Notes 2.7

Square Root of a Real Number

Words: A square root of a real number *a* is a real number *b* such that *b2 = a*.

Example: 42 = 16 and (-4)2 = 16, so 4 and -4 are the square roots of 16.

When we use square roots with a radical sign, we usually don’t write the index of 2. It is understood that the square root has an index of 2. Other indexes are written.

Example: Evaluate

1. $\sqrt{36}=6$
2. $-\sqrt{64}=\left(-1\right)\sqrt{64}= -8$
3. $\pm \sqrt{81}= \pm 9$

Approximate a square root: If the square root is not an integer, you can approximate it by finding what integers it’s between.

Example: Approximate the square root of $\sqrt{31}$

 $\sqrt{25}<\sqrt{31}<\sqrt{36}$

 $5<\sqrt{31}<6$

 $\sqrt{31} $is about halfway between the two integers, so $\sqrt{31}≈5.6$, since it’s a little more closer to 36 than 25. If we were to approximate it to the nearest integer then:

$$\sqrt{31}≈6$$

**Vocabulary:** The square root of a whole number that is not a perfect square is an **irrational number**.

Just as a reminder, look at the chart below:



Next, remember if-then statements? Rewrite:

1. No counting numbers are irrational.

If a number is a counting number, then it is not an irrational number.

True

1. Real numbers are rational numbers.

If a number is a real number, then it is a rational number.

False. Irrational numbers are real numbers, too.