7.1

FINDING SQUARE ROOTS

Do Now

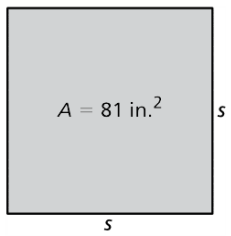
Find the product.

1. 12×12 **2.** 9×9 **3.** 18×18

4. 1.6×1.6 **5.** 2.5×2.5 **6.** $\frac{2}{3} \times \frac{2}{3}$

Do Now

7)



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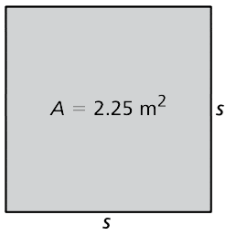


Perfect Squares

Perfect Squares that you should memorize

1^2	7^2	13^2
2^2	8^2	14^2
3^2	9^2	15^2
4^2	10^2	16^2
5^2	11^2	20^2
6^2	12^2	25^2

Roots Review

Parts of a Root

$$\sqrt{4}$$

Roots Review

Parts of a Root

$$\sqrt[2]{4}$$

Roots Review

Perfect Roots that you should memorize

$\sqrt{1}$	$\sqrt{49}$	$\sqrt{169}$
$\sqrt{4}$	$\sqrt{64}$	$\sqrt{196}$
$\sqrt{9}$	$\sqrt{81}$	$\sqrt{225}$
$\sqrt{16}$	$\sqrt{100}$	$\sqrt{256}$
$\sqrt{25}$	$\sqrt{121}$	$\sqrt{400}$
$\sqrt{36}$	$\sqrt{144}$	$\sqrt{625}$

Lesson

$$\sqrt{64}$$

$$-\sqrt{64}$$

$$\pm\sqrt{64}$$

Positive and...

Find the two square roots of 49.

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.** $\sqrt{12.25}$

Special property of roots

$$\sqrt{3^2} \qquad \sqrt{5^2}$$

Special property of roots

$\left(\sqrt{8}\right)^2$ $\left(\sqrt{11}\right)^2$

Operations with Square Roots

Evaluate each expression.

a. $5\sqrt{36} + 7$

b. $\frac{1}{4} + \sqrt{\frac{18}{2}}$

Operations with Square Roots

Evaluate each expression.

c. $(\sqrt{81})^2 - 5$

On Your Own

Evaluate each expression.

a. $2\sqrt{144} - 30$

b. $\sqrt{\frac{36}{4}} + \frac{1}{6}$

On Your Own

c. $49 - \left(\sqrt{49}\right)^2$

7.2

FINDING CUBE ROOTS

Perfect Cubes

Perfect Squares that you should know

1^3 4^3 7^3

2^3 5^3 8^3

3^3 6^3 9^3

10^3

Cube Roots

Perfect Cube Roots that you should know

$\sqrt[3]{1}$ $\sqrt[3]{64}$ $\sqrt[3]{343}$

$\sqrt[3]{8}$ $\sqrt[3]{125}$ $\sqrt[3]{512}$

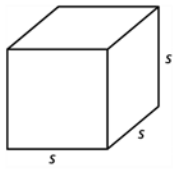
$\sqrt[3]{27}$ $\sqrt[3]{216}$ $\sqrt[3]{729}$

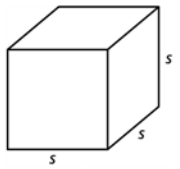
$\sqrt[3]{1000}$

Do Now

Find the edge length of the cube.

1. Volume = 64,000 ft^3 **2.** Volume = $\frac{1}{216}$ ft^3





Finding Cube Roots

Find each cube root.

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

b. $\sqrt[3]{-27}$

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

Evaluating with 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. $5\sqrt[3]{512} - 19$

Evaluating with Cube Roots

Evaluate $\frac{x}{4} + \sqrt[3]{\frac{x}{3}}$ when $x = 192$.

On Your Own

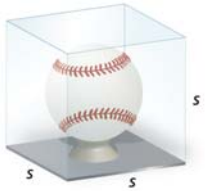
Evaluate the expression for the given value of the variable.

7. $\sqrt[3]{8y} + y, y = 64$

8. $2b - \sqrt[3]{9b}, b = -3$

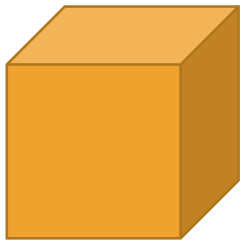
Critical Thinking...

Find the surface area of the baseball display case.



With Your Partner

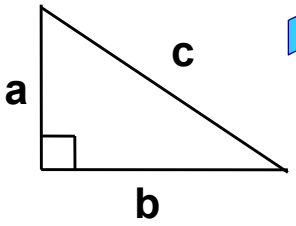
9. The volume of a music box that is shaped like a cube is 512 cubic centimeters. Find the surface area of the music box.



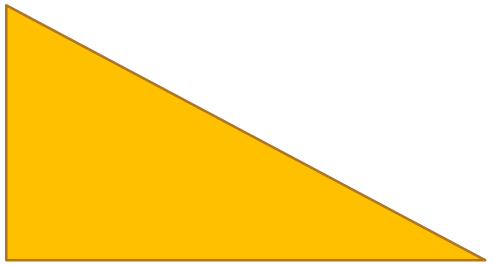
Did You Understand?

Explain the difference between $\sqrt{64}$ and $\sqrt[3]{64}$.

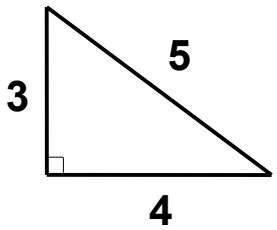
The 7.3 Pythagorean Theorem



Parts of a Right Triangle

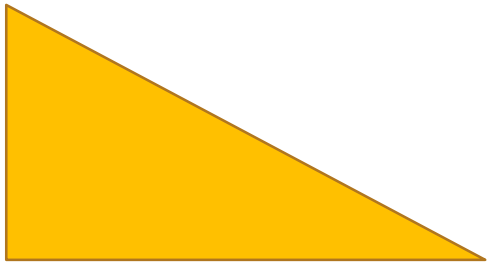


About 2,500 years ago, a Greek mathematician named Pythagorus discovered a special relationship between the sides of right triangles.



Pythagorus realized that if you have a right triangle, and you square the lengths of the two sides that make up the right angle, and add them together, you get the same number you would get by squaring the other side.

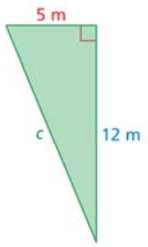
Pythagorean Theorem



Pythagorean Theorem

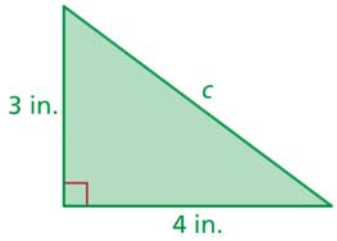
Find the length of the hypotenuse of the triangle.

1)



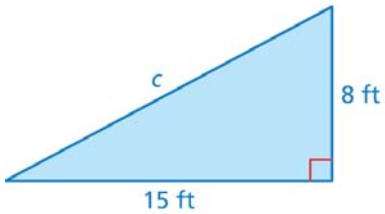
Pythagorean Theorem

2) Find the length of the hypotenuse of the triangle.



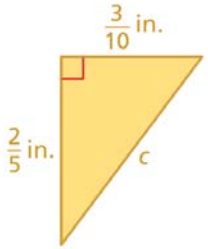
On Your Own

3) Find the length of the hypotenuse of the triangle.



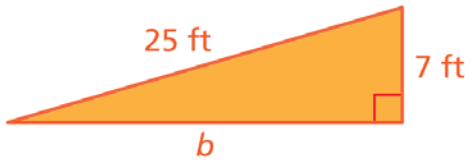
On Your Own

4) Find the length of the hypotenuse of the triangle.



Pythagorean Theorem

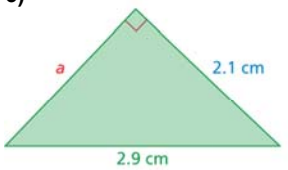
5) Find the missing length of the triangle.



Pythagorean Theorem

Find the missing length of the triangle.

6)



7) **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?**

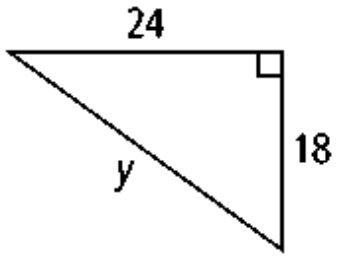
8) You and your cousin are planning to go to an amusement park. You live 36 miles south of the amusement park and 15 miles west of your cousin. How far away from the amusement park does your cousin live?

7.3

THE PYTHAGOREAN THEOREM (DAY 2)

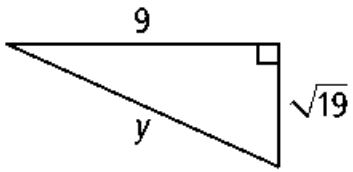
Practice

1) Find the missing length.



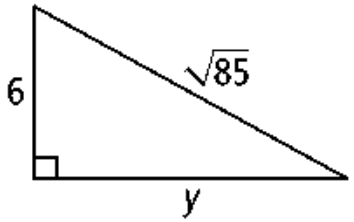
Practice

2) Find the missing length.



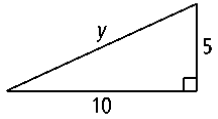
Practice

3) Find the missing length.



Practice

4) Find the missing length. Approximate your answer to the nearest tenth.



7.4

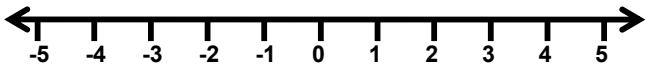
APPROXIMATING SQUARE ROOTS

Kinds of Numbers

Natural Numbers

Whole Numbers

Integers



Rational Number

Rational Numbers

- You CAN change the number into a fraction
- It is a terminating decimal
- It is a nonterminating AND repeating decimal
- You CAN find the PERFECT square root of it

Rational

Irrational

Organize the following numbers in as many groups as possible:

$\frac{5}{12}$	-12	-4.67	6	$-\frac{17}{31}$	4.581	23	π	-3	$\sqrt{25}$	0.37	$\frac{1}{2}$	$\sqrt{10}$	$0.\overline{31}$	2
0.101001000...			0.75	-13	$\frac{9}{5}$	$-\sqrt{123}$	3.01	73	$5.\overline{7}$	4.625	-62	$3\frac{5}{7}$	0	$\sqrt{81}$

Natural Numbers	Whole Numbers

Integers	Rational Numbers

Organize the following numbers in as many groups as possible:

$\frac{5}{12}$	-12	-4.67	6	$-\frac{17}{31}$	4.581	23	π	-3	$\sqrt{25}$	0.37	$\frac{1}{2}$	$\sqrt{10}$	$0.\overline{31}$	2
0.101001000...			0.75	-13	$\frac{9}{5}$	$-\sqrt{123}$	3.01	73	$5.\overline{7}$	4.625	-62	$3\frac{5}{7}$	0	$\sqrt{81}$

Irrational Numbers

Example 1

Identify all sets to which each of the following numbers belong:

a) $\frac{1}{9}$

b) 0

c) -18

Example 2

Terminating Decimal - When the division stops.

Repeating Decimal - When the last digit of the division repeats over and over, we use repeating decimal bars...

Both terminating and repeating decimals are RATIONAL

Write the decimal as a fraction. Simplify the fraction if possible.

a) 0.02 b) 0.105 c) -2.048

Example 3

If a decimal does not terminate and it doesn't repeat, it is IRRATIONAL.

Which is NOT a rational number?

a) $-\sqrt{32.8}$

b) -0.48

c) $1\frac{1}{4}$

d) $-\frac{2}{3}$

Example 5

Order these numbers from least to greatest:

$$-\frac{1}{2}, \frac{3}{4}, -0.05, 0.83$$

On Your Own

Classify the real number.

1. $0.121221222\ldots$
2. $-\sqrt{196}$
3. $\sqrt[3]{2}$

Approximating Square Roots

Example 1

Estimate $\sqrt{71}$ to the nearest (a) integer and (b) tenth.

Approximating Square Roots

Example 2

Estimate $\sqrt{23}$ to the nearest (a) integer and (b) tenth.

Approximating Square Roots

Example 3

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

4. $\sqrt{8}$ **5.** $-\sqrt{13}$ **6.** $-\sqrt{24}$ **7.** $\sqrt{110}$

Approximating Square Roots

Example 4

Which is greater, $\sqrt{5}$ or $2\frac{2}{3}$?

Approximating Square Roots

Example 5

Which is greater, $\sqrt{0.49}$ or 0.71?

7.5

CONVERSE OF THE PYTHAGOREAN THEOREM

The Converse of the Pythagorean Theorem

If it has 3 sides, then it is a triangle.

Converse

If _____, then _____.

If it is a right triangle, then $a^2+b^2=c^2$ works.

If _____, then _____.

The Converse of the Pythagorean Theorem

In a triangle if $a^2+b^2=c^2$ works , then the triangle is a _____.

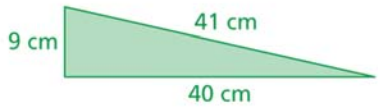
Determine if the triangle with the given side lengths is a right triangle.

1) $11,18,21$

2) $5,6,\sqrt{11}$

Tell whether each triangle is a right triangle.

a.



b.

Determine if the triangle with the given side lengths is a right triangle.

c. Triangle with sides 9, 7, 10

d. Triangle with sides 10, 6, 13

e. Triangle with sides 13, 5, 12

CHAPTER 7

REVIEW

Find the square root(s).

1) $-\sqrt{4}$

2) $\sqrt{\frac{16}{25}}$

Evaluate the expression.

3) $3\sqrt{49} + 5$

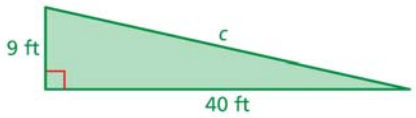
4) $10 - 4\sqrt{16}$

Evaluate the expression.

5) $\frac{1}{4} + \sqrt{\frac{100}{4}}$

Find the missing length of the triangle.

6)



Classify the real number.

7) $-\sqrt{225}$

8) $-1\frac{1}{9}$

9) $\sqrt{41}$

10) $\sqrt{17}$

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

11) $\sqrt{38}$

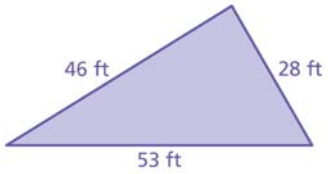
12) $\sqrt{115}$

Which number is greater? Explain.

13) $\sqrt{11}, 3\frac{3}{5}$

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

14)



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

15)