| | | |
|---|---|---|
| Geometry 1-2<br>Pythagorean Theorem | **UNIT 9** | Name:________________________<br>Teacher: ______________ Per:____ |

My academic goal for this unit is...

Check for Understanding Key:

- ● Understanding at start of the unit
- | Understanding after practice
- ▲ Understanding before unit test

| | LEARNING TARGETS | How is my understanding? | Test Score | Retake? |
|---|---|---|---|---|
| 9a | I can simplify radical expressions. | 1 2 3 4 | | |
| 9b | I can apply the Pythagorean theorem to find unknown side lengths. | 1 2 3 4 | | |
| 9c | I can apply the converse of the Pythagorean theorem to classify triangles as acute, obtuse or right. | 1 2 3 4 | | |
| 9d | I can apply the special right triangle conjectures to determine unknown side lengths. | 1 2 3 4 | | |
| 9e | I can calculate the distance between two points in coordinate geometry. | 1 2 3 4 | | |
| 9f | I can write and equation of a circle.. | 1 2 3 4 | | |

Who was Pythagoras?

What are the special right triangles? Draw them and label the sides and angles.

| DP/1<br>**Developing Proficiency**<br>Not yet, Insufficient | CP/2<br>**Close to Proficient**<br>Yes, but..., Minimal | PR/3<br>**Proficient**<br>Yes, Satisfactory | HP/4<br>**Highly Proficient**<br>WOW, Excellent |
|---|---|---|---|
| I can't do it and am not able to explain process or key points | I can sort of do it and am able to show process, but not able to identify/explain key math points | I can do it and able to both explain process and identify/explain math points | I'm great at doing it and am able to explain key math points accurately in a variety of problems |

Unit 9 Conjectures

| ***Title*** | ***Conjecture*** | ***Diagram*** |
|---|---|---|
| The Pythagorean Theorem Conjecture | In a right triangle, the sum of the squares of the lengths of the legs equals the square of the lengths of the hypotenuse. If $a$ and $b$ are the lengths of the legs, and $c$ is the length of the hypotenuse, then… | |
| Converse of the Pythagorean Theorem Conjecture | If the lengths of the three sides of a triangle satisfy the Pythagorean equation, then the triangle… | |
| Isosceles Right Triangle (45°-45°-90° ) Conjecture | In an isosceles right triangle, if the legs have length $\ell$, then the hypotenuse has length… | |
| 30°-60°-90° Right Triangle Conjecture | In a 30°-60°-90° triangle, if the shorter leg has length $a$, then the longer leg has length ______ and the hypotenuse has length _______. | |

# Unit 9 Conjectures

| ***Title*** | ***Conjecture*** | ***Diagram*** |
|---|---|---|
| Distance Formula Conjecture | The distance between points $A(x_1, y_1)$ and $B(x_2, y_2)$ is given by<br>$(AB)^2 = (\qquad\qquad)^2 + (\qquad\qquad)^2$<br>or<br>$AB = \sqrt{(\qquad\qquad)^2 + (\qquad\qquad)^2}$ | |
| Equation of a Circle Conjecture | The equation of a circle with radius $r$ center $(h, k)$ is…<br>$(x - \qquad)^2 + (y - \qquad)^2 = (\qquad)^2$ | |

<u>Additional Notes:</u>

**Key for Isosceles Right Triangles (45°-45°-90° )**

| Know… | Want… | Do… |
|---|---|---|
| Leg | Hypotenuse | $leg \cdot \sqrt{2}$ |
| Hypotenuse | Leg | $\frac{hypotenuse}{\sqrt{2}}$ |

**Key for 30°-60°-90° Right Triangles**

<table>
<tr><th>Know…</th><th>Want…</th><th>Do…</th></tr>
<tr><td rowspan="2">Short Leg</td><td>Hypotenuse</td><td>$short\ leg \cdot 2$</td></tr>
<tr><td>Long Leg</td><td>$shrt.leg \cdot \sqrt{3}$</td></tr>
<tr><td>Long Leg</td><td rowspan="2">Short Leg</td><td>$\frac{lg.leg}{\sqrt{3}}$</td></tr>
<tr><td>Hypotenuse</td><td>$\frac{hypotenuse}{2}$</td></tr>
</table>

Note: Always work thru the short leg.

# Practice: Simplifying Radicals

**Simplify.**

1) $\sqrt{108}$

2) $\sqrt{90}$

3) $\sqrt{105}$

4) $\sqrt{150}$

5) $\sqrt{112}$

6) $\sqrt{405}$

7) $\sqrt{32}$

8) $\sqrt{192}$

9) $\sqrt{30}$

10) $\sqrt{42}$

11) $\sqrt{648}$

12) $\sqrt{18}$

13) $6\sqrt{400}$

14) $5\sqrt{252}$

15) $7\sqrt{54}$

16) $2\sqrt{50}$

17) $7\sqrt{210}$

18) $10\sqrt{144}$

19) $4\sqrt{128}$

20) $8\sqrt{392}$

Geometry 1-2 Name: ____________________

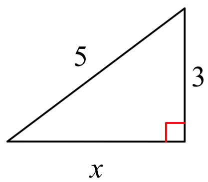


# Practice: Pythagorean Theorem & Converse

Date: ____________________ Period: ______

**Find the missing side of each triangle. Round your answers to the nearest tenth if necessary.**

1)

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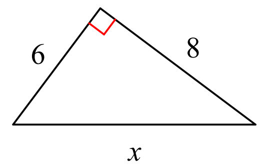


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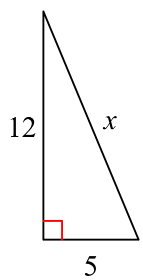


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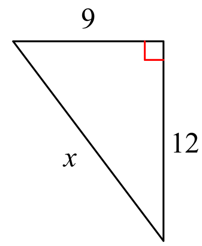
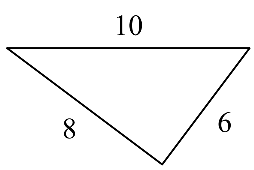



**State if each triangle is acute, obtuse, or right.**

5)

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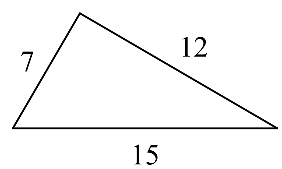


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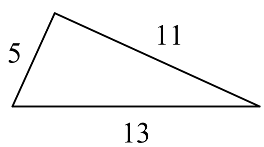


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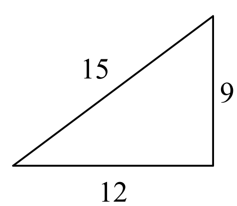
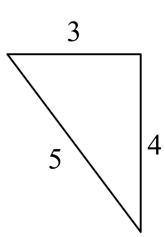



**State if each triangle is a right triangle.**

9)

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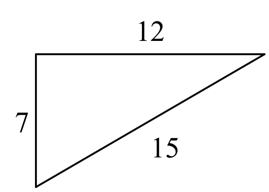
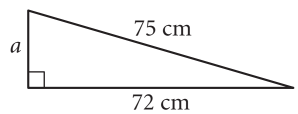


# Lesson 9.1 • The Theorem of Pythagoras

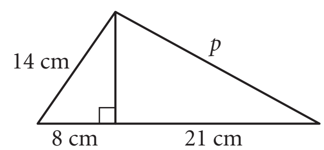
**Name** ______________________________ **Period** __________ **Date** ______________

Give all answers rounded to the nearest 0.1 unit.

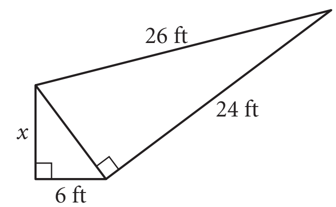
**1.** $a =$ _____




**2.** $p \approx$ _____

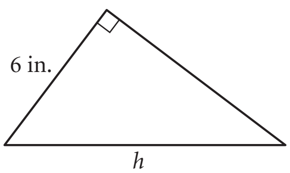



**3.** $x =$ _____

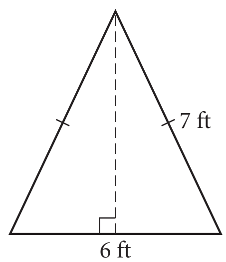



**4.** Area = 39 in$^2$

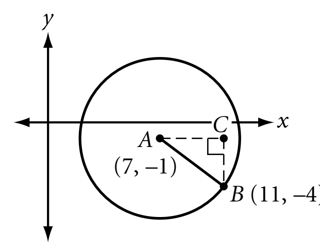
$h \approx$ _____



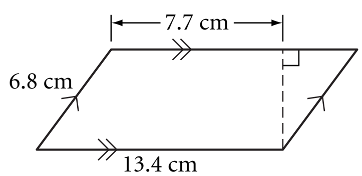

**5.** Find the area.



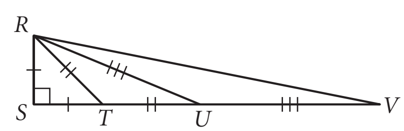

**6.** Find the coordinates of $C$ and the radius of circle $A$.



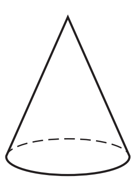

**7.** Find the area.




**8.** $RS = 3$ cm. Find $RV$.




**9.** Base area = $16\pi$ cm$^2$ and slant height = 3 cm. What's wrong with this picture?



**10.** Given $\triangle PQR$, with $m\angle P = 90°$, $PQ = 20$ in., and $PR = 15$ in., find the area of $\triangle PQR$, the length of the hypotenuse, and the altitude to the hypotenuse.

# Lesson 9.2 • The Converse of the Pythagorean Theorem

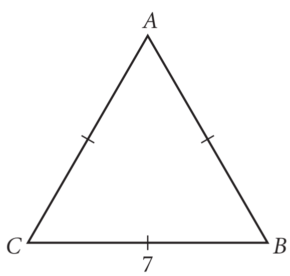
**Name** ________________________________ **Period** __________ **Date** ______________

All measurements are in centimeters. Give answers rounded to the nearest 0.01 cm.

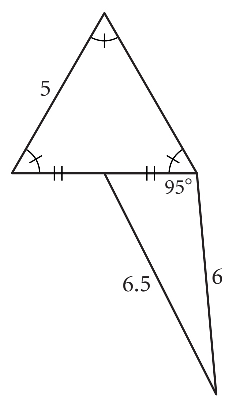
In Exercises 1–4, determine whether a triangle with the given side lengths is a right triangle.

**1.** 76, 120, 98 **2.** 221, 204, 85 **3.** 5.0, 1.4, 4.8 **4.** 80, 82, 18

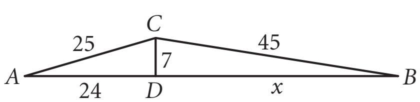
**5.** Find the area of $\triangle ABC$.



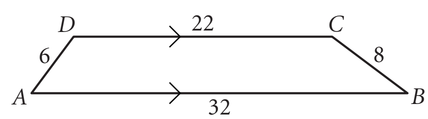

**6.** What's wrong with this picture?




**7.** Find $x$. Explain your method.

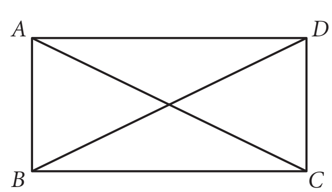



**8.** Find the area of $ABCD$.




In Exercises 9–11, determine whether $ABCD$ is a rectangle and justify your answer. If not enough information is given, write "cannot be determined."

**9.** $AB = 3$, $BC = 4$, and $AC = 6$.




**10.** $AB = 3$, $BC = 4$, $DA = 4$, and $AC = 5$.

**11.** $AB = 3$, $BC = 4$, $CD = 3$, $DA = 4$, and $AC = BD$.

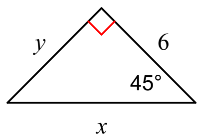
Geometry 1-2



# Practice: Special Right Triangles

**Find the missing side lengths. Leave your answers as radicals in simplest form.**

1)

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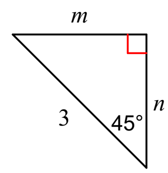


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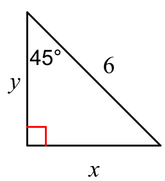


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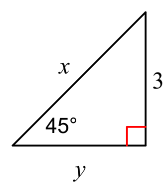


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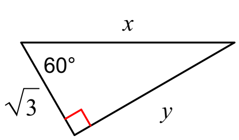


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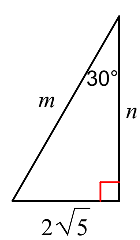


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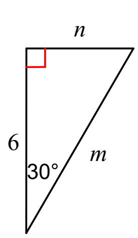


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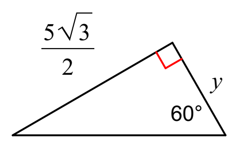

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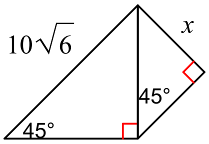


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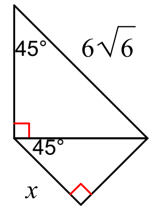


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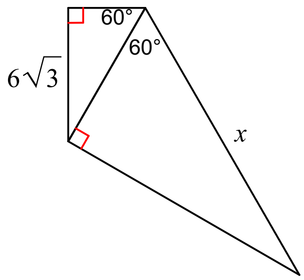


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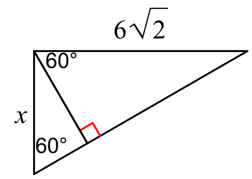


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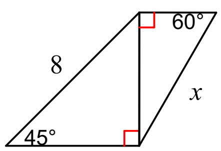


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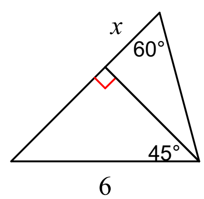


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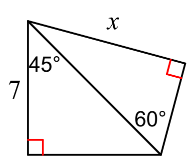
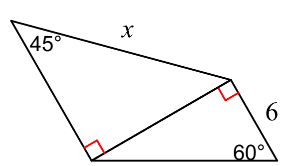



16)



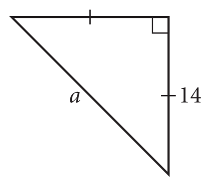
# Lesson 9.3 • Two Special Right Triangles

**Name** ______________________________ **Period** __________ **Date** ______________

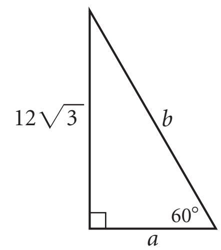
Give your answers in exact form unless otherwise indicated.
All measurements are in centimeters.

In Exercises 1–3, find the unknown lengths.

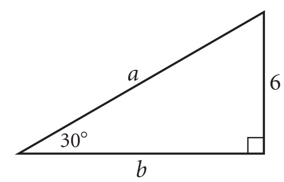
**1.** $a =$ ______



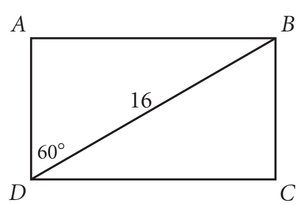

**2.** $a =$ ______, $b =$ ______



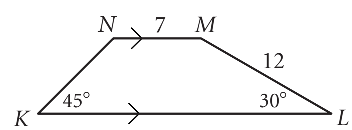

**3.** $a =$ ______, $b =$ ______



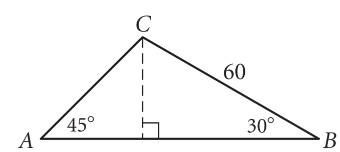

**4.** Find the area of rectangle *ABCD*.




**5.** Find the perimeter and area of *KLMN*.



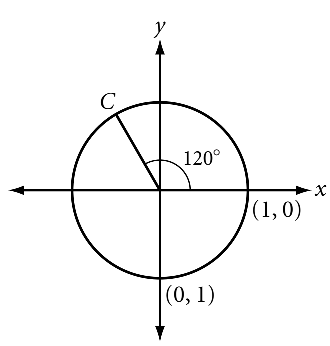

**6.** $AC =$ ______, $AB =$ ______, and area $\triangle ABC =$ ______.



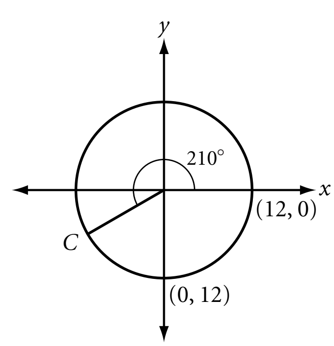

**7.** Find the area of an isosceles trapezoid if the bases have lengths 12 cm and 18 cm and the base angles have measure 60°.

In Exercises 8 and 9, find the coordinates of *C*.

**8.**




**9.**




**10.** Sketch and label a figure to demonstrate that $\sqrt{18}$ is equivalent to $3\sqrt{2}$.

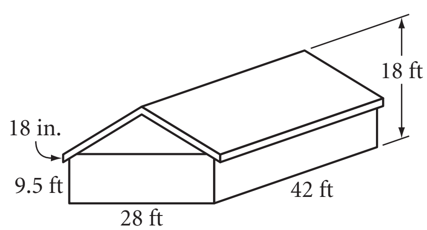
# Lesson 9.4 • Story Problems

**Name** ______________________________ **Period** __________ **Date** ____________

**1.** A 20 ft ladder reaches a window 18 ft high. How far is the foot of the ladder from the base of the building? How far must the foot of the ladder be moved to lower the top of the ladder by 2 ft?

**2.** Robin and Dovey have four pet pigeons that they train to race. They release the birds at Robin's house and then drive to Dovey's to collect them. To drive from Robin's to Dovey's, because of one-way streets, they go 3.1 km north, turn right and go 1.7 km east, turn left and go 2.3 km north, turn right and go 0.9 km east, turn left and go 1.2 km north, turn left and go 4.1 km west, and finally turn left and go 0.4 km south. How far do the pigeons have to fly to go directly from Robin's house to Dovey's house?

**3.** Hans needs to paint the 18 in.-wide trim around the roof eaves and gable ends of his house with 2 coats of paint. A quart can of paint covers 175 $ft^2$ and costs $9.75. A gallon can of paint costs $27.95. How much paint should Hans buy? Explain.



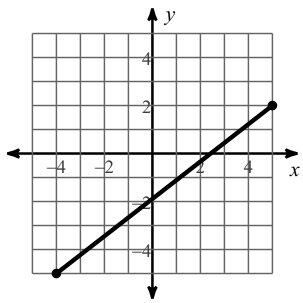

**4.** What are the dimensions of the largest 30°-60°-90° triangle that will fit inside a 45°-45°-90° triangle with leg length 14 in.? Sketch your solution.

Geometry 1-2

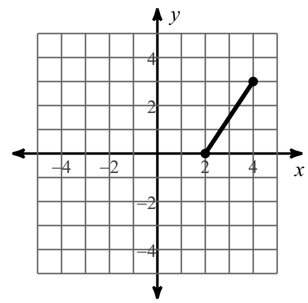

# Practice: Distance Formula

**Find the distance between each pair of points.**

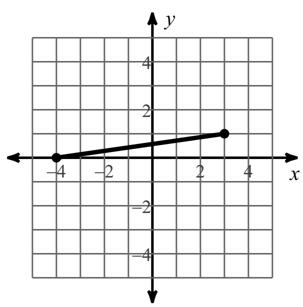
1)




2)




3)

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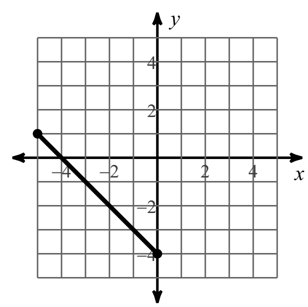



5) $(0, 2),\ (4, -2)$

6) $(7, 7),\ (0, 7)$

7) $(-7, 2),\ (-8, 6)$

8) $(5, 1),\ (2, -4)$

9) $(-2, 1),\ (5, -3)$

10) $(6, -6),\ (2, -6)$

# Lesson 9.5 • Distance in Coordinate Geometry

**Name** ______________________ **Period** ________ **Date** ____________

In Exercises 1–3, find the distance between each pair of points.

**1.** $(-5, -5)$, $(1, 3)$ **2.** $(-11, -5)$, $(5, 7)$ **3.** $(8, -2)$, $(-7, 6)$

In Exercises 4 and 5, use the distance formula and the slope of segments to identify the type of quadrilateral. Explain your reasoning.

**4.** $A(-2, 1)$, $B(3, -2)$, $C(8, 1)$, $D(3, 4)$ **5.** $T(-3, -3)$, $U(4, 4)$, $V(0, 6)$, $W(-5, 1)$

For Exercises 6 and 7, use $\triangle ABC$ with coordinates $A(4, 14)$, $B(10, 6)$, and $C(16, 14)$.

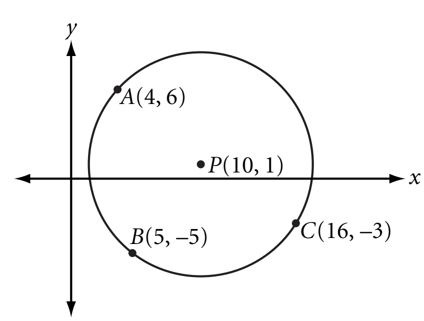
**6.** Determine whether $\triangle ABC$ is scalene, isosceles, or equilateral. Find the perimeter of the triangle.

**7.** Find the midpoints $M$ and $N$ of $\overline{AB}$ and $\overline{AC}$, respectively. Find the slopes and lengths of $\overline{MN}$ and $\overline{BC}$. How do the slopes compare? How do the lengths compare?

**8.** Find the equation of the circle with center $(-1, 5)$ and radius 2.

**9.** Find the center and radius of the circle whose equation is $x^2 + (y + 2)^2 = 25$.

**10.** $P$ is the center of the circle. What's wrong with this picture?



Geometry 1-2


# Practice: Equations of Circles

**Use the information provided to write the equation of each circle.**

1) Center: $(-13, 5)$
Radius: 4

2) Center: $(11, 6)$
Radius: $\sqrt{33}$

3) Center: $(-8, -16)$
Radius: 2

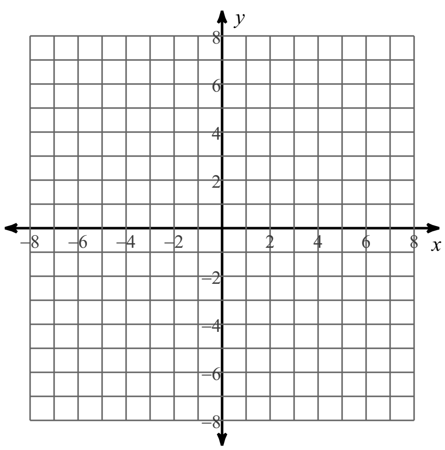
4) Center: $(-10, 9)$
Radius: 5

5) Center: $(-1, 16)$
Radius: 3

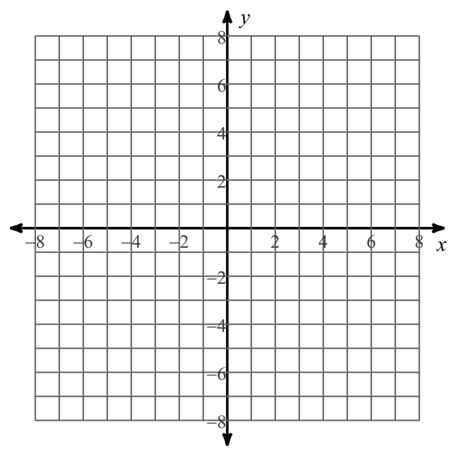
6) Center: $(-15, \sqrt{253})$
Radius: 1

**Identify the center and radius of each. Then sketch the graph.**

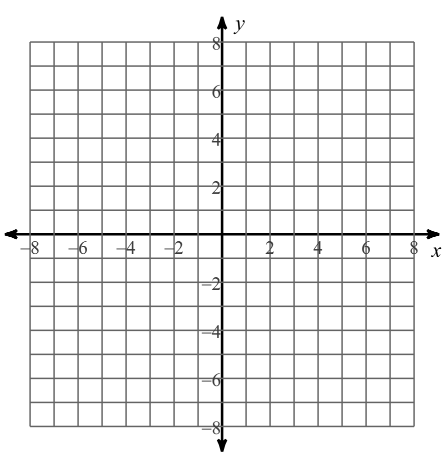
7) $(x-2)^2+(y-4)^2=5$



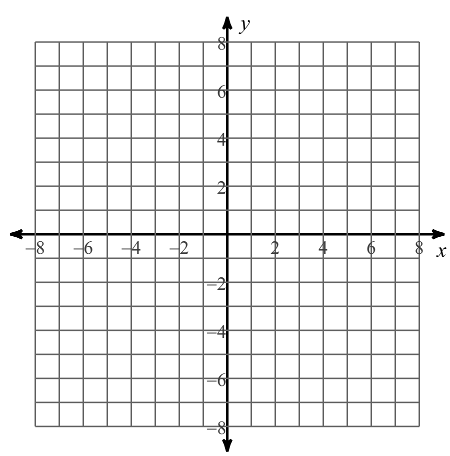

8) $(x+2)^2+(y+3)^2=9$




9) $(x-3)^2+(y-4)^2=9$




10) $(x-2)^2+(y+4)^2=1$

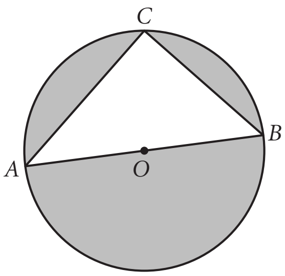


# Lesson 9.6 • Circles and the Pythagorean Theorem

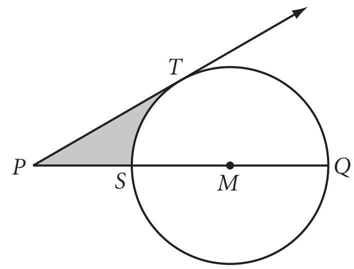
**Name** ________________________________ **Period** __________ **Date** ______________

In Exercises 1 and 2, find the area of the shaded region in each figure. All measurements are in centimeters. Write your answers in terms of $\pi$ and rounded to the nearest 0.1 $cm^2$.

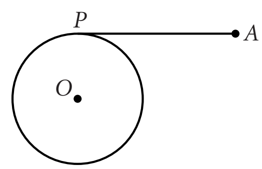
**1.** $AO = 5$. $AC = 8$.




**2.** Tangent $\overrightarrow{PT}$, $QM = 12$, $m\angle P = 30°$



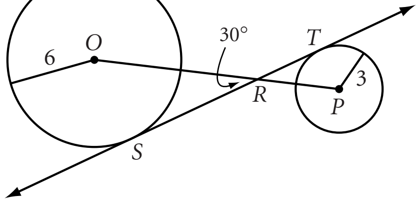

**3.** $AP = 63$ cm. Radius of circle $O = 37$ cm. How far is $A$ from the circumference of the circle?



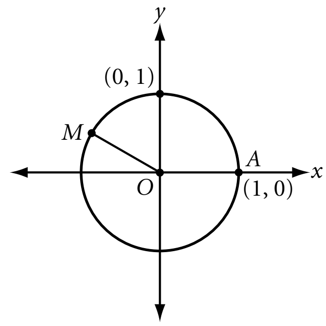

**4.** Two perpendicular chords with lengths 12.2 cm and 8.8 cm have a common endpoint. What is the area of the circle?

**5.** $ABCD$ is inscribed in a circle. $\overline{AC}$ is a diameter. If $AB = 9.6$ cm, $BC = 5.7$ cm, and $CD = 3.1$ cm, find $AD$.

**6.** Find $ST$.

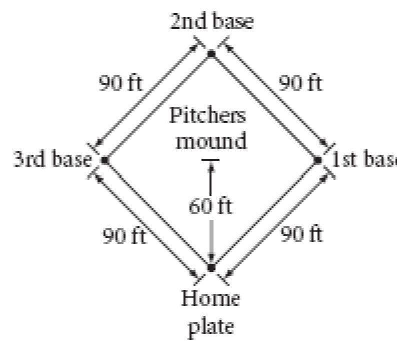



**7.** The coordinate of point $M$ is $\left(\frac{-\sqrt{3}}{2}, \frac{1}{2}\right)$. Find the measure of $\angle AOM$.



# Unit 9 • Challenge Problems

1. (*Target 9a & 9b*)
   On a baseball diamond, the bases are at the vertices of a square measuring 90 feet on a side. The pitcher's mound is on the diagonal between home plate and 2nd base, 60 feet from home plate. Give each answer to the nearest 0.01 foot.

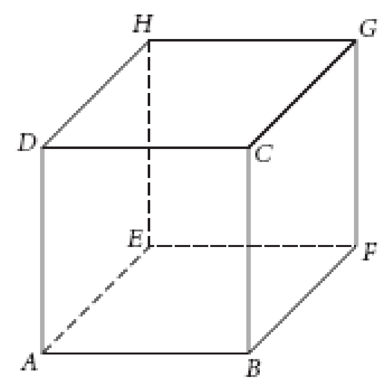
   
   

   a. How far is a throw from 3rd base to 1st base? Show all your work, and draw and label the triangle you used to find your answer.

   b. The shortstop catches the ball halfway between 2nd base and 3rd base, and then throws the ball to 1st base. How far is the throw? Show all your work, and draw and label the triangle you used to find your answer.

   c. Find the distance from the pitcher's mound to each base. Use diagrams to help you explain how you found each distance.

2. (*Target 9a, 9b & 9c*)
   The cube shown has edge length 5 cm.

   a. Find the area of rectangle *ADGF*. Explain how you found the area.

   b. Find the area of $\Delta ACH$. Explain how you found the area.

   c. Sketch cross section *AMGN* where *M* and *N* are the midpoints of $\overline{BC}$ and $\overline{EH}$, respectively. What type of quadrilateral is *AMGN*? Find the area of *AMGN* and explain how you found it.

# Unit 9 • Challenge Problems

3. (*Target 9b, 9c and 9d*)
Sherry Outfitter is designing a nylon cover for a conical tent. The cover should be a sector of a circle with radius 8 ft and a central angle of 157.5°. The center pole of the tent is 6 ft long. The covering needs to fit tightly and the center pole must be vertical. Because of the elastic nature of the special nylon, measurements need only be rounded to 0.1 ft.

   a. Sketch the sector, and label the central angle, radius, and arc length. Sketch the setup tent. Use the cover information to label the slant height and radius, and use the information about the pole length to label the altitude.

   b. Is the cover information correct? Explain why or why not.

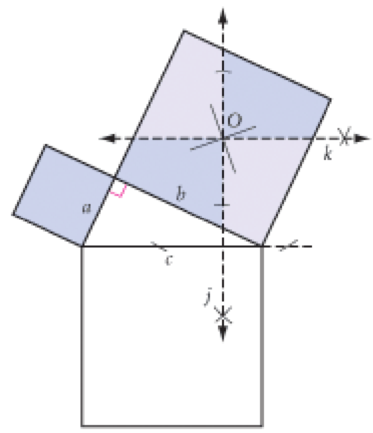
   c. The only modification Sherry can easily make is to change the central angle of the sector. By how many degrees should she increase or decrease the sector's central angle? What will be the dimensions of the setup tent?

4. (*Target 9f*)
Find the exact length of the radius of the circle with center (1, 7) that is tangent to the line $y = \frac{1}{2}x - \frac{7}{2}$. Explain each step of your solution.

# Unit 9 • Challenge Problems

5. (*Targets 9b*)
The puzzle in this investigation is intended to help you recall the Pythagorean Theorem. It uses a dissection, which means you will cut apart one or more geometric figures and make the pieces fit into another figure.

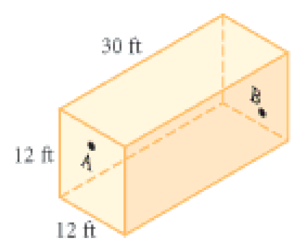
Step 1 Separate the four diagrams on the worksheet in the back of the packet so each person in your group starts with a different right triangle. Each diagram includes a right triangle with a square constructed on each side of the triangle. Label the legs *a* and *b* and the hypotenuse *c*. What is the area of each square in terms of its side?




Step 2 Locate the center of the square on the longer leg by drawing its diagonals. Label the center *O.*

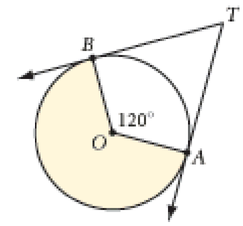
Step 3 Through point *O,* construct line *j* perpendicular to the hypotenuse and line *k* perpendicular to line *j.* Line *k* is parallel to the hypotenuse. Lines *j* and *k* divide the square on the longer leg into four parts.

6. (*Target 9b & 9c*)
In a rectangular room, measuring 30 by 12 by 12 feet, a spider is at point *A* on the middle of one of the end walls, 1 foot from the ceiling. A fly is at point *B* on the center of the opposite wall, 1 foot from the floor. What is the shortest distance that the spider must crawl to reach the fly, which remains stationary? The spider never drops or uses its web, but crawls fairly.

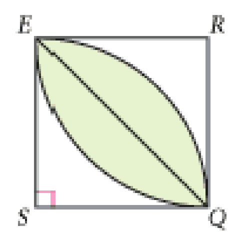


# Unit 9 • Challenge Problems

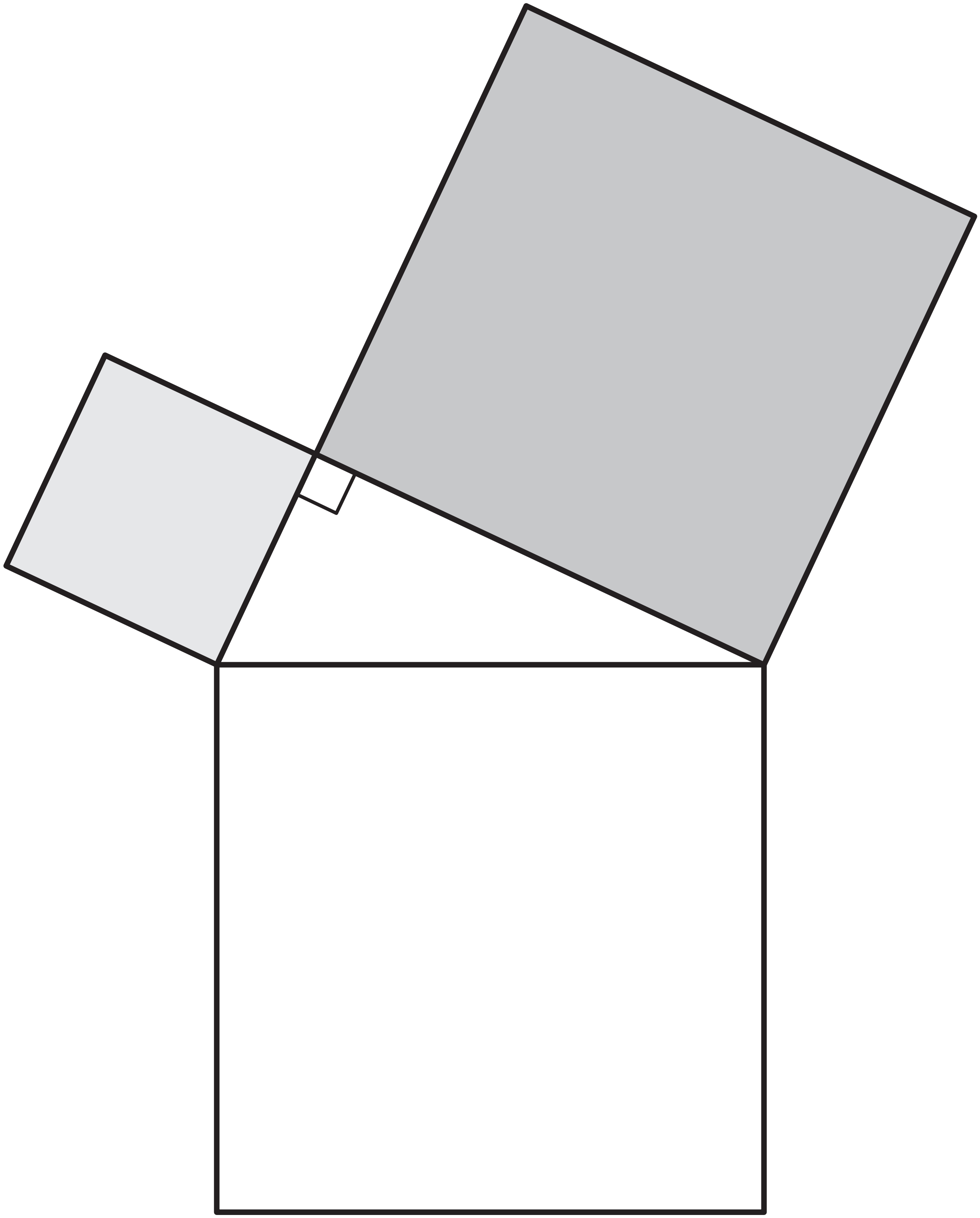
7. (*Target 9a, 9b & 9c*)
   Rays $\overrightarrow{TA}$ and $\overrightarrow{TB}$ are tangent to circle $O$ at $A$ and $B$ respectively, and $\overline{BT} = 6\sqrt{3}\ cm$.



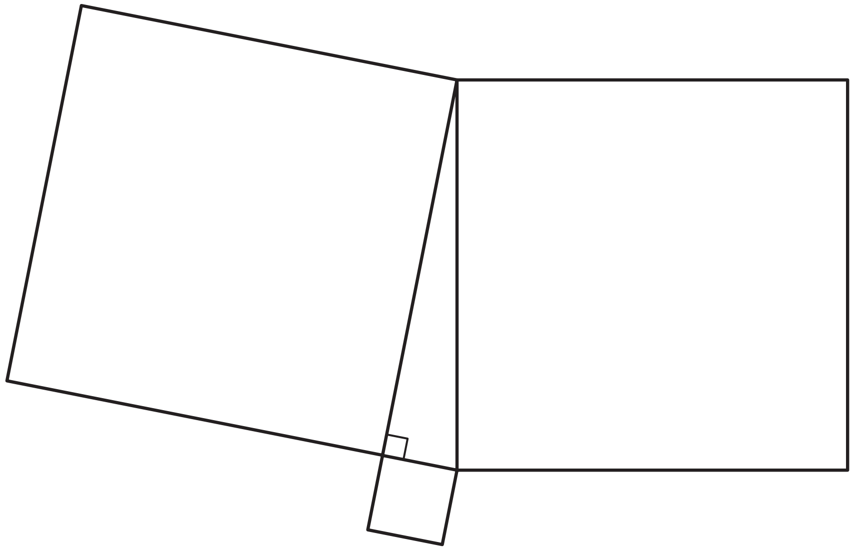

8. (*Target 9a, 9b & 9c*)
   The quadrilateral is a square, the arcs are portions of circles centered at $R$ and $S$, and $\overline{QE} = 2\sqrt{2}$ cm.

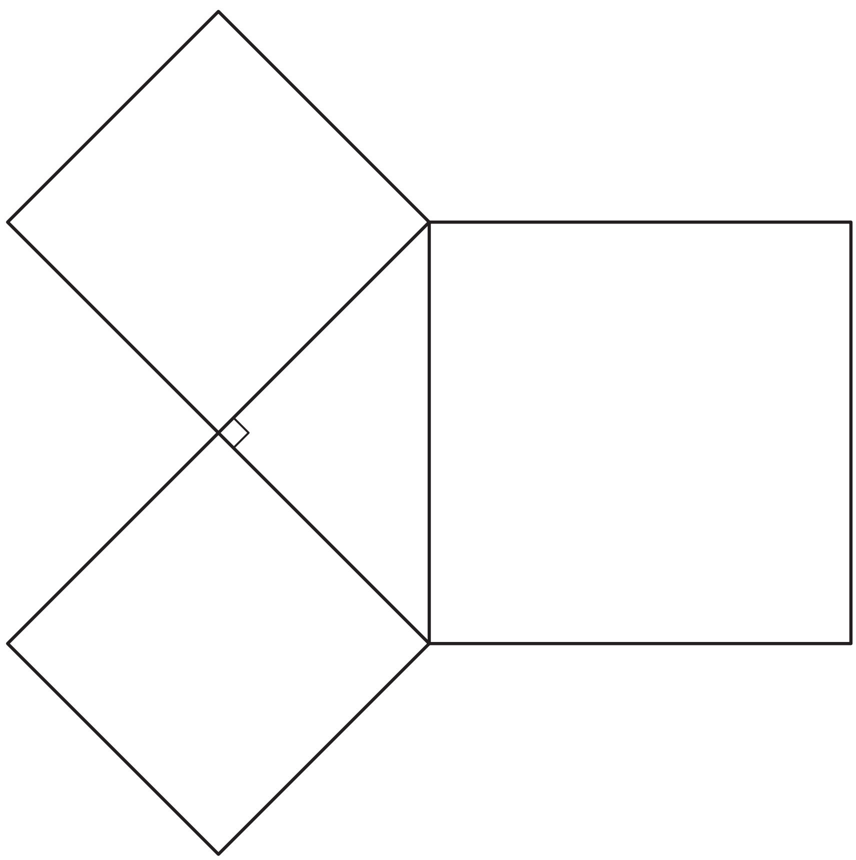


## Pythagorean Theorem

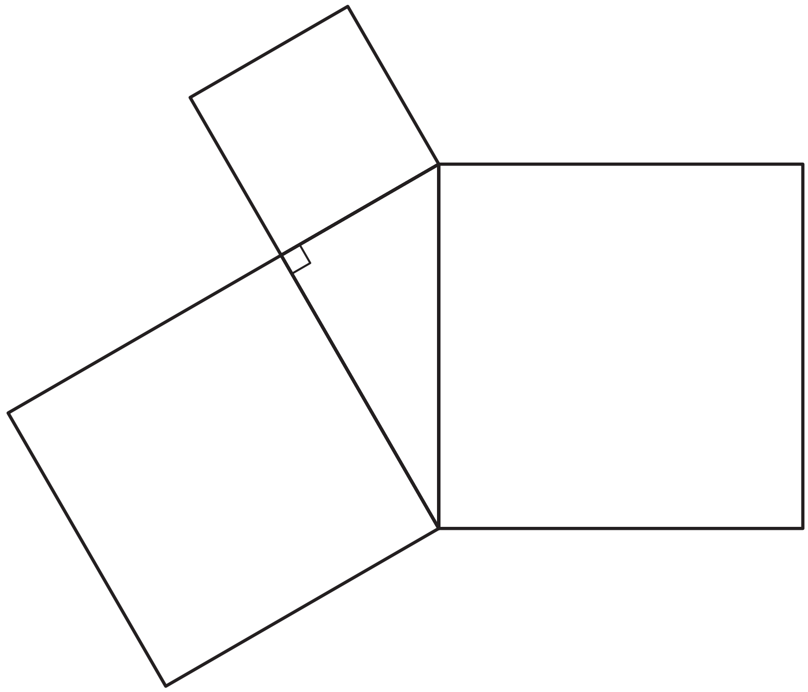


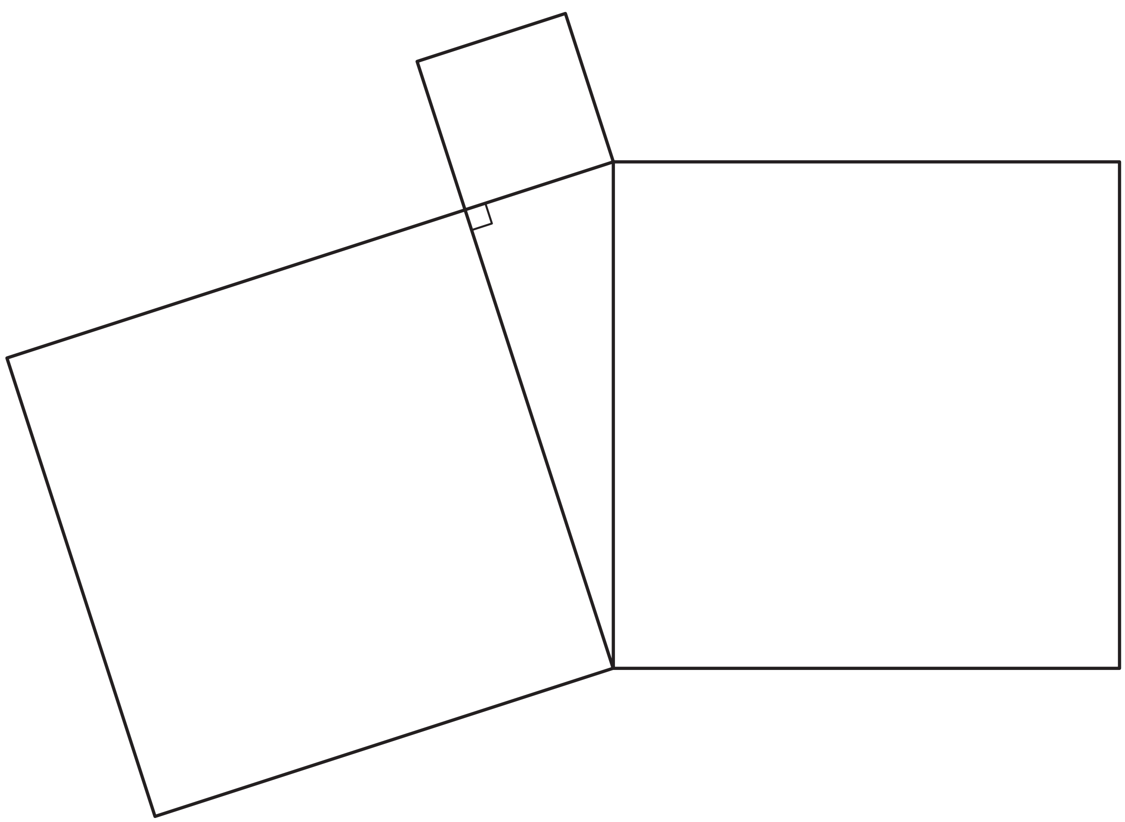
# Dissection of Squares (page 1 of 2)





# Dissection of Squares (page 2 of 2)





## LESSON 9.1 • The Theorem of Pythagoras

**1.** $a = 21$ cm

**2.** $p \approx 23.9$ cm

**3.** $x = 8$ ft

**4.** $h \approx 14.3$ in.

**5.** Area $\approx 19.0$ ft$^2$

**6.** $C(11, -1)$; $r = 5$

**7.** Area $\approx 49.7$ cm$^2$

**8.** $RV \approx 15.4$ cm

**9.** If the base area is $16\pi$ cm$^2$, then the radius is 4 cm. The radius is a leg of the right triangle; the slant height is the hypotenuse. The leg cannot be longer than the hypotenuse.

**10.** Area = 150 in$^2$; hypotenuse $QR = 25$ in.; altitude to the hypotenuse = 12 in.

## LESSON 9.2 • The Converse of the Pythagorean Theorem

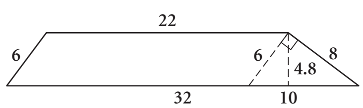
**1.** No **2.** Yes **3.** Yes **4.** Yes

**5.** Area $\approx 21.22$ cm$^2$

**6.** The top triangle is equilateral, so half its side length is 2.5. A triangle with sides 2.5, 6, and 6.5 is a right triangle because $2.5^2 + 6^2 = 6.5^2$. So, the angle marked 95° should be 90°.

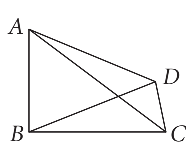
**7.** $x \approx 44.45$ cm. By the Converse of the Pythagorean Theorem, $\triangle ADC$ is a right triangle, and $\angle ADC$ is a right angle. $\angle ADC$ and $\angle BDC$ are supplementary, so $\angle BDC$ is also a right triangle. Use the Pythagorean Theorem to find $x$.

**8.** 129.6 cm$^2$




**9.** No. Because $AB^2 + BC^2 \neq AC^2$, $\angle B$ of $\triangle ABC$ is not a right angle.

**10.** Cannot be determined. The length of $CD$ is unknown. One possible quadrilateral is shown.




**11.** Yes. Using SSS, $\triangle ABC \cong \triangle BAD \cong \triangle CDA \cong \triangle DCB$. That means that the four angles of the quadrilateral are all congruent by CPCTC. Because the four angles must sum to 360° and they are all congruent, they must be right angles. So, $ABCD$ is a rectangle.

## LESSON 9.3 • Two Special Right Triangles

**1.** $a = 14\sqrt{2}$ cm

**2.** $a = 12$ cm, $b = 24$ cm

**3.** $a = 12$ cm, $b = 6\sqrt{3}$ cm

**4.** $64\sqrt{3}$ cm$^2$

**5.** Perimeter $= 32 + 6\sqrt{2} + 6\sqrt{3}$ cm; area $= 60 + 18\sqrt{3}$ cm$^2$

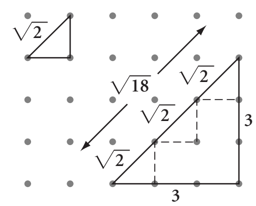
**6.** $AC = 30\sqrt{2}$ cm; $AB = 30 + 30\sqrt{3}$ cm; area $= 450 + 450\sqrt{3}$ cm$^2$

**7.** $45\sqrt{3}$ cm$^2$

**8.** $C\left(-\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$

**9.** $C(-6\sqrt{3}, -6)$

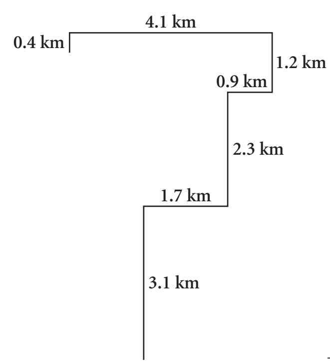
**10.** Possible answer:




## LESSON 9.4 • Story Problems

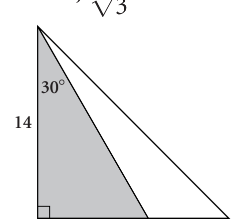
**1.** The foot is about 8.7 ft away from the base of the building. To lower it by 2 ft, move the foot an additional 3.3 ft away from the base of the building.

**2.** About 6.4 km




**3.** 149.5 linear feet of trim must be painted, or 224.3 feet$^2$. Two coats means 448.6 ft$^2$ of coverage. Just over $2\frac{1}{2}$ quarts of paint is needed. If Hans buys 3 quarts, he would have almost $\frac{1}{2}$ quart left. It is slightly cheaper to buy 1 gallon and have about $1\frac{1}{2}$ quarts left. The choice is one of money versus conserving. Students may notice that the eaves extend beyond the exterior walls of the house and adjust their answer accordingly.

**4.** 14 in., $\frac{14}{\sqrt{3}}$ in. $\approx 8.08$ in., $\frac{28}{\sqrt{3}}$ in. $\approx 16.17$ in.



## LESSON 9.5 • Distance in Coordinate Geometry

**1.** 10 units **2.** 20 units **3.** 17 units

**4.** *ABCD* is a rhombus: All sides $= \sqrt{34}$, slope $\overline{AB} = -\frac{3}{5}$, slope $\overline{BC} = \frac{3}{5}$, so $\angle B$ is not a right angle, and *ABCD* is not a square.

**5.** *TUVW* is an isosceles trapezoid: $\overline{TU}$ and $\overline{VW}$ have slope 1, so they are parallel. $\overline{UV}$ and $\overline{TW}$ have length $\sqrt{20}$ and are not parallel (slope $\overline{UV} = -\frac{1}{2}$, slope $\overline{TW} = -2$).

**6.** Isosceles; perimeter = 32 units

**7.** $M(7, 10)$; $N(10, 14)$; slope $\overline{MN} = \frac{4}{3}$; slope $\overline{BC} = \frac{4}{3}$; $MN = 5$; $BC = 10$; the slopes are equal; $MN = \frac{1}{2}BC$.

**8.** $(x + 1)^2 + (y - 5)^2 = 4$ **9.** Center $(0, -2)$, $r = 5$

**10.** The distances from the center to the three points on the circle are not all the same: $AP = \sqrt{61}$, $BP = \sqrt{61}$, $CP = \sqrt{52}$

## LESSON 9.6 • Circles and the Pythagorean Theorem

**1.** $(25\pi - 24)$ cm$^2$, or about 54.5 cm$^2$

**2.** $(72\sqrt{3} - 24\pi)$ cm$^2$, or about 49.3 cm$^2$

**3.** $(\sqrt{5338} - 37)$ cm $\approx$ 36.1 cm

**4.** Area $= 56.57\pi$ cm $\approx$ 177.7 cm$^2$

**5.** $AD = \sqrt{115.04}$ cm $\approx$ 10.7 cm

**6.** $ST = 9\sqrt{3} \approx 15.6$ **7.** 150°

# Answers to Practice: Simplifying Radicals

| | | | |
|---|---|---|---|
| 1) $6\sqrt{3}$ | 2) $3\sqrt{10}$ | 3) $\sqrt{105}$ | 4) $5\sqrt{6}$ |
| 5) $4\sqrt{7}$ | 6) $9\sqrt{5}$ | 7) $4\sqrt{2}$ | 8) $8\sqrt{3}$ |
| 9) $\sqrt{30}$ | 10) $\sqrt{42}$ | 11) $18\sqrt{2}$ | 12) $3\sqrt{2}$ |
| 13) 120 | 14) $30\sqrt{7}$ | 15) $21\sqrt{6}$ | 16) $10\sqrt{2}$ |
| 17) $7\sqrt{210}$ | 18) 120 | 19) $32\sqrt{2}$ | 20) $112\sqrt{2}$ |

# Answers to Practice: Pythagorean Theorem & Converse

| | | | |
|---|---|---|---|
| 1) 4 | 2) 10 | 3) 13 | 4) 15 |
| 5) Right | 6) Obtuse | 7) Obtuse | 8) Right |
| 9) Yes | 10) No | | |

# Answers to Practice: Special Right Triangles

1) $x = 6\sqrt{2},\ y = 6$

2) $m = \dfrac{3\sqrt{2}}{2},\ n = \dfrac{3\sqrt{2}}{2}$

3) $x = 3\sqrt{2},\ y = 3\sqrt{2}$

4) $x = 3\sqrt{2},\ y = 3$

5) $x = 2\sqrt{3},\ y = 3$

6) $m = 4\sqrt{5},\ n = 2\sqrt{15}$

7) $m = 4\sqrt{3},\ n = 2\sqrt{3}$

8) $x = 5,\ y = \dfrac{5}{2}$

9) $5\sqrt{6}$

10) $3\sqrt{6}$

11) 24

12) $2\sqrt{6}$

13) $\dfrac{8\sqrt{6}}{3}$

14) $\sqrt{6}$

15) $\dfrac{7\sqrt{6}}{2}$

16) $6\sqrt{6}$

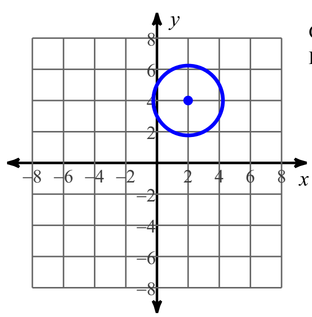
# Answers to Practice: Distance Formula

1) $\sqrt{130}$
2) $\sqrt{13}$
3) $5\sqrt{2}$
4) $5\sqrt{2}$
5) $4\sqrt{2}$
6) 7
7) $\sqrt{17}$
8) $\sqrt{34}$
9) $\sqrt{65}$
10) 4

# Answers to Practice: Equations of Circles

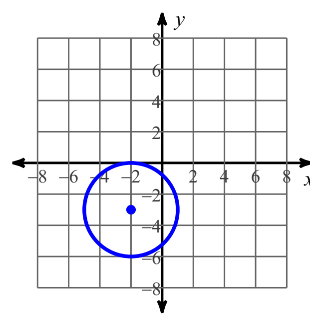
1) $(x+13)^2+(y-5)^2=16$
2) $(x-11)^2+(y-6)^2=33$
3) $(x+8)^2+(y+16)^2=4$
4) $(x+10)^2+(y-9)^2=25$
5) $(x+1)^2+(y-16)^2=9$
6) $(x+15)^2+(y-\sqrt{253})^2=1$

7)



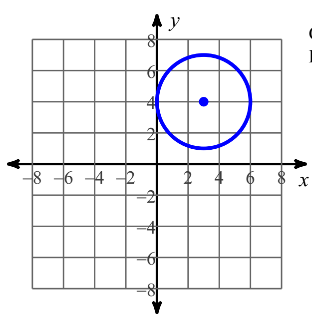

Center: $(2, 4)$
Radius: $\sqrt{5}$

8)



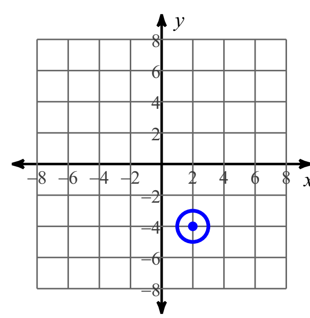

Center: $(-2, -3)$
Radius: 3

9)




Center: $(3, 4)$
Radius: 3

10)




Center: $(2, -4)$
Radius: 1