Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Math 8

 **Page 1**

**Unit 8: NOTES ON THE NUMBER SYSTEM**

**Notes: pp. 1 -** **6.**

Vocabulary:

1. Real numbers: any numbers that do not give an undefined term.

Examples of numbers that are not real:

1. Fractions with zero in the denominator. 8/0
2. Negative square roots. √ - 4
3. whole numbers: numbers that do not include negatives and decimals.

Set of whole numbers: { 0, 1, 2, 3, 4, … }

1. Integers: numbers that include positive and negative numbers, but no decimals.

Set of integers: { …, - 3, - 2, - 1, 0, 1, 2, 3, … }

 **Page 2**

1. Terminating decimal: any number where the decimal stops or ends.

Examples: 6, 5.76, - 44.897

1. Repeating decimal: any number where the decimal does not end, but shows that something repeats.

Examples: 1/3, 0.666…, 0.123123123…

1. Truncate: to shorten a decimal number by rounding.
2. Rational numbers: numbers that can be written in the form a/b, where a and b are integers and b ≠ 0. In decimal form, any decimal that terminates or repeats.

Examples: 5 = 5/1, 2/3, 0.25 = ¼, - 8 = - 8/1

1. Irrational numbers: numbers that cannot be expressed as a/b, where a and b are integers and b ≠ 0. In decimal form, any decimal that does not terminate or repeat.

Examples: √2, π

1. Square root of a number: one of two equal factors of a number.

Example: 4 • 4 = 16; 4 is the square root of 16.

 **Page 3**

1. Perfect squares: a rational number whose square root is a whole number.

Examples: √100 = 10 10 • 10 = 100

Example that is not a perfect square root: √8

1. Cube root of a number: one of three equal factors of a number.

Example: 2 • 2 • 2 = 8; 2 is the cube root of 8.

1. Perfect cube: a rational number whose cube root is a whole number.

Example: 3√27 = 3 3 • 3 • 3 = 27

1. Radical: the symbol placed over a number to indicate a root.

Symbol: √

1. Radicand: the number under the square root symbol.

Example: √25 The radicand is 25.

 **Page 4**

Model Problems:

1. Identify the following real numbers as either rational numbers or irrational numbers and explain why.
2. ¾ Rational number because it is in the form a/b where both

 a and b are integers.

1. √3 Irrational number because it can be converted to a decimal

that does not terminate and does not repeat.

1. Place the following numbers on the number line below.

π, √10, 3√28

π = 3.141592654

√10 = 3.16227766

3√28 = 3.036588972

 3√28 π √10

 **Page 5**

1. √16 = 4, but it also equals – 4.

**Remember:** To find the square root of a number, you have to find what you can multiple by itself to get the number inside the radical sign.

4 • 4 = 16 and - 4 • - 4 = 16

Therefore, √16 = + 4. **Read:** positive and negative 4.

1. √1/4 = √1/√4 = + ½
2. 3√1/27 = 3√1 / 3√27 = 1/3 **Note:** There is no negative cube root since

 multiplying 3 negatives would give

 a negative.

1. Solve for x:

x2 = 25 **Remember:** To solve an equation means doing

√x2 = √25 the opposite. The opposite of

x = + 5 squaring a number is to take its

 square root.

 x2 = 4/9

1. √x2 = √4/9

x = + 2/3

 **Page 6**

1. x3 = 27

3√x3 = 3√27

x = 3

1. x3 = 1/8

3√x3 = 3√1/8

x = ½

1. What is the length of a side of a square with an area of 49ft2?

A = side times side

s2 = 49

√s2 = √49

s = 7 ft.