Name ______________________________ Period _________

Chapter 7

Pre-Algebra

Real Numbers and the Pythagorean Theorem

Standards

MAFS.8.NS.1.1 Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number

MAFS.8.NS.1.2 Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions.

MAFS.8.G.2.6 Explain a proof of the Pythagorean Theorem and its converse.

MAFS.8.G.2.7 Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.

MAFS.8.G.2.8 Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.

MAFS.8.EE.1.2 Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.

Essential Question

How can you find the dimensions of a square or circle when you are given its area?

Learning Targets

In this lesson I will:

- Find square roots of perfect squares
- Evaluate expressions involving square roots
- Use square roots to solve equations

7.1

Finding Square Roots

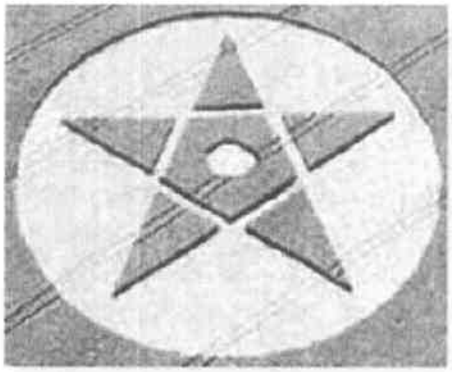
A **square root** of a number is a number that, when multiplied by itself, equals the given number. Every positive number has a positive *and* a negative square root. A **perfect square** is a number with integers as its square roots.

The symbol $\sqrt{\ }$ is called a **radical sign**. It is used to represent a square root. The number under the radical sign is called the **radicand**.

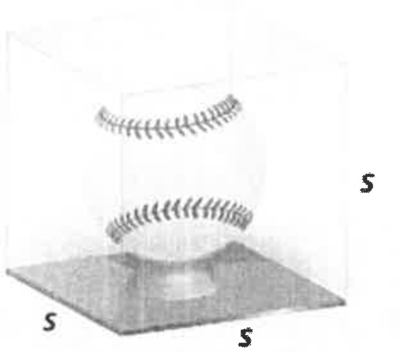
Positive Square Root, $\sqrt{\ }$	**Negative Square Root, $-\sqrt{\ }$**	**Both Square Roots, $\pm\sqrt{\ }$**
$\sqrt{16} = 4$	$-\sqrt{16} = -4$	$\pm\sqrt{16} = \pm 4$

Squaring a positive number and finding a square root are inverse operations. You can use this relationship to evaluate expressions and solve equations involving squares.

Example 1 **Finding Square Roots of Perfect Squares**	**Find the two square roots of 49.**
Example 2 **Finding Square Roots**	**Find the square root(s).** **a.** $\sqrt{25}$ **b.** $-\sqrt{\frac{9}{16}}$ **c.** $\pm\sqrt{2.25}$
On Your Own	**Find the two square roots of the number.** **1.** 36 **2.** 100 **3.** 121 **Find the square root(s).** **4.** $-\sqrt{1}$ **5.** $\pm\sqrt{\frac{4}{25}}$ **6.** $\sqrt{12.25}$
Example 3	**Evaluate each expression.** **a.** $5\sqrt{36} + 7$ **b.** $\frac{1}{4} + \sqrt{\frac{18}{2}}$ **c.** $(\sqrt{81})^2 - 5$

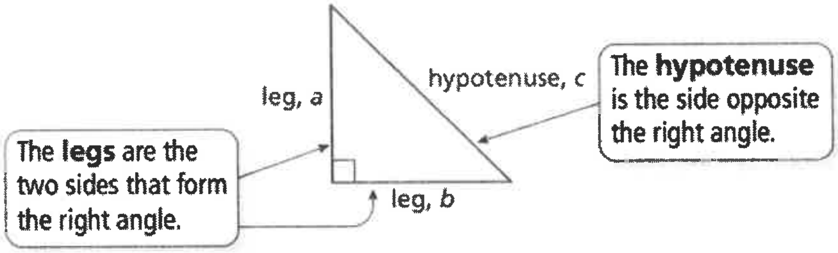
Example 4 **Real Life Application**	 **The area of a crop circle is 45,216 square feet. What is the radius of the crop circle? Use 3.14 for π.**
On Your Own	**Evaluate the expression.** **7.** $12 - 3\sqrt{25}$ **8.** $\sqrt{\frac{28}{7}} + 2.4$ **9.** $15 - (\sqrt{4})^2$ **10.** The area of a circle is 2826 square feet. Write and solve an equation to find the radius of the circle. Use 3.14 for π.
Essential Question	How is the cube root of a number different from the square root of a number?
Learning Targets	In this lesson I will: • Find cube roots of perfect cubes • Evaluate expressions involving cube roots • Use cube roots to solve equations
7.2 **Finding Cube Roots**	A **cube root** of a number is a number that, when multiplied by itself, and then multiplied by itself again, equals the given number. A **perfect cube** is a number that can be written as the cube of an integer. The symbol $\sqrt[3]{\ }$ is used to represent a cube root. Cubing a number and finding a cube root are inverse operations. You can use this relationship to evaluate expressions and solve equations involving cubes.

Example 1 **Finding Cube Roots**	**Find each cube root.** **a.** $\sqrt[3]{8}$ **b.** $\sqrt[3]{-27}$ **c.** $\sqrt[3]{\frac{1}{64}}$
Example 2 **Evaluating Expressions Involving Cube Roots**	**Evaluate each expression.** **a.** $2\sqrt[3]{-216} - 3$ **b.** $\left(\sqrt[3]{125}\right)^3 + 21$
On Your Own	**Find the cube root.** **1.** $\sqrt[3]{1}$ **2.** $\sqrt[3]{-343}$ **3.** $\sqrt[3]{-\frac{27}{1000}}$ **Evaluate the expression.** **4.** $18 - 4\sqrt[3]{8}$ **5.** $\left(\sqrt[3]{-64}\right)^3 + 43$ **6.** $5\sqrt[3]{512} - 19$
Example 3 **Evaluating an Algebraic Expression**	**Evaluate** $\frac{x}{4} + \sqrt[3]{\frac{x}{3}}$ **when** $x = 192$.

On Your Own	**Evaluate the expression for the given value of the variable.** **7.** $\sqrt[3]{8y} + y, y = 64$ **8.** $2b - \sqrt[3]{9b}, b = -3$
Example 4	**Find the surface area of the baseball display case.**  Volume = 125 in.^3
	9. The volume of a music box that is shaped like a cube is 512 cubic centimeters. Find the surface area of the music box.
Essential Question	How are the lengths of the sides of a right triangle related?
Learning Targets	In this lesson I will: • Provide a geometric proof of the Pythagorean Theorem • Use the Pythagorean Theorem to find missing side lengths of right triangles • Solve real-life problems
7.3 The Pythagorean Theorem	Pythagoras was a Greek mathematician and philosopher who discovered one of the most famous rules in mathematics. In mathematics, a rule is called a **theorem**. So, the rule that Pythagoras discovered is called the Pythagorean Theorem.  Pythagoras (c. 570–c. 490 B.C.)

Sides of a Right Triangle

The sides of a right triangle have special names.



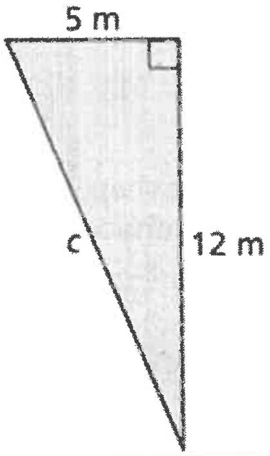
The Pythagorean Theorem

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 the Hypotenuse

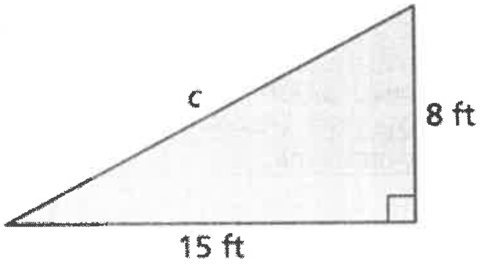
Find the length of the hypotenuse of the triangle.



On Your Own

Find the length of the hypotenuse of the triangle.

1.



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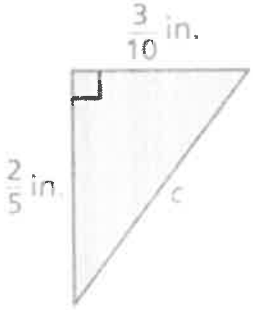
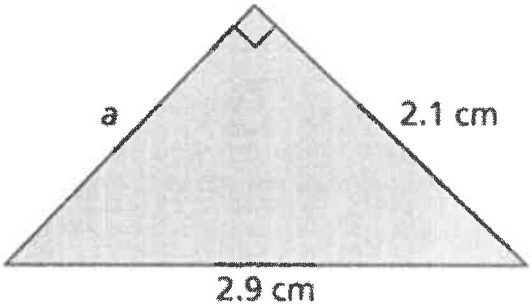


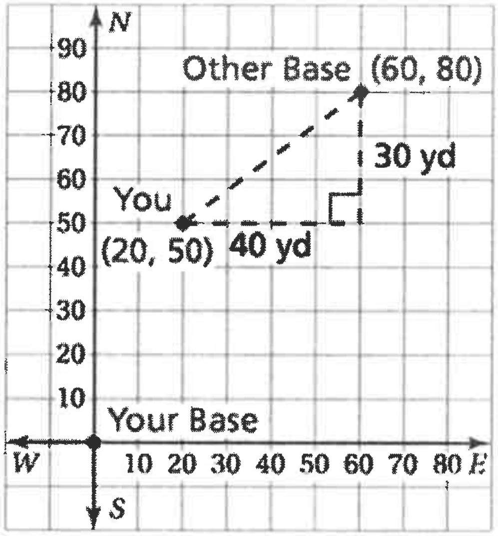
Example 2
Finding the Missing Length of a Triangle

Find the missing length of the triangle.



Example 3
Real Life Application

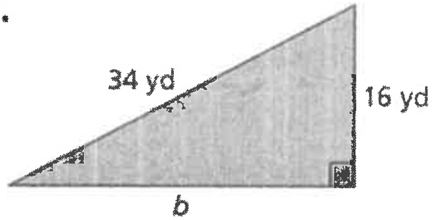
You are playing capture the flag. You are 50 yards north and 20 yards east of your team's base. The other team's base is 80 yards north and 60 yards east of your base. How far are you from the other team's base?



On Your Own

Find the missing length of the triangle.

3.



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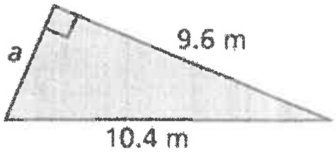


5. In Example 3, what is the distance between the bases?

Essential Question

How can you find the decimal approximations of square roots that are not rational?

Learning Targets

In this lesson I will:

- Define irrational numbers
- Approximate square roots
- Approximate values of expressions involving irrational numbers

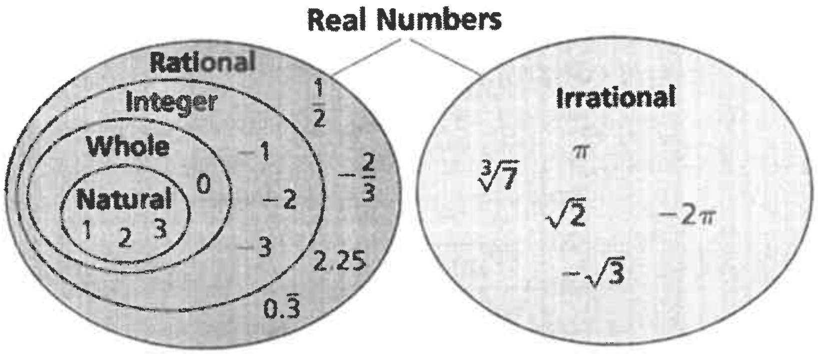
7.4 Approximating Square Roots

A rational number is a number that can be written as the ratio of two integers. An **irrational number** cannot be written as the ratio of two integers.

- The square root of any whole number that is not a perfect square is irrational. The cube root of any integer that is not a perfect cube is irrational.
- The decimal form of an irrational number neither terminates nor repeats.

Real Numbers

Rational numbers and irrational numbers together form the set of **real numbers**.



Example 1

Classify each real number.

	Number	Subset(s)	Reasoning
a.	$\sqrt{12}$	Irrational	12 is not a perfect square.
b.	$-0.\overline{25}$	Rational	$-0.\overline{25}$ is a repeating decimal.
c.	$-\sqrt{9}$	Integer, Rational	$-\sqrt{9}$ is equal to -3.
d.	$\frac{72}{4}$	Natural, Whole, Integer, Rational	$\frac{72}{4}$ is equal to 18.
e.	π	Irrational	The decimal form of π neither terminates nor repeats.

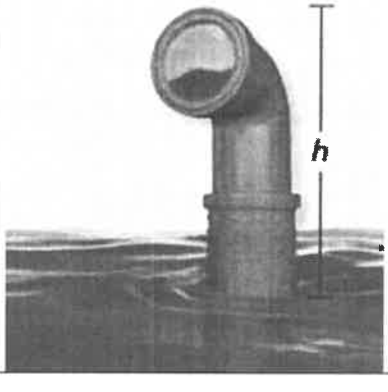
On Your Own

Classify the real number.

1. 0.121221222 . . .

2. $-\sqrt{196}$

3. $\sqrt[3]{2}$

Example 2 **Approximating a Square Root**	**Estimate $\sqrt{71}$ to the nearest (a) integer and (b) tenth.** **a.** Make a table of numbers whose squares are close to 71. **b.** Make a table of numbers between 8 and 9 whose squares are close to 71.
On Your Own	**Estimate the square root to the nearest (a) integer and (b) tenth.** **4.** $\sqrt{8}$ **5.** $-\sqrt{13}$ **6.** $-\sqrt{24}$ **7.** $\sqrt{110}$
Example 3 **Comparing Real Numbers**	**Which is greater, $\sqrt{5}$ or $2\frac{2}{3}$?**
Example 4 **Approximating the Value of an Expression**	**The radius of a circle with area A is approximately $\sqrt{\frac{A}{3}}$. The area of a circular mouse pad is 51 square inches. Estimate its radius to the nearest integer.**
Example 5 **Real Life Application**	**The distance (in nautical miles) you can see with a periscope is $1.17\sqrt{h}$, where h is the height of the periscope above the water. Can you see twice as far with a periscope that is 6 feet above the water than with a periscope that is 3 feet above the water? Explain.** 

Which number is greater? Explain.

8. $4\frac{1}{5}, \sqrt{23}$

9. $\sqrt{10}, -\sqrt{5}$

10. $-\sqrt{2}, -2$

11. The area of a circular mouse pad is 64 square inches. Estimate its radius to the nearest integer.

12. In Example 5, you use a periscope that is 10 feet above the water. Can you see farther than 4 nautical miles? Explain.

7.4 ext. Repeating Decimals

In this extension I will:

- Write a repeating decimal as a fraction

Writing a Repeating Decimal as a Fraction

Let a variable x equal the repeating decimal d.

Step 1: Write the equation $x = d$.

Step 2: Multiply each side of the equation by 10^n to form a new equation, where n is the number of repeating digits.

Step 3: Subtract the original equation from the new equation.

Step 4: Solve for x.

Example 1
Writing a Repeating Decimal as a Fraction (1-digit repeats)

Write $0.\overline{4}$ as a fraction in simplest form.

On Your Own

Write the decimal as a fraction or a mixed number.

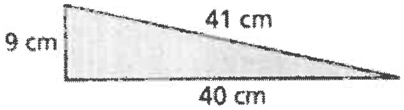
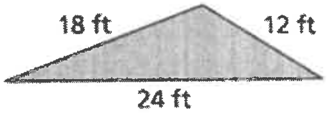
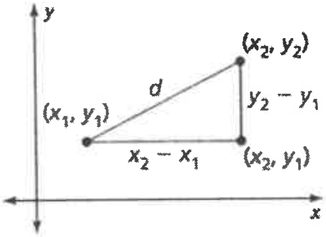
1. $0.\overline{1}$

2. $-0.\overline{5}$

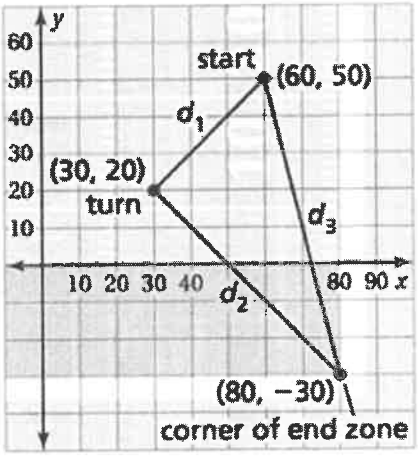
3. $-1.\overline{2}$

4. $5.\overline{8}$

	5. **STRUCTURE** In Example 1, why can you subtract the original equation from the new equation after multiplying by 10? Explain why these two steps are performed. 6. **REPEATED REASONING** Compare the repeating decimals and their equivalent fractions in Exercises 1–4. Describe the pattern. Use the pattern to explain how to write a repeating decimal as a fraction when only the tenths digit repeats.
Example 2 Writing a Repeating Decimal as a Fraction (1-digit repeats)	**Write $-0.2\overline{3}$ as a fraction in simplest form.**
Example 2 Writing a Repeating Decimal as a Fraction (2-digits repeat)	**Write $1.\overline{25}$ as a mixed number.**
	Write the decimal as a fraction or a mixed number. 7. $-0.4\overline{3}$ 8. $2.0\overline{6}$ 9. $0.\overline{27}$ 10. $-4.\overline{50}$ 11. **REPEATED REASONING** Find a pattern in the fractional representations of repeating decimals in which only the tenths and hundredths digits repeat. Use the pattern to explain how to write $9.\overline{04}$ as a mixed number.
Essential Question	In what other ways can you use the Pythagorean Theorem?
Learning Targets	In this lesson I will: - Use the converse of the Pythagorean Theorem to identify right triangles - Use the Pythagorean Theorem to find distances in the coordinate plane - Solve real-life problems
7.5 Using the Pythagorean Theorem	**Converse of the Pythagorean Theorem** If the equation $a^2 + b^2 = c^2$ is true for the side lengths of a triangle, then the triangle is a right triangle.

Example 1 Identifying a Right Triangle	**Tell whether each triangle is a right triangle.** **a.**  **b.** 
On Your Own	**Tell whether the triangle with the given side lengths is a right triangle.** **1.** 28 in., 21 in., 20 in. **2.** 1.25 mm, 1 mm, 0.75 mm
	Distance Formula The distance d between any two points (x_1, y_1) and (x_2, y_2) is given by the formula $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$. 
Example 2 Finding the Distance between Two Points	**Find the distance between (1, 5) and (−4, −2).**

Example 3 Real Life Application



You design a football play in which a player runs down the field, makes a 90° turn, and runs to the corner of the end zone. Your friend runs the play as shown. Did your friend make a 90° turn? Each unit of the grid represents 10 feet.

On Your Own

Find the distance between the two points.

3. (0, 0), (4, 5)

4. (7, −3), (9, 6)

5. (−2, −3), (−5, 1)

6. **WHAT IF?** In Example 3, your friend made the turn at (20, 10). Did your friend make a 90° turn?

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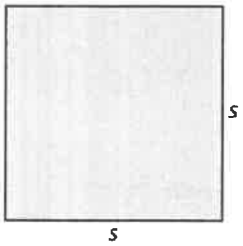
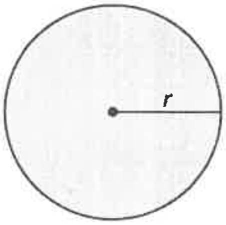
7.1 Practice A

Find the dimensions of the square or circle. Check your answer.

1. Area = 196 in.^2



2. Area = 36π m^2



Find the two square roots of the number.

3. 16

4. 0

Find the square root(s).

5. $\sqrt{121}$

6. $-\sqrt{\frac{1}{36}}$

7. $\pm\sqrt{\frac{289}{49}}$

8. $-\sqrt{0.64}$

Evaluate the expression.

9. $2\sqrt{25} + 3$

10. $7 - 12\sqrt{\frac{1}{9}}$

Copy and complete the statement with <, >, or =.

11. $\sqrt{64}$ __?__ 5

12. 0.6 __?__ $\sqrt{0.49}$

13. The volume of a right circular cylinder is represented by $V = \pi r^2 h$, where r is the radius of the base (in feet). What is the radius of a right circular cylinder when the volume is 144π cubic feet and the height is 9 feet?

14. The cost C (in dollars) of producing x widgets is represented by $C = 4.5x^2$. How many widgets are produced if the cost is \$544.50?

15. Two squares are drawn. The larger square has area of 400 square inches. The areas of the two squares have a ratio of 1 : 4. What is the side length s of the smaller square?

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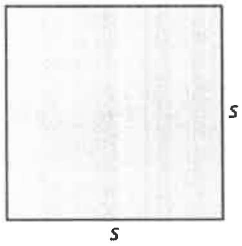
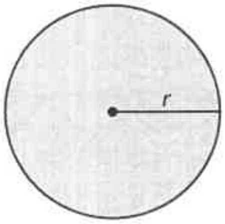
7.1 Practice B

Find the dimensions of the square or circle. Check your answer.

1. Area $= \frac{169}{225}$ cm^2



2. Area $= 121\pi$ yd^2



Find the two square roots of the number.

3. 225

4. 400

Find the square root(s).

5. $-\sqrt{484}$

6. $\pm\sqrt{\frac{25}{64}}$

7. $\sqrt{6.25}$

8. $\pm\sqrt{1.69}$

Evaluate the expression.

9. $6\sqrt{2.25} - 4.2$

10. $3\left(\sqrt{\frac{48}{3}} - 2\right)$

Copy and complete the statement with <, >, or =.

11. $\sqrt{\frac{49}{9}}$ $\underline{\ ?\ }$ 2

12. $\frac{2}{5}$ $\underline{\ ?\ }$ $\sqrt{\frac{12}{75}}$

13. The area of a sector of a circle is represented by $A = \frac{5}{18}\pi r^2$, where r is the radius of the circle (in meters). What is the radius when the area is 40π square meters?

14. Two squares are drawn. The smaller square has an area of 256 square meters. The areas of the two squares have a ratio of 4 : 9. What is the side length s of the larger square?

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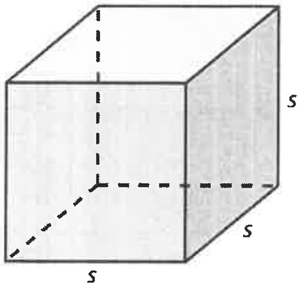
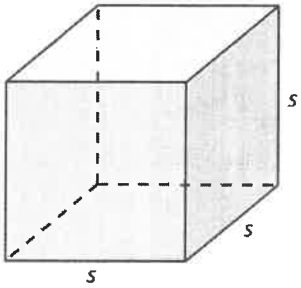
7.2 Practice A

Find the edge length of the cube.

1. Volume $= 27{,}000 \text{ cm}^3$



2. Volume $= \frac{1}{8} \text{ in.}^3$



Find the cube root.

3. $\sqrt[3]{125}$

4. $\sqrt[3]{-1}$

5. $\sqrt[3]{-8}$

6. $\sqrt[3]{-1000}$

7. $\sqrt[3]{8000}$

8. $\sqrt[3]{512}$

9. $\sqrt[3]{-\frac{1}{64}}$

10. $\sqrt[3]{0.001}$

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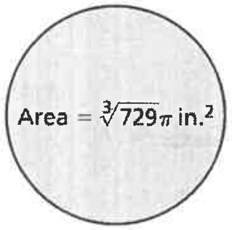
11. $-\sqrt[3]{27}$ __?__ -4

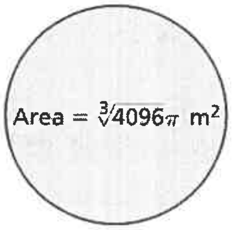
12. $\sqrt[3]{64}$ __?__ $\sqrt{16}$

Find the circumference of the circle.

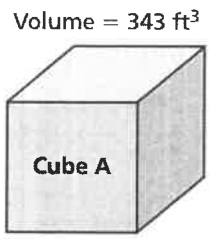
13.

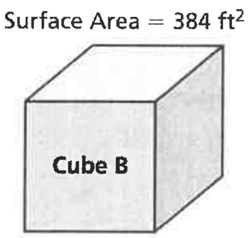


14.



15. Which cube has a greater edge length? How much greater is it?





Name ______________________________ Date __________

7.2 Practice B

Find the cube root.

1. $\sqrt[3]{343}$

2. $\sqrt[3]{-1331}$

3. $\sqrt[3]{-8000}$

4. $\sqrt[3]{3375}$

5. $\sqrt[3]{\frac{1}{64}}$

6. $\sqrt[3]{-\frac{125}{27}}$

Evaluate the expression.

7. $13 + \left(\sqrt[3]{125}\right)^3$

8. $2\frac{2}{3} - \left(\sqrt[3]{\frac{1}{27}}\right)^3$

9. $24 + \left(\sqrt[3]{-1000}\right)^3$

Evaluate the expression for the given value of the variable.

10. $\sqrt[3]{4t} + 3t,\ t = 54$

11. $\sqrt[3]{\frac{n}{24}} - \frac{n}{25},\ n = 375$

12. The volume of storage pod that is shaped like a cube is 1728 cubic feet.

- **a.** What is the edge length of the storage pod?
- **b.** What is the surface area of the storage pod?
- **c.** What is the area of the floor space of the storage pod?

Copy and complete the statement with <, >, or =.

13. $0.25 \ \underline{\ ?\ }\ \sqrt[3]{0.008}$

14. $\sqrt{729}\ \underline{\ ?\ }\ \sqrt[3]{729}$

15. There are infinitely many pairs of numbers of which the sum of their cube roots is zero. Give two of these pairs.

16. The radius of a sphere can be represented by $r = \sqrt[3]{\frac{3V}{4\pi}}$, where V is the volume of the sphere. What is the radius of a sphere with a volume of 36π cubic meters?

Solve the equation.

17. $(4x - 1)^3 = 343$

18. $(15x^3 - 2)^3 = 2197$

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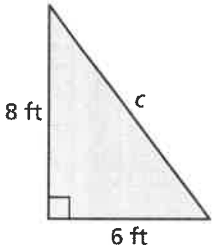
7.3 Practice A

Find the missing length of the triangle.

1.



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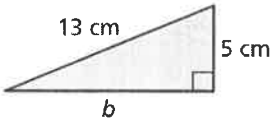

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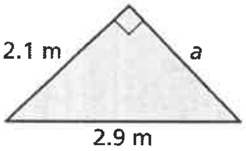
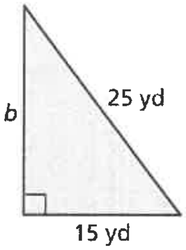


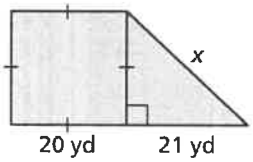
4.



5. A small shelf sits on two braces that are in the shape of a right triangle. The leg (brace) attached to the wall is 4.5 inches and the hypotenuse is 7.5 inches. The leg holding the shelf is the same length as the width of the shelf. What is the width of the shelf?

Find the missing length of the figure.

6.



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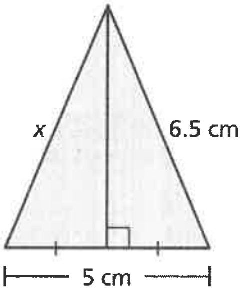


8. Can a right triangle have a leg that is 10 meters long and a hypotenuse that is 10 meters long? Explain.

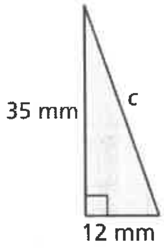
9. One leg of a right triangular piece of land has a length of 24 yards. The hypotenuse has a length of 74 yards. The other leg has a length of $10x$ yards. What is the value of x?

Name ____ Date __________

7.3 Practice B

Find the missing length of the triangle.

1.



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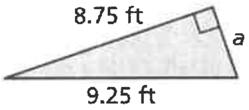

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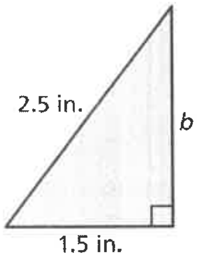

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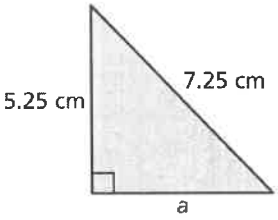
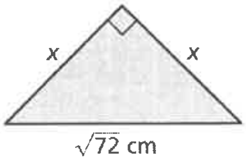


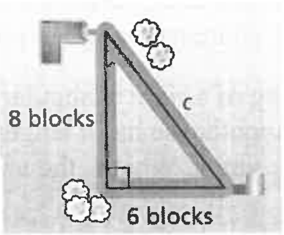
5. You built braces in the shape of a right triangle to hold your surfboard. The leg (brace) attached to the wall is 10 inches and your surfboard sits on a leg that is 24 inches. What is the length of the hypotenuse that completes the right triangle?

6. Laptops are advertised by the lengths of the diagonals of the screen. You purchase a 15-inch laptop and the width of the screen is 12 inches. What is the height of its screen?

7. In a right isosceles triangle, the lengths of both legs are equal. For the given isosceles triangle, what is the value of x?



8. To get from your house to your school, you ride your bicycle 6 blocks west and 8 blocks north. A new road is being built that will go directly from your house to your school, creating a right triangle. When you take the new road to school, how many fewer blocks will you be riding to school and back?



Name____ Date__________

7.4 Practice A

Tell whether the rational number is a reasonable approximation of the square root.

1. $\frac{277}{160}, \sqrt{3}$

2. $\frac{590}{160}, \sqrt{17}$

Classify the real number.

3. $-\sqrt{14}$

4. $1.\overline{3}$

5. 2.375

6. $\sqrt{100}$

7. You are finding the area of a circle with a radius of 2 feet. Is the area a *rational* or *irrational* number? Explain.

Estimate the square root to the nearest (a) integer and (b) tenth.

8. $\sqrt{33}$

9. $\sqrt{630}$

10. $-\sqrt{8}$

11. $\sqrt{\frac{7}{2}}$

12. A swimming pool is in the shape of a right triangle. One leg has a length of 10 feet and one leg has a length of 15 feet. Estimate the length of the hypotenuse to the nearest integer.

Which number is greater? Explain.

13. $\sqrt{70}, 8$

14. $-\sqrt{16}, 3$

15. $\sqrt{210}, 16\frac{1}{4}$

16. $\sqrt{\frac{4}{25}}, \frac{3}{10}$

17. Find a number a such that $2 < \sqrt{a} < 3$.

18. Is $\sqrt{\frac{1}{9}}$ a rational number? Explain.

19. Is $\sqrt{\frac{5}{9}}$ a rational number? Explain.

20. Is $\sqrt{\frac{2}{18}}$ a rational number? Explain.

Name ____ Date __________

7.4 Practice B

Tell whether the rational number is a reasonable approximation of the square root.

1. $\frac{2999}{490}, \sqrt{41}$

2. $\frac{2298}{490}, \sqrt{22}$

Classify the real number.

3. $2\frac{2}{9}$

4. $-\sqrt{576}$

5. $2.\overline{41}$

6. $\sqrt{130}$

7. You are finding the circumference of a circle with a diameter of 10 meters. Is the circumference a *rational* or *irrational* number? Explain.

Estimate the square root to the nearest (a) integer and (b) tenth.

8. $-\sqrt{\frac{250}{9}}$

9. $\sqrt{395}$

10. $\sqrt{0.79}$

11. $\sqrt{1.48}$

12. A patio is in the shape of a square, with a side length of 35 feet. You wish to draw a black line down one diagonal.

- **a.** Use the Pythagorean Theorem to find the length of the diagonal. Write your answer as a square root.
- **b.** Find the two perfect squares that the length of the diagonal falls between.
- **c.** Estimate the length of the diagonal to the nearest tenth.

Which number is greater? Explain.

13. $\sqrt{220}, 14\frac{3}{4}$

14. $-\sqrt{135}, -\sqrt{145}$

15. $\sqrt{\frac{7}{64}}, \frac{3}{8}$

16. $-0.25, -\sqrt{\frac{1}{4}}$

17. Find two numbers a and b such that $7 < \sqrt{a} < \sqrt{b} < 8$.

Name____ Date__________

7.5 Practice A

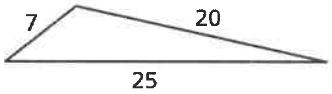
Write the converse of the true statement. Determine whether the converse is true or false. If it is true, justify your reasoning. If it is false, give a counterexample.

1. If a is an odd number, then $2a$ is an even number.

2. If a is negative, then $\frac{1}{a}$ is negative.

Tell whether the triangle with the given side lengths is a right triangle.

3.



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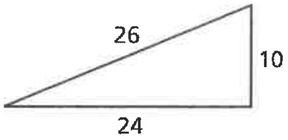


Find the distance between the two points.

5. $(2, -4), (3, -1)$

6. $(3, 2), (7, 5)$

7. $(-9, -2), (-7, 5)$

8. The side of the clip on a clip board appears to be a right triangle. The leg lengths are 2 millimeters and 2.1 millimeters and the hypotenuse is 2.9 millimeters. Is the side of the clip a right triangle?

Tell whether a triangle with the given side lengths is a right triangle.

9. 18, 80, 82

10. $\sqrt{28}$, 63, 65

11. 2, $\sqrt{96}$, 10

12. You are standing 6 feet away from the stage and your friend is standing 7 feet away from the stage.

a. You are standing on a platform, which places your eyes at 6.5 feet. What is the distance from your eyes to the stage?

b. Your friend's eyes are at 5 feet. What is the distance from your friend's eyes to the stage?

c. Do you or your friend have a closer visual?

13. On the Junior League baseball field, you run 60 feet to first base and then 60 feet to second base. You are out at second base and then run directly along the diagonal to home plate. Find the total distance that you ran. Round your answer to the nearest tenth.

Name ____ Date __________

7.5 Practice B

Tell whether the triangle with the given side lengths is a right triangle.

1. 11 in., 60 in., 61 in.

2. 45 cm, 26 cm, 51 cm

Find the distance between the two points.

3. $(5, 5), (8, 7)$

4. $(-6, 2), (3, -2)$

5. $(10, -3), (-1, -8)$

6. Describe and correct the error in finding the distance between the points $(-5, -2)$ and $(-1, 4)$.

X
$$\begin{aligned} d &= \sqrt{(-5-1)^2 + (-2-4)^2} \\ &= \sqrt{36 + 36} \\ &= \sqrt{72} \end{aligned}$$

Tell whether a triangle with the given side lengths is a right triangle.

7. $9, \sqrt{54}, 8$

8. $\sqrt{704}, 27, 5$

9. 88, 103, 137

10. Your teacher gives you and your friend two different sets of points and wants both of you to find the distance between the two points.

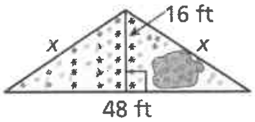
a. Your two points are $(5, 9)$ and $(2, 1)$. Find the distance between the two points.

b. Your friend's two points are $(-5, -9)$ and $(-2, -1)$. Find the distance between the two points.

c. Do you and your friend obtain the same answer? If possible, explain why.

d. Give another example of this situation where the coordinates in the first set of points are a mixture of positive and negative values, and the second set of points have opposite values. Show that the distance is the same.

11. You are creating a flower garden in the triangular shape shown. You purchase edging to go around the flower garden. The edging costs $1.50 per foot. What is the cost of the edging? Round your lengths to the nearest whole number.



Name ____ Date __________

Chapter 7

Take Home Quiz #1

For use after Section 7.3

Find the square root(s).

1. $-\sqrt{16}$

2. $\sqrt{\frac{25}{169}}$

3. $\pm\sqrt{12.25}$

Find the cube root.

4. $\sqrt[3]{512}$

5. $\sqrt[3]{-8}$

6. $\sqrt[3]{\frac{64}{27}}$

Evaluate the expression.

7. $5\sqrt{4} - \sqrt{49}$

8. $-4\sqrt{100} + 10\sqrt{16}$

9. $2\sqrt{\frac{25}{64}} - \frac{3}{8}$

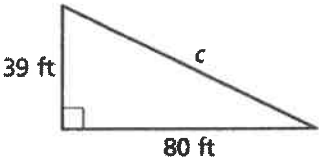
10. $\left(\sqrt[3]{1000}\right)^3 + 6$

11. $5\sqrt[3]{-64} + 45$

12. $61 - 2\sqrt[3]{-125}$

Find the missing length of the triangle.

13.



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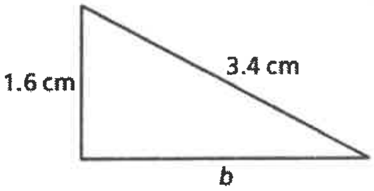

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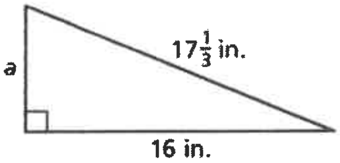

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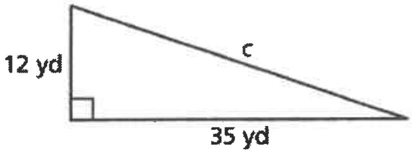
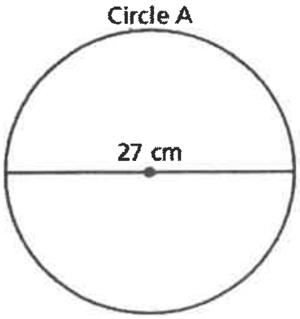


17. The value of the circumference of Circle A is three times the value of the area of Circle B. What is the radius of Circle B?



18. A cube-shaped box has a volume of 1331 cubic inches. How tall is the box?

Answers

1. ____________
2. ____________
3. ____________
4. ____________
5. ____________
6. ____________
7. ____________
8. ____________
9. ____________
10. ____________
11. ____________
12. ____________
13. ____________
14. ____________
15. ____________
16. ____________
17. ____________
18. ____________

Name ______________________________ Date __________

Chapter 7

Take Home Quiz #2

For use after Section 7.5

Classify the real number.

1. $\sqrt{2}$ **2.** $\frac{1}{11}$ **3.** 7

Estimate the square root to the nearest (a) integer and (b) tenth.

4. $\sqrt{24}$ **5.** $-\sqrt{220}$ **6.** $\sqrt{\frac{18}{5}}$

Which number is greater? Explain.

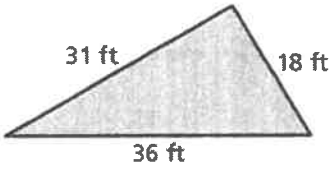
7. $\sqrt{\frac{1}{102}}, \frac{1}{9}$ **8.** $\pi, \sqrt{\pi}$

Write the decimal as a fraction or a mixed number.

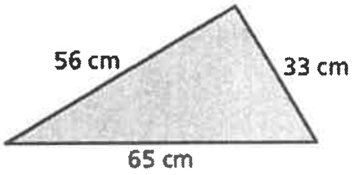
9. $2.\overline{4}$ **10.** $-3.\overline{27}$

Tell whether the triangle with the given side lengths is a right triangle.

11.



12.

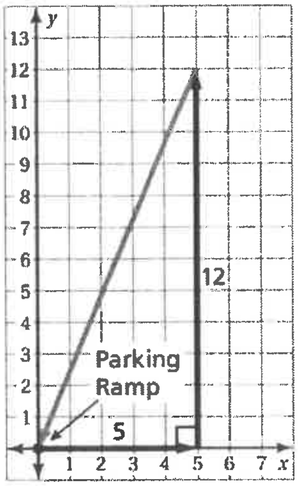


Find the distance between the two points.

13. $(0, 0), (3, 4)$ **14.** $(2, -3), (7, -15)$

15. $(-5, -1), (0, 2)$ **16.** $(-1, 4), (-3, -2)$

17. A car leaves a parking ramp and travels 5 miles due east. The car makes a 90° turn and travels 12 miles due north. The car has enough gas in the tank to travel 12.7 miles. Can the car make it back to the parking ramp using a direct route? Explain your reasoning.



Answers

1. ____________
2. ____________
3. ____________
4. a.____________
   b.____________
5. a.____________
   b.____________
6. a.____________
   b.____________
7. ____________
   ____
8. ____________
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9. ____________
10. ____________
11. ____________
12. ____________
13. ____________
14. ____________
15. ____________
16. ____________
17. ____________
    ____
    ____
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