Section 10-3: Finding and Estimating Square Roots.

$(3)^2 =$ 9 $\quad$ $(-3)^2 =$ 9

What are the square roots of 9? ± 3

What are the square roots of 729? ± 27

What are the square roots of - 196?

- 196 has no real roots

Every positive number has how many square roots? 2 real roots

Every negative number has how many square roots? No real roots

What is the only number that has ONE real square root? Zero

Find the real square roots of each number

1. $\frac{81}{169}$ $\quad \pm\frac{9}{13}$

2. -144 $\quad$ No Real Square Roots

3. 729 $\quad \pm 27$

4. 0.09 $\quad \pm 0.3$

What is each problem asking for?

1. $-\sqrt{25}$ The negative Square Root of 25. -5

2. $\pm\sqrt{25}$ Both the positive and negative Square Root of 25. ± 5

3. $\sqrt{25}$ The positive Square Root of 25. Also known as the Principal Square Root. 5

The Principal Root:

When there is more than one root of a number the Principal Root is the Positive Root.

Simplify each.

1. $\pm\sqrt{441}$ ± 21

2. $\sqrt{\frac{4}{49}}$ $+\frac{2}{7}$

3. $-\sqrt{225}$ -15

4. $\sqrt{-9}$ NO real roots

You can now finish Hwk #23 Due Monday

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Problems 10-12, 21, 22, 26-28 AND simplify the following square roots:

a) $\sqrt{80}$ b) $\sqrt{12}$ c) $\sqrt{54}$ d) $\sqrt{252}$ e) $\sqrt{294}$

Without using a calculator estimate each square root as being between what consecutive integers.

1. $\sqrt{40}$ Between 6 and 7

2. $\sqrt{79}$ Between 8 and 9

3. $\sqrt{13}$ Between 3 and 4

Rational and Irrational Square Roots:

Rational #'s: Any number that can be written as the ratio of two integers.
(decimals that repeat or terminate)

Irrational #'s: Any number that can't be written as the ratio of two integers
(non-terminating and non-repeating decimals)

Is each expression rational or irrational?

1. $\pm\sqrt{64}$ Rational

2. $-\sqrt{0.0049}$ Rational

3. $\sqrt{27}$ Irrational

4. $-\sqrt{0.016}$ Irrational

5. $\sqrt{\frac{16}{25}}$ Rational

6. $\pm\sqrt{\frac{1}{5}}$ Irrational

$\sqrt{}$

This is called the radical symbol.

It's used for undoing exponents.

If $x^2 = 49$ how would you solve for x?

Undo squaring by taking the square root of both sides.

Squaring and Square Roots are inverses of each other.

What are the solutions?

$x = \pm 7$

if $x^3 = 8$ then the value of x is found by doing

the "cube root" of 8.

In symbols: $\sqrt[3]{8} = 2$

Index:

Tells what root is being found

$\sqrt[3]{}$

Radical Symbol

If there is no index it's assumed to mean square root.

Solve. $\sqrt{x^2} = \sqrt{441}$

$\boxed{x = \pm 21}$

A square has an area of 256 square inches. Find the length of each side of the square.

$A = x^2$

x

x

$x^2 = 256$

$x = \pm 16$

$\boxed{x = 16 \text{ in}}$

The negative answer isn't possible for this situation.

Quadratic Function: Any function that can be written as

$y = ax^2 + bx + c$ where $a \neq 0$

Quadratic Equation: any equation that can be written as

$ax^2 + bx + c = 0$ where $a \neq 0$

Solving a Quadratic Equation using square roots:

1. Isolate the term that is being square
2. Find the square roots of both sides of the equation
3. Finish solve for x if necessary

Solve. $5x^2 = 80$

$\frac{5x^2}{5} = \frac{80}{5}$

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

$\boxed{x = \pm 4}$

Find all real solutions to each equation using square roots. Simplify irrational answers.

1. $3x^2 - 7 = 5$

$+7 \quad +7$

$\frac{3x^2}{3} = \frac{12}{3}$

$\sqrt{x^2} = \sqrt{4}$

$\boxed{x = \pm 2}$

2. $120 - 5x^2 + 9 - x^2 = 33$

$-6x^2 + 129 = 33$

$-129 \quad -129$

$\frac{-6x^2}{-6} = \frac{-96}{-6}$

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

$\boxed{x = \pm 4}$

Find all real solutions to each equation using square roots. Simplify irrational answers.

3. $2x^2 + 77 = 27$

$-77 \quad -77$

$\frac{2x^2}{2} = \frac{-50}{2}$

$\sqrt{x^2} = \sqrt{-25}$

No Real Sol

When the book says to find solutions it means find all REAL solutions.

When they write no solution it means NO REAL solution.