

Algebra I  
Section 1.3 Notes  
Real Numbers and the Number Line

Name: Key

**Key Definitions:**

1. The expression under a radical symbol is called the

radicand.

$\sqrt{x}$  ← radicand

2. A perfect square is the square of any integer that produces a whole number.

3. A set is a well-defined collection of objects that are similar.

4. Each object in a set is called an element.

set  
↓  
{x, y, z} ← element

5. A subset of a set consists of elements from the given set.

6. An inequality is a mathematical sentence that compares the values of two expressions using an inequality symbol.

7. A rational number is any number that you can write in the form  $\frac{a}{b}$ , where  $a$  and  $b$  are integers and  $b \neq 0$ .

8. An irrational number cannot be represented as the quotient of two integers. In decimal form, irrational numbers do not terminate or repeat.

9. An integer is any number from  $[-\infty, \infty]$ .

10. A whole number is any number from  $[0, \infty]$ .

11. A natural number is any number from  $[1, \infty]$ .

**Real Numbers**

**Rational Numbers**

$\{\frac{2}{3}, 5.34, \frac{-4}{7}, 3.\bar{2}\}$

**Irrational Numbers**

$\{\pi, 1.010032\dots, \sqrt{10}\}$

**Integers**

$\{\dots, -1, 0, 1, \dots\}$

**Whole Numbers**

$\{0, 1, 2, 3, \dots\}$

**Natural Numbers**

$\{1, 2, 3, \dots\}$

**Practice Problems:**

Simplify each expression or estimate the square root (round to the nearest integer).

1.  $\sqrt{81} = 9$

2.  $\sqrt{169} = 13$

3.  $\sqrt{\frac{64}{9}} = \frac{8}{3}$

4.  $\sqrt{0.64} \approx 0.8$

5.  $\sqrt{6.25} \approx 2.5$

6.  $\sqrt{\frac{1}{625}} = \frac{1}{25}$

7.  $\sqrt{10} \approx 3.2$

8.  $\sqrt{38} \approx 6.2$

9.  $\sqrt{256} = 16$

Name the subset(s) of the real numbers to which each number belongs.

1.  $\frac{12}{18}$  rational

2. 5564 natural  
whole  
integer

3.  $\sqrt{13}$  irrational

4.  $2\pi$  irrational

5.  $-\frac{2}{3}$  rational

6. 4.678678678...  
rational

Compare the numbers in each exercise using an inequality symbol.

1.  $\sqrt{25}, \sqrt{64}$

$\sqrt{25} < \sqrt{64}$

2.  $\pi, \frac{19}{6}$

$\pi < \frac{19}{6}$

3.  $\sqrt{81}, -\sqrt{121}$

$\sqrt{81} > -\sqrt{121}$

4.  $\frac{34}{19}, 1.8$

$\frac{34}{19} < 1.8$

5.  $\frac{4}{5}, \sqrt{1.3}$

$\frac{4}{5} < \sqrt{1.3}$

6.  $\frac{1}{3}, \sqrt{1.25}$

$\frac{1}{3} < \sqrt{1.25}$

Order the numbers from least to greatest.

1. 1.875,  $\sqrt{64}, -\sqrt{121}$

$-\sqrt{121}, 1.875, \sqrt{64}$

2.  $\frac{100}{22}, \sqrt{25}, \frac{27}{17}$

$\frac{27}{17}, \frac{100}{22}, \sqrt{25}$

3. 1.25,  $\frac{1}{3}, \sqrt{1.25}$

$\frac{1}{3}, \sqrt{1.25}, 1.25$

4.  $\frac{3}{5}, -0.6, \sqrt{1}$

$-0.6, 0.6, \sqrt{1}$