ units}$$

∴ So, the perimeter of the rectangle is $2(6) + 2(4) = 20$ units.



Study Tip

You can also find the length using vertices H and J . You can find the width using vertices F and J .



EXAMPLE 3 Real-Life Application

In a grid of the exhibits at a zoo, the vertices of the giraffe exhibit are $E(0, 90)$, $F(60, 90)$, $G(100, 30)$, and $H(0, 30)$. The coordinates are measured in feet. What is the area of the giraffe exhibit?

Plot and connect the vertices using a coordinate grid to form a trapezoid. Use the coordinates to find the lengths of the bases and the height.

$$b_1 = 60 - 0 = 60$$

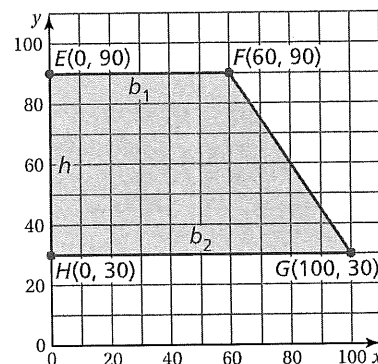
$$b_2 = 100 - 0 = 100$$

$$h = 90 - 30 = 60$$

Use the formula for the area of a trapezoid.

$$\begin{aligned} A &= \frac{1}{2}(60)(60 + 100) \\ &= \frac{1}{2}(60)(160) = 4800 \end{aligned}$$

∴ The area of the giraffe exhibit is 4800 square feet.



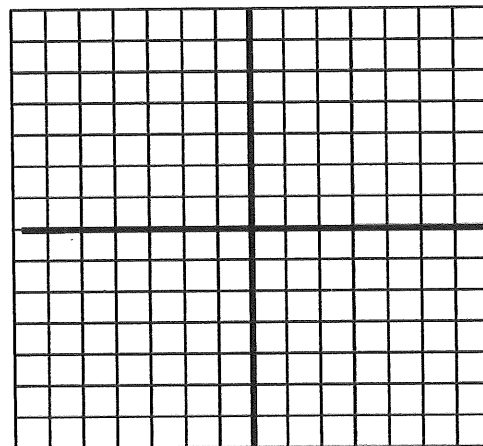
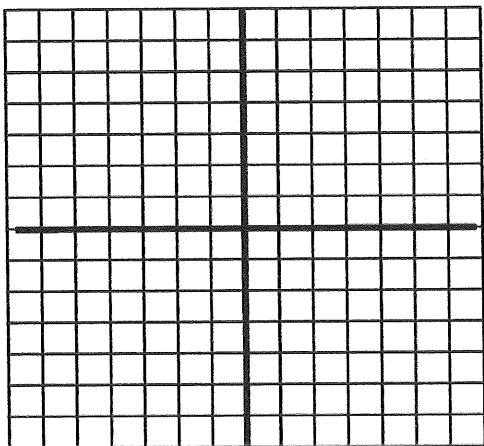
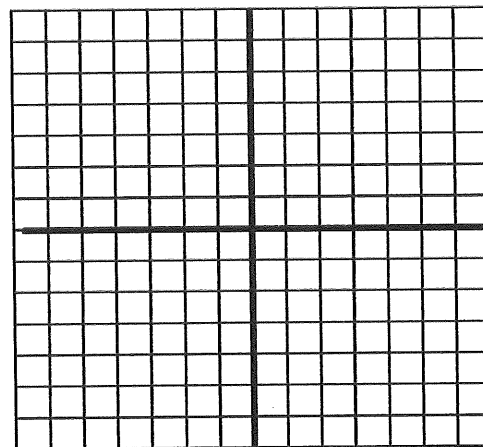
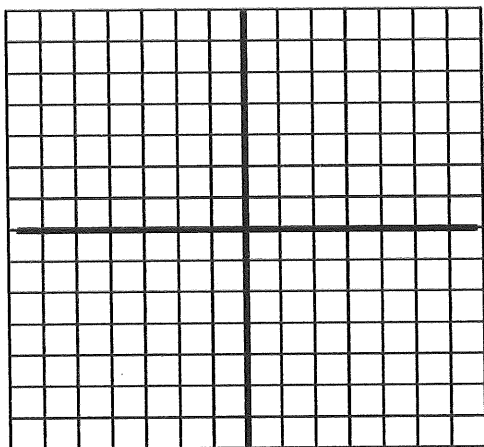
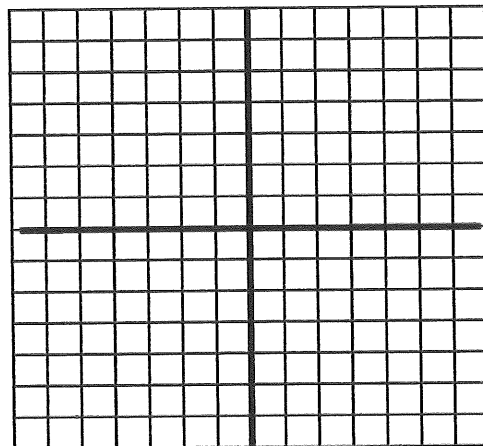
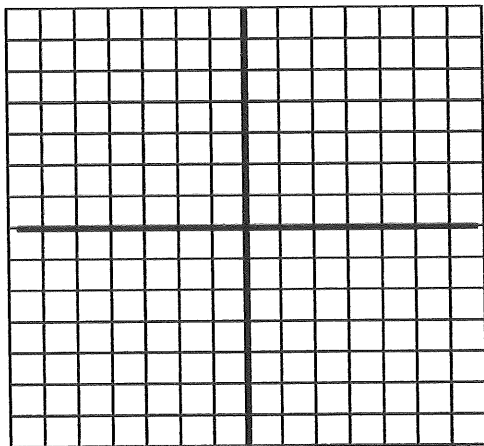
Common Error

You can count grid lines to find the dimensions, but make sure you consider the scale of the axes.

On Your Own

Now You're Ready
Exercises 12–15

- The vertices of a rectangle are $J(2, 7)$, $K(4, 7)$, $L(4, 1.5)$, and $M(2, 1.5)$. Find the perimeter and the area of the rectangle. *Use the grid on the following page.*
- WHAT IF?** In Example 3, the giraffe exhibit is enlarged by moving vertex F to $(80, 90)$. How does this affect the area? Explain.



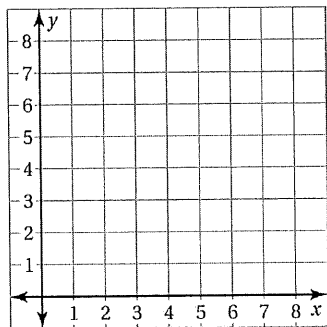
4.4

Area and Perimeter in a Coordinate Plane Practice

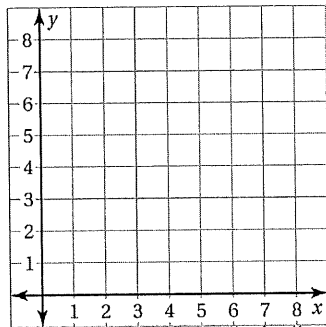
For use after Lesson 4.4

Plot and label each pair of points in the coordinate plane. Find the area of the polygon.

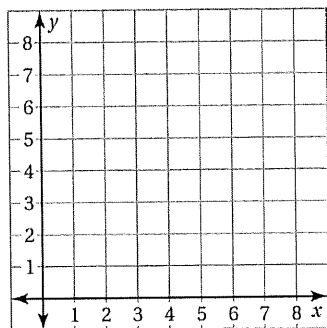
1. $A(2, 2)$, $B(2, 6)$, $C(5, 2)$



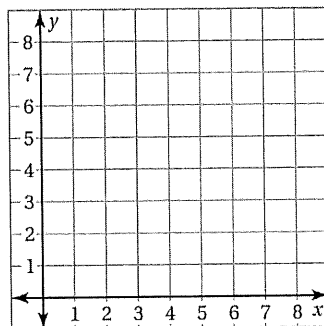
2. $D(3, 2)$, $E(3, 7)$, $F(6, 2)$, $G(6, 7)$



3. $H(3, 3)$, $I(3, 7)$, $J(7, 7)$, $K(7, 3)$

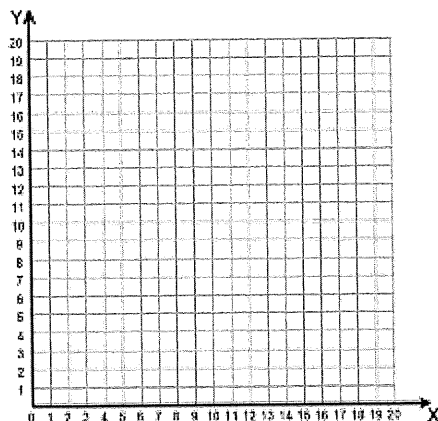


4. $L(1, 2)$, $M(1, 7)$, $N(7, 4)$



5. The vertices of a sandbox are $P(12, 14)$, $Q(12, 17)$, $R(16, 17)$, and $S(16, 14)$. The coordinates are measured in feet. What is the perimeter of the sandbox?

[Can you answer this question without graphing? If not, use the coordinate plane below.]



14.3 Lesson

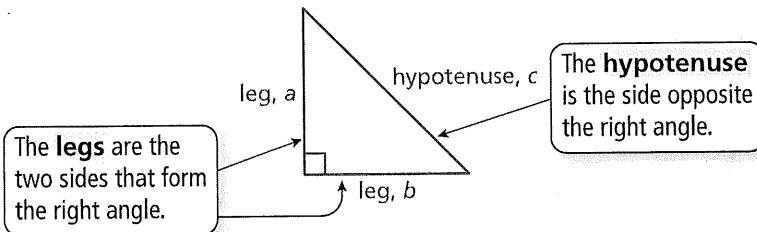
Key Vocabulary

theorem, p. 638
legs, p. 640
hypotenuse, p. 640
Pythagorean
Theorem, p. 640

Key Ideas

Sides of a Right Triangle

The sides of a right triangle have special names.



Study Tip

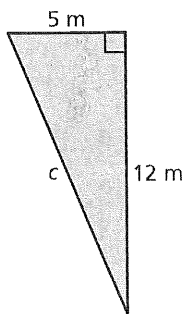
In a right triangle, the legs are the shorter sides and the hypotenuse is always the longest side.

The Pythagorean Theorem

Words In any right triangle, the sum of the squares of the lengths of the legs is equal to the square of the length of the hypotenuse.

Algebra $a^2 + b^2 = c^2$

EXAMPLE 1 Finding the Length of a Hypotenuse



Find the length of the hypotenuse of the triangle.

$$a^2 + b^2 = c^2$$

Write the Pythagorean Theorem.

$$5^2 + 12^2 = c^2$$

Substitute 5 for a and 12 for b .

$$25 + 144 = c^2$$

Evaluate powers.

$$169 = c^2$$

Add.

$$\sqrt{169} = \sqrt{c^2}$$

Take positive square root of each side.

$$13 = c$$

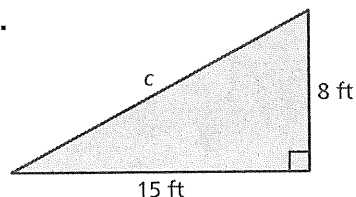
Simplify.

✧ The length of the hypotenuse is 13 meters.

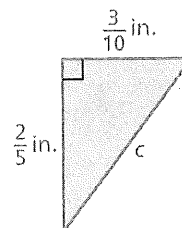
On Your Own

Find the length of the hypotenuse of the triangle.

1.



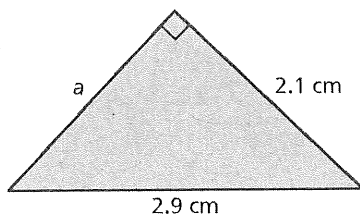
2.



Now You're Ready
Exercises 3 and 4

EXAMPLE 2 Finding the Length of a Leg

Find the missing length of the triangle.



$$a^2 + b^2 = c^2$$

Write the Pythagorean Theorem.

$$a^2 + 2.1^2 = 2.9^2$$

Substitute 2.1 for b and 2.9 for c .

$$a^2 + 4.41 = 8.41$$

Evaluate powers.

$$a^2 = 4$$

Subtract 4.41 from each side.

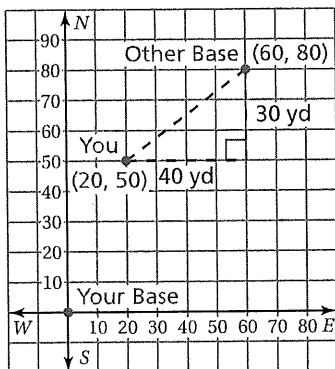
$$a = 2$$

Take positive square root of each side.

∴ The missing length is 2 centimeters.

EXAMPLE 3 Real-Life Application

You are playing capture the flag. You are 50 yards north and 20 yards east of your team's base. The other team's base is 80 yards north and 60 yards east of your base. How far are you from the other team's base?



Step 1: Draw the situation in a coordinate plane. Let the origin represent your team's base. From the descriptions, you are at (20, 50) and the other team's base is at (60, 80).

Step 2: Draw a right triangle with a hypotenuse that represents the distance between you and the other team's base. The lengths of the legs are 30 yards and 40 yards.

Step 3: Use the Pythagorean Theorem to find the length of the hypotenuse.

$$a^2 + b^2 = c^2$$

Write the Pythagorean Theorem.

$$30^2 + 40^2 = c^2$$

Substitute 30 for a and 40 for b .

$$900 + 1600 = c^2$$

Evaluate powers.

$$2500 = c^2$$

Add.

$$50 = c$$

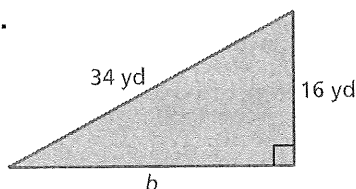
Take positive square root of each side.

∴ So, you are 50 yards from the other team's base.

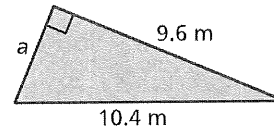
On Your Own

Find the missing length of the triangle.

3.



4.



5. In Example 3, what is the distance between the bases?

Now You're Ready
Exercises 5–8

14.3

Pythagorean Theorem Practice

For use after Lesson 14.3

1. **VOCABULARY:** In a right triangle, how can you tell which sides are the legs and which side is the hypotenuse?

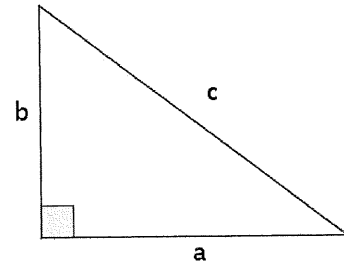
2. **DIFFERENT WORDS, SAME QUESTION:** Which phrase is different? Find “both” answers.

Which side is the hypotenuse?

Which side is the longest?

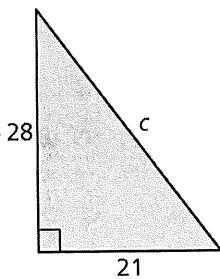
Which side is a leg?

Which side is opposite the 90° angle?

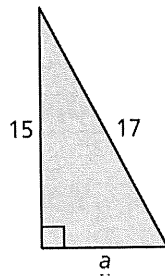


Find the missing length of the triangle. Show all work. You should use a calculator.

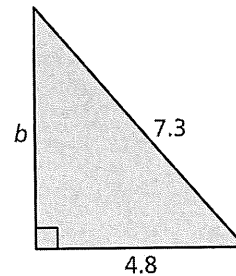
3.



4.

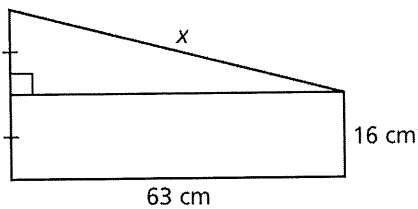


5.

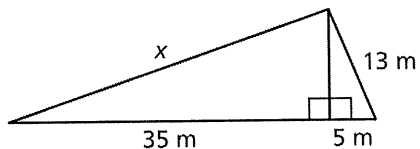


Find the missing length of the figure. Show all work. You should use a calculator.

6.

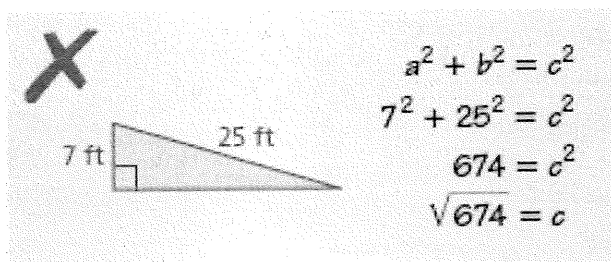


7.

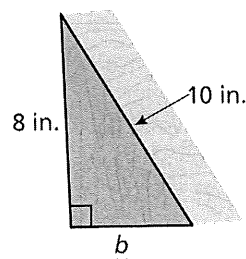


[Hint: You will need to use the Pythagorean Theorem twice!]

8. **ERROR ANALYSIS:** Describe and correct the error in the work shown below.

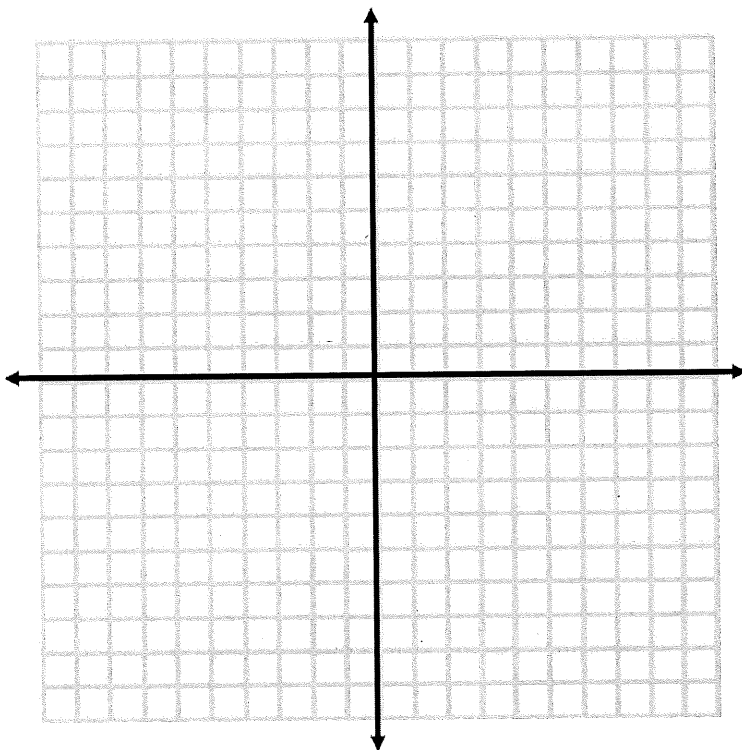


9. In wood shop, you make a bookend that is in the shape of a right triangle. What is the base b of the bookend?



10. **SNOWBALLS** You and a friend stand back to back. You run 20 feet forward then 15 feet to your right. At the same time, your friend runs 16 feet forward then 12 feet to her right. She stops, turns, and hits you with a snowball.

- a. Draw the situation in the coordinate plane at right. [Hint: How might you scale the axes to make the situation fit on the graph?]
- b. How far does your friend throw the snowball? Show the work you used to calculate your answer.



LESSON

0.2

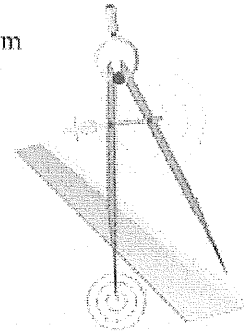
*We especially need
imagination in science. It is
not all mathematics, nor all
logic, but it is somewhat
beauty and poetry.*

MARIA MITCHELL

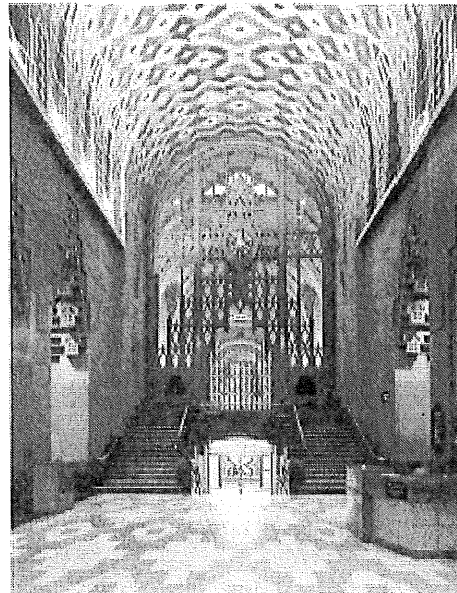
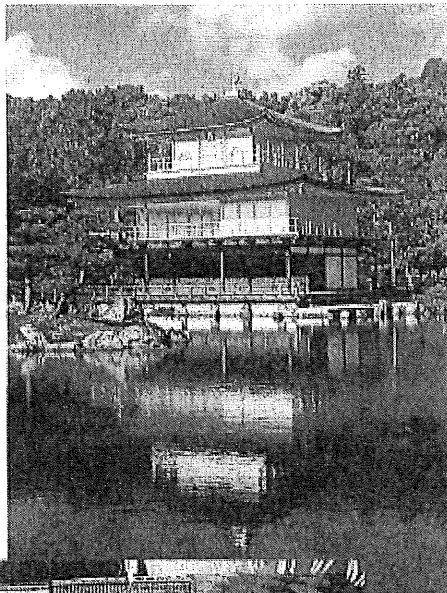
Line Designs

The symmetry and patterns in geometric designs make them very appealing. You can make many designs using the basic tools of geometry—compass and straightedge.

You'll use a straightedge to construct straight lines and a compass to construct circles and to mark off equal distances. A straightedge is like a ruler but it has no marks. You can use the edge of a ruler as a straightedge. The straightedge and the compass are the classical construction tools used by the ancient Greeks, who laid the foundations of the geometry that you are studying.



Japanese design is known for its simple, clean lines.



The complementary line designs on the arched ceiling and tile floor make this building lobby look grandiose.



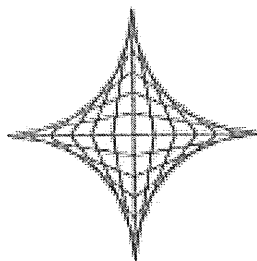
Notice how the patterns of these Guatemalan rugs are a non-uniform and dynamic arrangement of lines.



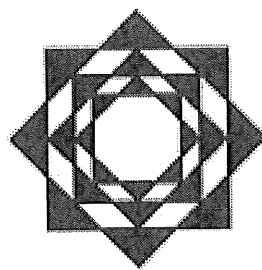
Some of the lines in this mosaic appear to be tied in knots!

You can create many types of designs using only straight lines. Here are two line designs and the steps for creating each one.

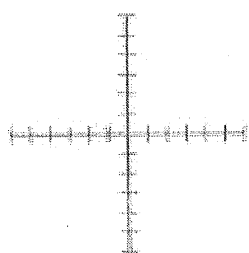
The Astrid



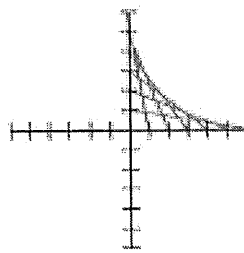
The 8-pointed Star



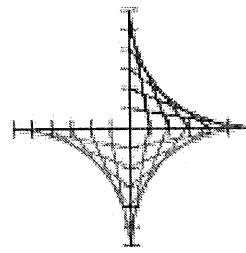
The Astrid



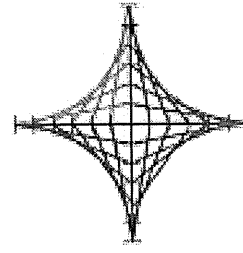
Step 1



Step 2

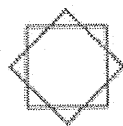


Step 3

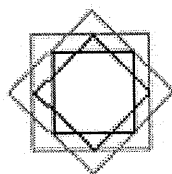


Step 4

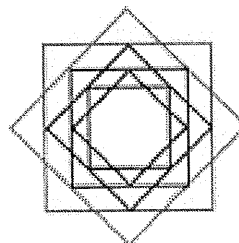
The 8-pointed Star



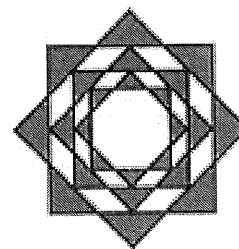
Step 1



Step 2



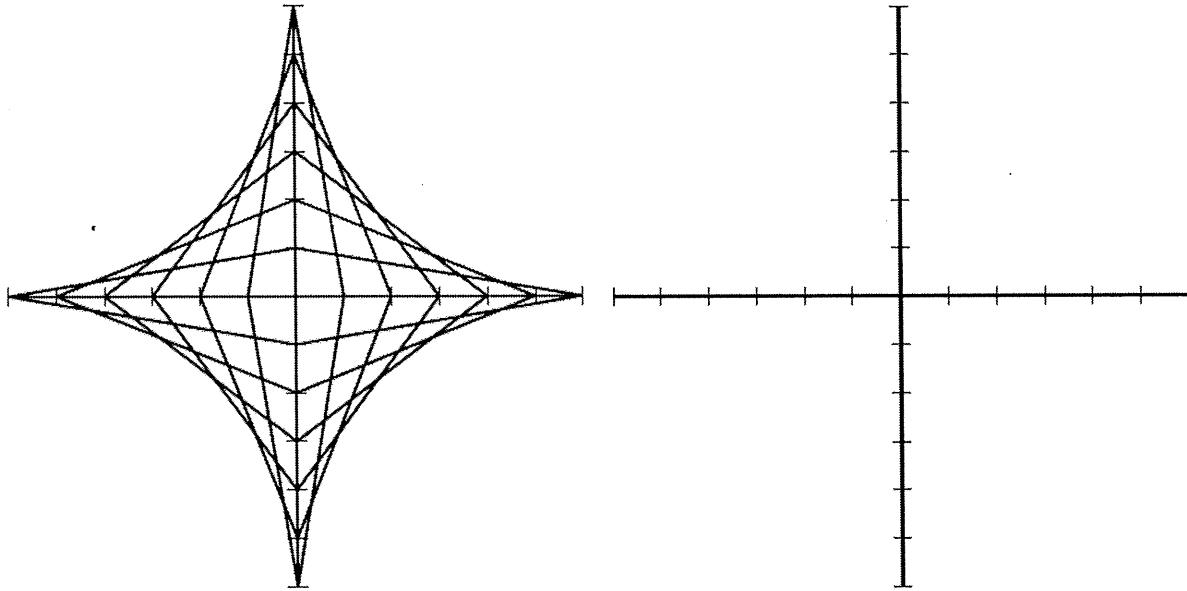
Step 3



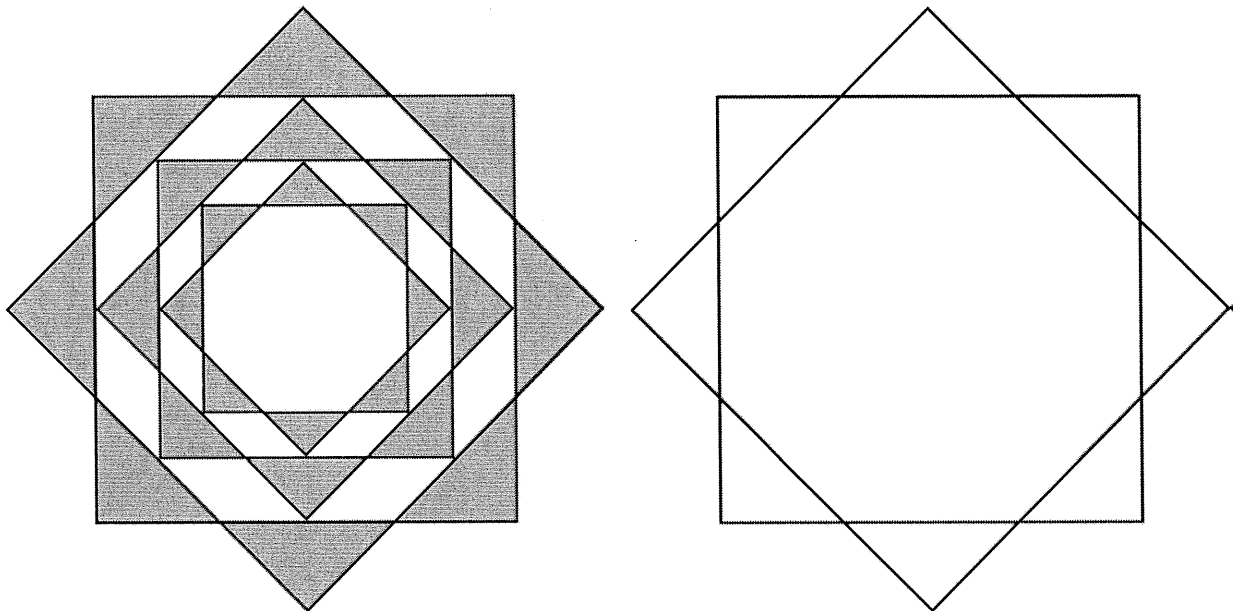
Step 4

Read p. 7-8 in your book about Line Designs.

21. Use the grid below and a straight-edge to draw an Astrid.



22. Use the square below to begin an 8-pointed star design. Shade or color your star as shown in the book. Notice that this example begins the construction with the outermost squares. Look carefully at the example on the left to figure out where the corners of the next square should be located.



Selected Answers - Use these to check your work to the listed problems. Mark each problem correct/incorrect on your page - try to rework incorrect problems before you move on.

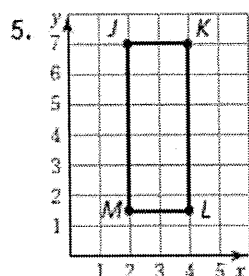
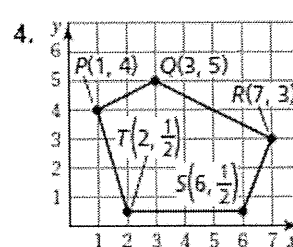
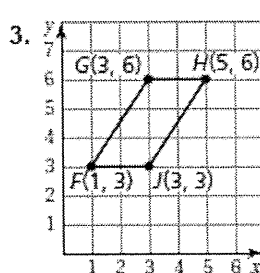
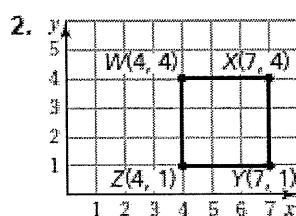
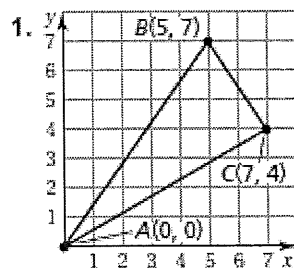
What You've Learned Before - Area of Rectangles

1. $A = (7)(7) = 49 \text{ m}^2$
2. $A = (9)(20) = 180 \text{ yd}^2$
3. $A = (65)(90) = 5850 \text{ mm}^2$

Area of Triangles (Chapter 4.2 from Resource Book)

1. $A = (\frac{1}{2})(11)(4) = 22 \text{ ft}^2$
2. $A = (\frac{1}{2})(22)(10) = 110 \text{ m}^2$
3. $A = (\frac{1}{2})(15)(8) = 60 \text{ cm}^2$
4. $A = (\frac{1}{2})(6)(3) = 9 \text{ cm}^2$, which is 9 times the area of the blue wing

Area and Perimeter in a Coordinate Plane



Length = $4 - 2 = 2$ units

Width = $7 - 1.5 = 5.5$ units

The perimeter of the rectangle is

$2(2) + 2(5.5) = 15$ units.

The area of the rectangle is $2(5.5) = 11$ square units.

6. The area will increase.

$b_1 = 80 - 0 = 80$

$A = \frac{1}{2}60(80 + 100)$

$= \frac{1}{2}60(180)$

$= 5400$

The new area of the giraffe exhibit is 5400 square feet, which is $5400 - 4800 = 600$ square feet larger.

Pythagorean Theorem (Chapter 14 from Resource Book)

1. $a^2 + b^2 = c^2$

$$8^2 + 15^2 = c^2$$

$$64 + 225 = c^2$$

$$289 = c^2$$

$$\sqrt{289} = \sqrt{c^2}$$

$$17 = c$$

The length of the hypotenuse is 17 feet.

3. $a^2 + b^2 = c^2$

$$16^2 + b^2 = 34^2$$

$$256 + b^2 = 1156$$

$$b^2 = 900$$

$$\sqrt{b^2} = \sqrt{900}$$

$$b = 30$$

The length of the leg is 30 yards.

4. $a^2 + b^2 = c^2$

$$a^2 + 9.6^2 = 10.4^2$$

$$a^2 + 92.16 = 108.16$$

$$a^2 = 16$$

$$\sqrt{a^2} = \sqrt{16}$$

$$a = 4$$

The length of the leg is 4 meters.

5. Use the graph in the book to find the legs. The lengths of the legs are 60 and 80.

$$a^2 + b^2 = c^2$$

$$60^2 + 80^2 = c^2$$

$$3600 + 6400 = c^2$$

$$10,000 = c^2$$

$$\sqrt{10,000} = \sqrt{c^2}$$

$$100 = c$$

So, the distance between the two bases is 100 yards.

2. $a^2 + b^2 = c^2$

$$\left(\frac{2}{5}\right)^2 + \left(\frac{3}{10}\right)^2 = c^2$$

$$\frac{4}{25} + \frac{9}{100} = c^2$$

$$\frac{16}{100} + \frac{9}{100} = c^2$$

$$\frac{25}{100} = c^2$$

$$\sqrt{\frac{25}{100}} = \sqrt{c^2}$$

$$\frac{5}{10} = c$$

$$\frac{1}{2} = c$$

The length of the hypotenuse is $\frac{1}{2}$ inch.

[Hint for #2: You also could rewrite each side length as a decimal using your calculator and work the problem using decimal values.]