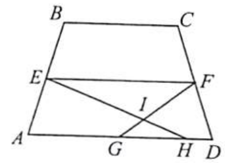
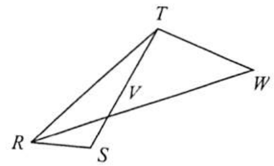
3. Given: $\overline{EF}$ is the median of trapezoid $ABCD$.
Prove: $EI \times GH = IH \times EF$.



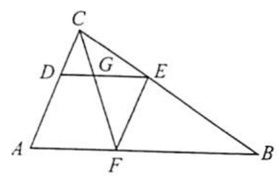
Exercise 3

4. Given: V is a point on $\overline{ST}$ such that $\overline{RVW}$ bisects $\angle SRT$, $\overline{TW} \cong \overline{TV}$.
Prove: $RW \times SV = RV \times TW$.



Exercise 4

5. Given: $\triangle ABC$ with $\overline{CDA}$, $\overline{CEB}$, $\overline{AFB}$, $\overline{DE} \parallel \overline{AB}$, $\overline{EF} \parallel \overline{AC}$, $\overline{CF}$ intersects $\overline{DE}$ at G.
Prove: a. $\triangle CAF \sim \triangle FEG$.
b. $DG \times GF = EG \times GC$



Exercise 5

6. Rosalie thinks she discovered a new theorem. She claims that "The product of the lengths of the legs of a right triangle is always equal to the product of the lengths of the hypotenuse and the altitude drawn to the hypotenuse." Prove or disprove Rosalie's theorem.

CHAPTER 6

RIGHT TRIANGLES AND TRIGONOMETRY

6.1 PROPORTIONS IN A RIGHT TRIANGLE

KEY IDEAS

Drawing an altitude to the hypotenuse of a right triangle creates pairs of similar right triangles from which useful proportions can be derived.

Mean Proportional

If the means of a proportion are the same, as in $\frac{8}{4} = \frac{4}{2}$, then either mean is called the **mean proportional** or **geometric mean** between the other two numbers. Thus, 4 is the *mean proportional* between 8 and 2. Equivalently, 4 is the *geometric mean* of 8 and 2.

Example 1

Find the mean proportional between:
a. 2 and 50 b. $6a$ and $8a^3$

Solution: Let x represent the mean proportional between the given pair of numbers.

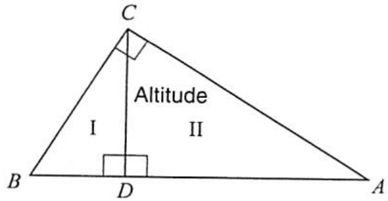
a.
$$\frac{4}{x} = \frac{x}{25}$$
$$x \cdot x = 4 \cdot 25$$
$$x^2 = 100$$
$$x = \sqrt{100} = \mathbf{10}.$$

b.
$$\frac{6a}{x} = \frac{x}{8a^3}$$
$$x^2 = 48a^4$$
$$x = \sqrt{48} \cdot \sqrt{a^4}$$
$$= \sqrt{16} \cdot \sqrt{3} \cdot a^2$$
$$= \mathbf{4\sqrt{3}\,a^2}$$

Right Triangle Proportions

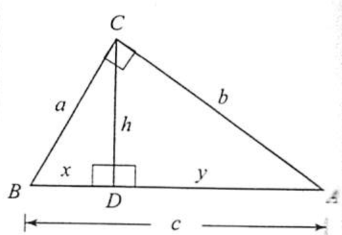
The altitude drawn to the hypotenuse of a right triangle separates it into two other right triangles that are similar to each other and to the original right triangle. In the accompanying figure of right triangle ABC,

- $\Delta I \sim \Delta ABC$ since the two right triangles have $\angle B$ in common.
- $\Delta II \sim \Delta ABC$ as the two right triangles have $\angle A$ in common.
- $\Delta I \sim \Delta II$ because two triangles similar to the same triangle are similar to each other (Transitive Property of Similarity).



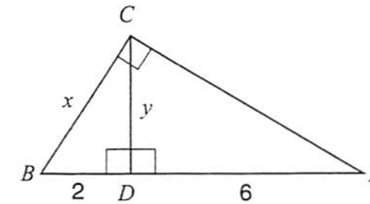
> **Theorem: Altitude–Hypotenuse Theorem**
> If the altitude is drawn to the hypotenuse of a right triangle, then the two right triangles that are formed are similar to each other and to the original right triangle.

Two important corollaries of this theorem tell how the segments formed on the hypotenuse are related to the legs and to the altitude on the hypotenuse.

Corollary	Proportions	Figure
Corollary 1: The altitude to the hypotenuse of a right triangle divides the hypotenuse so that either leg is the mean proportional between the hypotenuse and the segment of the hypotenuse adjacent to that leg.	$\frac{x}{a} = \frac{a}{c}$ and $\frac{y}{b} = \frac{b}{c}$	
Corollary 2: The altitude to the hypotenuse of a right triangle is the mean proportional between the two segments along the hypotenuse.	$\frac{x}{h} = \frac{h}{y}$	

Example 2

In the accompanying diagram of right triangle ABC, $\overline{CD}$ is the altitude to hypotenuse $\overline{AB}$. Find the values of x and y.



Solution: The length of hypotenuse $\overline{AB}$ is $2 + 6 = 8$.

Use Corollary 1 to find x:

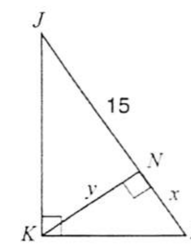
$$\frac{BD}{x} = \frac{x}{AB}$$
$$\frac{2}{x} = \frac{x}{8}$$
$$x^2 = 16$$
$$x = \sqrt{16} = \mathbf{4}$$

Use Corollary 2 to find y:

$$\frac{BD}{y} = \frac{y}{AD}$$
$$\frac{2}{x} = \frac{x}{6}$$
$$x^2 = 12$$
$$x = \sqrt{4 \cdot 3} = \mathbf{2\sqrt{3}}$$

Example 3

In the accompanying diagram of right triangle JKL, $\overline{KN}$ is the altitude to hypotenuse $\overline{LJ}$. Find the values of x and y.



Solution: The length of hypotenuse $\overline{LJ}$ is represented by $x + 15$.

Use Corollary 1 to find x:

$$\frac{LN}{10} = \frac{10}{LJ}$$
$$\frac{x}{10} = \frac{10}{x+15}$$
$$x(x + 15) = 100$$
$$x^2 + 15x - 100 = 0$$
$$(x - 5)(x + 20) = 0$$
$$x - 5 = 0 \quad \text{or} \quad x + 20 = 0$$
$$\mathbf{x = 5} \quad \text{or} \quad x = -20$$

← Reject since x must be positive

Use Corollary 2 to find y:

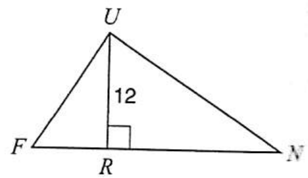
$$\frac{LN}{y} = \frac{y}{NJ}$$
$$\frac{5}{x} = \frac{x}{15}$$
$$x^2 = 75$$
$$x = \sqrt{25 \cdot 3}$$
$$= \mathbf{5\sqrt{3}}$$

Check Your Understanding of Section 6.1

A. Multiple Choice

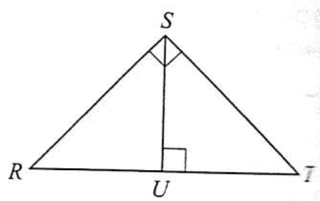
1. If the length of the altitude drawn to the hypotenuse of a right triangle is 10 inches, the number of inches in the lengths of the segments of the hypotenuse may be
(1) 5 and 20 (2) 2 and 5 (3) 3 and 7 (4) 50 and 50

2. In the accompanying diagram, $\triangle FUN$ is a right triangle, $\overline{UR}$ is the altitude to hypotenuse $\overline{FN}$, $UR = 12$, and the lengths of $\overline{FR}$ and $\overline{FN}$ are in the ratio 1:10. What is the length of $\overline{FR}$?
(1) 1 (3) 36
(2) 1.2 (4) 4



3. In the right triangle ABC, $m\angle C = 90$ and altitude $\overline{CD}$ is drawn to hypotenuse $\overline{AB}$. If $AD = 4$ and $DB = 5$, what is AC?
(1) $\sqrt{20}$ (2) 6 (3) $\sqrt{45}$ (4) 9

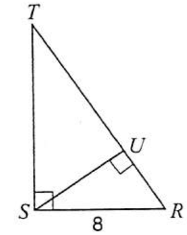
4. In the accompanying diagram, $\triangle RST$ is a right triangle, $\overline{SU}$ is the altitude to hypotenuse $\overline{RT}$. $RT = 16$, and $RU = 7$. What is the length of $\overline{ST}$?
(1) $3\sqrt{7}$ (3) 9
(2) $4\sqrt{7}$ (4) 12



5. The altitude drawn to the hypotenuse of a right triangle divides the hypotenuse into segments of lengths 4 and 12. The length of the shorter leg of the right triangle is
(1) 8 (2) $\sqrt{20}$ (3) $\sqrt{48}$ (4) $\sqrt{192}$

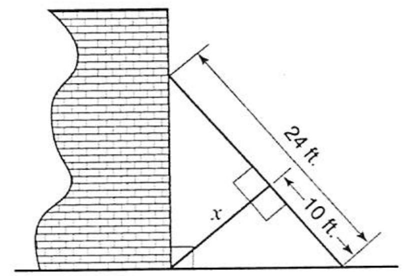
6. What is the geometric mean of $\frac{1}{3}x$ and $27x^3$ when $x \neq 0$?
(1) $3x^2$ (2) $9x$ (3) $3x$ (4) $9x^2$

7. In the accompanying diagram, $\triangle RST$ is a right triangle, $\overline{SU}$ is the altitude to hypotenuse $\overline{RT}$, $RS = 8$, and the ratio of RU to UT is 1 to 3. What is the length of $\overline{RT}$?
(1) 16 (3) 24
(2) 20 (4) 32



B. Show or explain how you arrived at your answer.

8. The altitude drawn to the hypotenuse of a right triangle divides the hypotenuse into two segments whose lengths are in the ratio of 1 to 4. If the length of the altitude is 8, find the length of the longer leg of the triangle.



9. The accompanying diagram shows a 24-foot ladder leaning against a building. A steel brace extends from the ladder to the point where the building meets the ground. The brace forms a right angle with the ladder. If the steel brace is connected to the ladder at a point that is 10 feet from the foot of the ladder, find to the nearest tenth of a foot the length, x, of the steel brace.

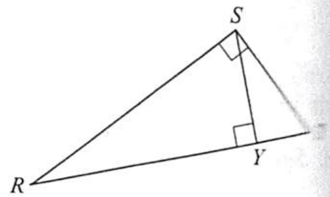
10. In right triangle JKL, $\angle K$ is a right angle. Altitude $\overline{KH}$ intersects the hypotenuse at H in such a way that JH exceeds HL by 5. If $KH = 6$, find the length of the hypotenuse.

11. In right triangle ABC, the length of altitude $\overline{CD}$ to hypotenuse $\overline{AB}$ is 12. If the length of the longer segment of the hypotenuse exceeds the length of the shorter segment of the hypotenuse by 7, find the length of the hypotenuse.

12. In right triangle ABC, altitude $\overline{CD}$ is drawn to hypotenuse $\overline{AB}$. If AB is four times as great as AD and AC is 3 more than AD, find the length of altitude $\overline{CD}$.

13. In right triangle ABC, altitude $\overline{CD}$ is drawn to hypotenuse $\overline{AB}$, $AD =$ [illegible] and DB is 3 less than CD. Find, in simplest radical form, the perimeter of triangle ABC.

14. In the accompanying diagram of right triangle RST, altitude $\overline{YS}$ is drawn to hypotenuse $\overline{RT}$, $RT = 20$, $TY < YR$, and $YS = 8$.
   a. If x is used to represent the length of $\overline{TY}$, write a proportion that could be used to find x. Solve the proportion algebraically for x.
   b. Find the length of $\overline{ST}$ in simplest radical form.

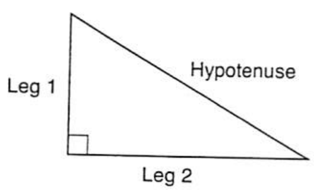


6.2 THE PYTHAGOREAN THEOREM

KEY IDEAS

The Pythagorean Theorem relates the lengths of the three sides of a right triangle:

$$(\text{Leg }1)^2 + (\text{Leg }2)^2 = (\text{Hypotenuse})^2$$



The Pythagorean Theorem can be proved using the proportions derived from the Altitude-Hypotenuse Theorem.

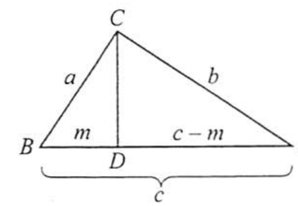
A Proof of the Pythagorean Theorem

Although there is more than one way of proving the Pythagorean Theorem, here is a proof that uses proportions in a right triangle.

Theorem: Pythagorean Theorem
In a right triangle, the sum of the squares of the lengths of the legs is equal to the square of the length of the hypotenuse ($a^2 + b^2 = c^2$).

Proof

Given: $\triangle ABC$, $\angle C$ is a right angle, c is the length of the hypotenuse, a and b are the lengths of the legs.
Prove: $a^2 + b^2 = c^2$.



Draw altitude $\overline{CD}$, and let $BD = m$, so $AD = c - m$, as shown in the accompanying diagram. Then apply Corollary 1:

$$\frac{m}{a} = \frac{a}{c} \quad \text{so} \quad a^2 = +mc$$
$$\frac{c-m}{b} = \frac{b}{c} \quad \text{so} \quad b^2 = c^2 - mc$$
Add the two equations.
$$a^2 + b^2 = c^2 \leftarrow \text{Pythagorean Theorem}$$

Applying the Pythagorean Theorem

The Pythagorean Theorem can be used to find the length of *any* side of a right triangle when the lengths of the other two sides are known:

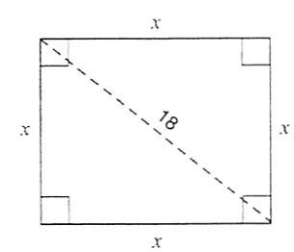
If $a = 3$ and $b = 5$, then	If $a = \sqrt{13}$ and $c = 7$, then
$a^2 + b^2 = c^2$	$a^2 + b^2 = c^2$
$3^2 + 5^2 = c^2$	$(\sqrt{13})^2 + b^2 = 7^2$
$9 + 25 = c^2$	$13 + b^2 = 49$
$c^2 = 34$	$b^2 = 49 - 13$
$c = \sqrt{34}$	$b = \sqrt{36} = 6$

Example 1

Ray wants to build a square garden in which the distance between opposite corners is *at least* 18.0 feet. What is the shortest possible side length of the square garden correct to the *nearest tenth of a foot*?

Solution: Use the Pythagorean Theorem where x represents the length of a side of the square garden:

$$x^2 + x^2 = 18^2$$
$$2x^2 = 324$$
$$\frac{2x^2}{2} = \frac{324}{2}$$
$$x = \sqrt{162}$$
$$x \approx 12.728$$



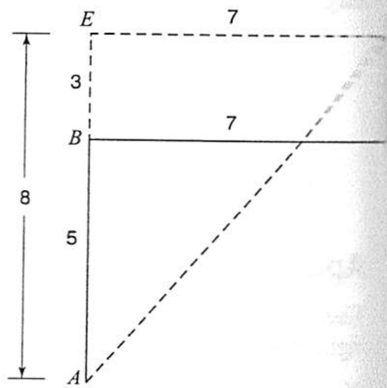
Round up from 12.728 to **12.8 feet** in order for the diagonal length to be *at least* 18.0 feet.

Example 2

Katie hikes 5 miles north, 7 miles east, and then 3 miles north again. *To the nearest tenth of a mile*, how far, in a straight line, is Katie from her starting point?

Solution: The four key points on Katie's trip are labeled A through D in the accompanying diagram.

- To determine how far, in a straight line, Katie is from her starting point at A, find the length of $\overline{AD}$.
- Form a right triangle in which $\overline{AD}$ is the hypotenuse by completing rectangle $BCDE$ as shown in the accompanying diagram.
- Because opposite sides of a rectangle have the same length, $ED = BC = 7$, and $BE = CD = 3$. Thus, $AE = 5 + 3 = 8$.
- Since AD is the hypotenuse in right triangle AED:



$$\begin{aligned}(AD)^2 &= (AF)^2 + (FD)^2\\ &= 8^2 \quad + 7^2\\ &= 64 \quad + 4\\ &= 113\end{aligned}$$

$$AD = \sqrt{113} \approx 10.63$$

Correct to the *nearest tenth of a mile*, Katie is **10.6** miles from her starting point.

Pythagorean Triples

A **Pythagorean triple** is a set of three positive integers $\{x, y, z\}$ that satisfy the relationship $x^2 + y^2 = z^2$. Here are some commonly encountered Pythagorean triples that you should memorize:

$$\{3, 4, 5\}, \{5, 12, 13\}, \text{ and } \{8, 15, 17\}$$

Multiplying each member of a Pythagorean triple by the same whole number produces another Pythagorean triple. For example, multiplying each member of $\{3, 4, 5\}$ by 2 forms a 6–8–10 Pythagorean triple:

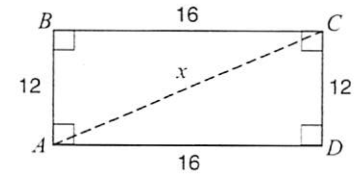
$$\{\underline{3} \times 4, \underline{4} \times 2, \underline{5} \times 2\} = \{6, 8, 10\}$$

Recognizing Pythagorean triples can make problems easier to solve.

Example 3

A rectangular yard measures 12 yards by 16 yards. What is the distance from one corner of the yard to the opposite corner?

Solution 1: Draw rectangle $ABCD$. The lengths of the sides of right triangle ADC are a multiple of the basic 3–4–5 Pythagorean triple since $12 = \underline{3} \times 4$ and $16 = \underline{4} \times 4$ so $AC = \underline{5} \times 4 = 20$.



Solution 2: If you did not recognize that a Pythagorean triple was involved, use the Pythagorean theorem to find the length of leg $\overline{AB}$:

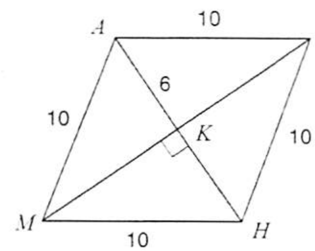
$$\begin{aligned}12^2 + 16^2 &= (AC)^2\\ 144 + 256 &= (AC)^2\\ (AC)^2 &= 400\\ AC &= \sqrt{400} = 20\end{aligned}$$

Area Applications

You may need to use the Pythagorean Theorem or a Pythagorean triple to find the length of a segment required in an area formula. A summary of area formulas is included in the section at the back of the book titled, "Some Geometric Relationships Worth Remembering."

Example 4

In the accompanying figure of rhombus $MATH$, diagonals $\overline{TM}$ and $\overline{AH}$ intersect at K, $AK = 6$, and each side measures 10. Find the area of rhombus $MATH$.



Solution: The area, A, of a rhombus is given by the formula,

$$A = \frac{1}{2}d_1d_2$$

where d_1 and d_2 are the lengths of its diagonals.

- The length of the sides of right triangle MKA form a 6–8–10 Pythagorean triple where $MK = 8$.
- Since the diagonals of a rhombus bisect each other,

$$d_1 = AH = 6 + 6 = 12 \text{ and } d_2 = MT = 8 + 8 = 16$$

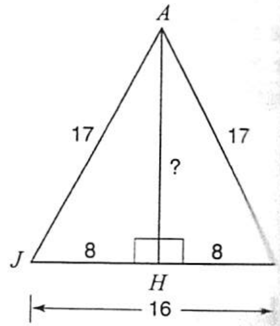
- Use the area formula $A = \frac{1}{2}d_1d_2$ where $d_1 = 12$ and $d_2 = 16$:

$$A = \frac{1}{2}(12)(16) = 96$$

The area of rhombus *MATH* is **96** square units.

Example 5

In the accompanying diagram of isosceles triangle *JAM*, the length of base $\overline{JM}$ is 16 cm. If the perimeter of $\triangle JAM$ is 50 cm, find the area of the triangle.



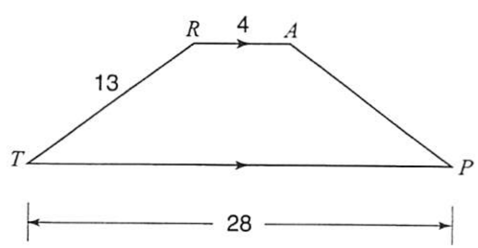
Solution: The sum of the lengths of the three sides is 50 cm, so the lengths of the two congruent legs add up to $50 - 16 = 34$ cm. Therefore, the length of each leg is 17 cm. The altitude drawn to the base bisects the base so that an 8–***15***–17 right triangle is formed where $AH = 15$. If you did not recognize that a Pythagorean triple was involved, you could have used the Pythagorean Theorem to find the unknown length.

$$\begin{aligned}\text{Area of } \triangle JAM &= \frac{1}{2} \times \text{base} \times \text{height} \\ &= \frac{1}{2}(16 \text{ cm} \times 15 \text{ cm}) \\ &= 120 \text{ cm}^2\end{aligned}$$

The area of $\triangle JAM$ is **120 cm²**.

Example 6

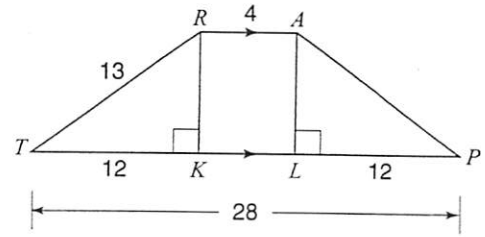
In the accompanying diagram of isosceles trapezoid *TRAP*, $\overline{RA} \parallel \overline{TP}$, $RA = 4$, $TP = 28$, and $RT = 13$. What is the area of trapezoid *TRAP*?



Solution: The area, A, of a trapezoid is given by the formula

$$A = \frac{1}{2}h(b_1 + b_2)$$

where b_1 and b_2 represent the lengths of the two bases and h is the altitude.



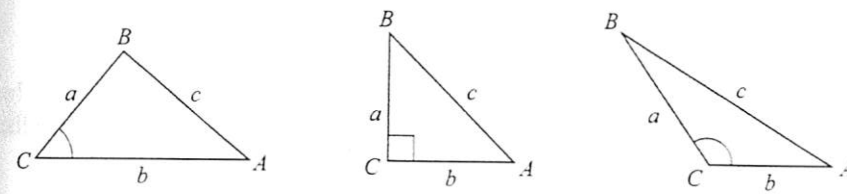
- Draw altitudes $\overline{RK}$ and $\overline{AL}$ thereby forming rectangle *RALK*. Since $KL = RA = 4$, $TK + LP = 28 - 4 = 24$.
- Because $\triangle TKR \cong \triangle PLA$, $TK = LP = \frac{1}{2}(24) = 12$.
- The lengths of the sides of right triangle *TKR* form a **5**–12–13 Pythagorean triple where altitude $RK = 5$.
- Use the area formula $A = \frac{1}{2}h(b_1 + b_2)$, where $h = 5$, $b_1 = 4$, and $b_2 = 28$:

$$\begin{aligned}A &= \frac{1}{2}(5)(4 + 28) \\ &= \frac{1}{2}(5)(32) \\ &= 80\end{aligned}$$

The area of trapezoid *TRAP* is **80** square units.

Pythagorean Inequalities

You can tell whether a triangle is acute, right, or obtuse by comparing the squares of the lengths of its sides.



If $c^2 < a^2 + b^2$, $\angle C$ is an acute angle. | If $c^2 = a^2 + b^2$, $\angle C$ is a right angle. | If $c^2 > a^2 + b^2$, $\angle C$ is an obtuse angle.

Given the lengths of a side of a triangle are 4, 5, and 6. Compare the square of the largest of the three numbers to the sum of the squares of the other two numbers:

$$6^2 \boxed{?} 4^2 + 5^2$$

$$6^2 \boxed{?} 16 + 25$$

$$36 < 41$$

Because $c^2 < a^2 + b^2$, the triangle is an acute triangle.

***Example* 7**

Classify the triangle whose sides measure $\sqrt{7}$, 3, and 4.

Solution: Compare the square of the largest of the three numbers to the sum of the squares of the other two numbers:

$$4^2 \boxed{?} (\sqrt{7})^2 + 3^2$$

$$16 \boxed{?} 7 + 9$$

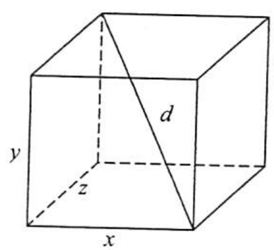
$$16 = 16$$

Because $c^2 = a^2 + b^2$, the triangle is a **right triangle**.

The Pythagorean Theorem In Rectangular Solids

The Pythagorean relationship may be extended to rectangular solids. In the accompanying figure,

$$x^2 + y^2 + z^2 = d^2$$



For example, in a rectangular box whose measurements are 5 inches by 6 inches by 9 inches, the distance, d, from one corner on top of the box to the opposite corner at the bottom of the box is given by

$$5^2 + 6^2 + 9^2 = d^2$$

so $25 + 36 + 81 = d^2$ and $d = \sqrt{142}$.

Check Your Understanding of Section 6.2

A. *Multiple Choice*

1. The lengths of the two legs of a right triangle are 2 and $\sqrt{3}$. What is the length of the hypotenuse?
   (1) $4\sqrt{3}$ (2) 10 (3) $\sqrt{14}$ (4) $\sqrt{7}$

2. The length of the hypotenuse of a right triangle is $\sqrt{15}$ and the length of one leg is 3. What is the length of the other leg?
   (1) 6 (2) 9 (3) $\sqrt{6}$ (4) $3\sqrt{2}$

3. What is the length of a diagonal of a square whose perimeter is 32?
   (1) $\sqrt{2}$ (2) $2\sqrt{2}$ (3) $4\sqrt{2}$ (4) $8\sqrt{2}$

4. Which set of numbers do *not* represent the lengths of the sides of a right triangle?
   (1) {9, 40, 41} (3) $\{\sqrt{12}, 6, 7\}$
   (2) $\{2, 4, 2\sqrt{5}\}$ (4) $\{1, 1, \sqrt{2}\}$

5. What is the length of a diagonal of a rectangle in which the lengths of two adjacent sides are $\sqrt{13}$ and 6?
   (1) 7 (2) 19 (3) $5\sqrt{3}$ (4) $\sqrt{23}$

6. If the lengths of the diagonals of a rhombus are 6 and 8, the perimeter of the rhombus is
   (1) 14 (2) 20 (3) 28 (4) 40

7. In rectangle $MATH$, $AT = 8$ and $TH = 12$. What is the length of diagonal $\overline{HA}$ to the *nearest tenth*?
   (1) 14.4 (2) 11.7 (3) 8.9 (4) 7.2

8. What is the length of the altitude drawn to a side of an equilateral triangle whose perimeter is 60 cm?
   (1) 10 cm (2) $10\sqrt{2}$ cm (3) $10\sqrt{3}$ cm (4) $10\sqrt{5}$ cm

9. A carpenter is building a rectangular deck with dimensions of 16 feet by 30 feet. To ensure that the adjacent sides form 90° angles, what should each diagonal measure?
(1) 26 ft (2) 30 ft (3) 34 ft (4) 46 ft

10. At 9:00 A.M. a car starts at point A and travels north for 1 hour at an average rate of 60 miles per hour. Without stopping, the car then travels east for 2 hours at an average rate of 45 mile per hour. At 12:00 P.M., what is the best approximation of the distance, in miles, of the car from point A?
(1) 100 (2) 105 (3) 108 (4) 115

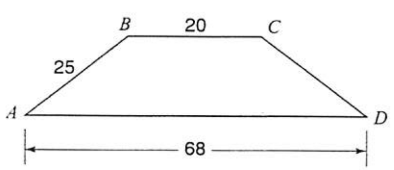
11. If the length of each leg of an isosceles triangle is 17 and the base is 16, the length of the altitude to the base is
(1) 8 (2) $8\frac{1}{2}$ (3) 15 (4) $\sqrt{32}$

12. The lengths of the bases of an isosceles trapezoid are 6 centimeters and 12 centimeters. If the length of each leg is 5 centimeters, what is the area of the trapezoid?
(1) 18 cm^2 (2) 36 cm^2 (3) 45 cm^2 (4) 90 cm^2

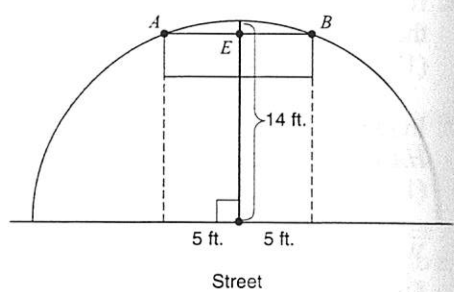
B. *Show or explain how you arrived at your answer.*

13. A baseball diamond is in the shape of a square with a side length of 90 feet. What is the distance from home plate to second base, correct to the *nearest tenth of a foot*?

14. The cross section of an attic is in the shape of an isosceles trapezoid as shown in the accompanying figure. If $AB = CD = 25$ feet, $BC = 20$ feet, and $AD = 68$ feet, what is the area of the cross section?



Exercise 14



Exercise 15

15. The accompanying diagram shows a semicircular arch over a street that has a radius of 14 feet. A banner is attached to the arch at points A and B in such a way that $AE = EB = 5$ feet. How many feet above the ground are these points of attachment for the banner? Estimate to the *nearest tenth of a foot.*

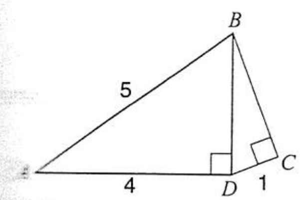
16. The perimeter of a rhombus is 100 centimeters and the length of the longer diagonal is 48 centimeters. Find the area of the rhombus.

17. The length and width of a rectangle are in the ratio of 3:4. If the length of the diagonal of the rectangle is 60, what are the length and width of the rectangle?

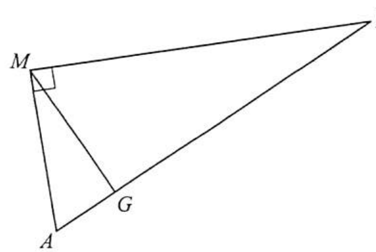
18. Two hikers started at the same location. One traveled 2 miles east and then 1 mile north. The other traveled 1 mile west and then 3 miles south. At the end of their hikes, how many miles apart were the two hikers?

19. To get from his high school to his home, Jamal travels 5.0 miles east and then 4.0 miles north. When Sheila goes to her home from the same high school, she travels 8.0 miles east and 2.0 miles south. What is the shortest distance, to the *nearest tenth* of a mile, between Jamal's home and Sheila's home?

20. In the accompanying diagram of right triangles ABD and DBC, $AB = 5$, $AD = 4$, and $CD = 1$. Find the length of $\overline{BC}$, to the *nearest tenth.*



Exercise 20



Exercise 21

21. Town A is 8 miles from town C, town B is 15 miles from town C, and angle ACB is a right angle. On the straight road that connects towns A and B, a restaurant will be built at the point that is closest to town C. To the *nearest tenth of a mile*, find
a. The distance from town A to the restaurant
b. The distance from town C to the restaurant