What are the real square roots of 144?

± 12

What are the real square roots of -16?

No Real square roots

There are two real square roots of every positive number.

What does each ask for?

$\pm\sqrt{25}$ both positive and negative square roots of 25

$-\sqrt{36}$ only the negative square root of 36

$\sqrt{49}$ only the positive square root of 49

Simplify. $\sqrt{49} = 7$

When there are two roots of a number
the radical symbol $\sqrt{\ }$ without anything in front
means

The Prinicpal Square Root
(the positive square roots)

Solve.

$x^2 = 225$

$\sqrt{x^2} = \sqrt{225}$

$x = \pm 15$

Simplify.

$\sqrt{48}$

$= \sqrt{16 \cdot 3}$

$= 4\sqrt{3}$

Solving Quadratic Equations using square roots.

Steps:

- rearrange the equation so that what ever is being squared is by itself. (Isolate the quadratic term)
- Take the square roots of both sides.
- Finish solving for x if necessary.

Which of these equations can you solve using square roots?

1. $2x^2 - 13 = 37$ ✓

You can get x^2 = then square root both sides to get x=

2. $x^2 - 3x = 10$ ✗

If you moved the 3x to get $x^2 = 3x+10$ then took the square root of both sides your answer for x would have an x in it!

3. $(x + 2)^2 - 1 = 8$ ✓

You can get $(x+2)^2$ = , square root both sides, then subtract 2 to get x=

When can you solve using square roots?

1.

When equation is in Standard Form and b=0.

2.

When equation is in Vertex Form.

Find all REAL EXACT solutions.

REAL solutions
vs.
Imaginary solutions

$x = \sqrt{7}$ Real Sol

vs.

$x = \sqrt{-9}$ imaginary Sol.

EXACT solutions
vs.
Approximate solutions

$x = \sqrt{12} = 2\sqrt{3}$ exact

vs.

$x = \sqrt{2} = 1.4142$ approximate

Find all REAL EXACT solutions using square roots.

1. $3x^2 - 13 = 62$

2. $31 + 5x^2 = 11$

3. $2x^2 - 33 = 67$

1. $3x^2 - 13 = 62$

$+13 \quad +13$

$\frac{3x^2}{3} = \frac{75}{3}$

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

$x = \pm 5$

2. $31 + 5x^2 = 11$

$-31 \quad -31$

$\frac{5x^2}{5} = \frac{-20}{5}$

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

NO Real Solution

3. $2x^2 - 33 = 67$

$+33 \quad +33$

$\frac{2x^2}{2} = \frac{100}{2}$

$\sqrt{x^2} = \sqrt{50} = \sqrt{25 \cdot 2}$

$x = \pm 5\sqrt{2}$

Find all REAL EXACT solutions using square roots.

4. $2(x-1)^2+3=35$

5. $-3(x-8)^2+31=10$

6. $6(x+5)^2-1=71$

4. $2(x-1)^2+3=35$

$-3 \quad -3$

$\frac{2(x-1)^2}{2}=\frac{32}{2}$

$\sqrt{(x-1)^2}=\sqrt{16}$

$x-1=\pm 4$ $\begin{cases} +4+1 \\ -4+1 \end{cases}$

$+1$

$x=-3,5$

5. $-3(x-8)^2+31=10$

$-31 \quad -31$

$\frac{-3(x-8)^2}{-3}=\frac{-21}{-3}$

$\sqrt{(x-8)^2}=\sqrt{7}$

$x-8=\pm\sqrt{7}$

$+8 \quad +8$

$\Rightarrow x=8\pm\sqrt{7}$

6. $6(x+5)^2-1=71$

$+1 \quad +1$

$\frac{6(x+5)^2}{6}=\frac{72}{6}$

$\sqrt{(x+5)^2}=\sqrt{12}$

$x+5=\pm\sqrt{12}=\pm\sqrt{4\cdot 3}=\pm 2\sqrt{3}$

$-5 \qquad\qquad -5$

$x=-5\pm 2\sqrt{3}$

If you are to solve quadratic equations using these methods:

- Factoring
- Square Roots

Which method should you try first?

Look to use Square Roots first because:
you can only solve using square roots if
Equation is in Standard Form and b=0
or
Equation is in Vertex Form

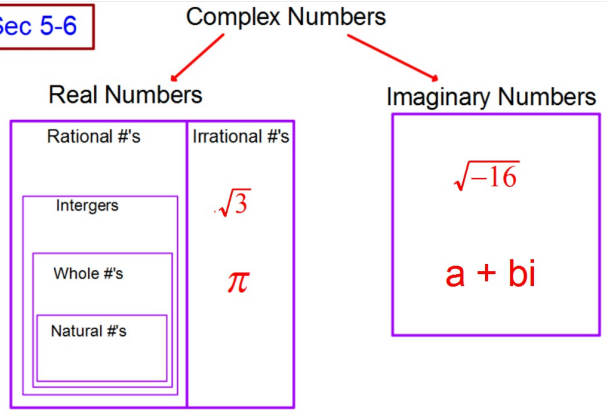
You are now ready to finish Hwk #14.

Practice Sheet

Sec 5-5

Solve quadratics using square roots and factoring.

Sec 5-6



Find all Real Solutions.

1. $x^2 - 11 = 14$

$+11 \quad +11$

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

$x = \pm 5$

2. $x^2 + 53 = 17$

$-53 \quad -53$

$\sqrt{x^2} = \sqrt{-36}$

NO Real Solution

Imaginary Numbers:

$$\sqrt{-1} = i$$

i is called the imaginary unit.

Simplify each.

1. $\sqrt{20}$

$= \sqrt{4 \cdot 5}$

$= 2\sqrt{5}$

2. $\sqrt{-16}$

$= \sqrt{-1 \cdot 16}$

$= 4i$

Find ALL solutions.

$7x^2 + 104 = 41$

$-104 \quad -104$

$\frac{7x^2}{7} = \frac{-63}{7}$

$\sqrt{x^2} = \sqrt{-9}$

$x = \pm 3i$