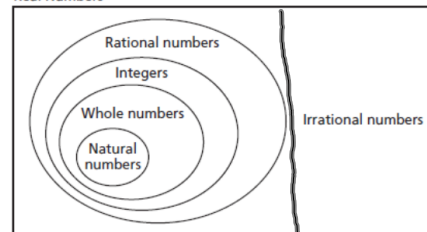## Slide 1

Lesson 1

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Slide 2

Up to Math 9 - you focused on Rational numbers. This year we are going to look at the other side - Irrational numbers.

Lets review the Number set Diagram.

Real Numbers

Rational numbers
Integers
Whole numbers
Natural numbers

Irrational numbers

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Slide 3

Rational Number

Are numbers that have decimal representation that either terminate or repeat. They can also be put in the form $\frac{a}{b}$

Radicals that are square roots of perfect squares, cube roots of perfect cubes are also rational numbers.

Examples:

$\sqrt{100}$ $\sqrt{0.25}$ $\sqrt{\dfrac{9}{64}}$ $\sqrt[5]{-32}$ $\sqrt[3]{8}$

$\dfrac{5}{6}$ 0.8^2 0.5

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Slide 4

Radical $\leftarrow$ Radicals $\sqrt[n]{x}$

n = is called the index

x = is called the radicand

Example : $\sqrt[5]{-32}$ y^x ^

Calculator: 5 [2nd] $\sqrt[x]{\ }$ -32 = $\sqrt{-2}$

shift

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Definitions:

<u>Irrational Number</u>
Are numbers that cannot be written in the form $\frac{a}{b}$, where a and b are integers, n ≠ 0. The decimal representation of an irrational number neither terminates nor repeats. When an irrational number is written as a radical, the radical is the **exact value** of the irrational number.

<u>Examples:</u>

$$\sqrt{0.24} \qquad \sqrt{2} \qquad \sqrt{\frac{1}{3}} \qquad \sqrt[4]{12} \qquad \sqrt[3]{9}$$

In the past we would have known that "Pi - π" would be a great example of an irrational number.

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Classifying Numbers

Tell whether each number is rational or irrational. Explain how you know.

Rational   Irrational   Rational

$$\frac{-3}{5} \qquad\qquad \sqrt{14} \qquad\qquad \sqrt[3]{\frac{8}{27}} = \frac{2}{3}$$

$\frac{-6}{10}$ 3.741657387... $0.\overline{6}$
                                                Repeating

-0.6
terimates

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YOU TRY!

Tell whether each number is rational or irrational. Explain how you know.

1.21 $\sqrt{\dfrac{49}{16}}$ $\sqrt[3]{-30}$
Rational   −3.107232506
              $\frac{7}{4}$ Irrational
              $1\frac{3}{4}$ Rational

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Express Decimals Into fraction Form.

Ex 1: Non-Repeating Decimals

a) $0.48 = \frac{48}{100} = \frac{12}{25}$ b) $3.25 = 3\frac{25}{100} = \frac{325}{100}$

$= \frac{13}{4}$

Ex 2: Repeating Decimals (Rule of 9's)

a) $0.\overline{8} = \frac{8}{9}$ b) $0.123\,123\,1... = \frac{123}{999}$

c) $3.21212121... = 3\frac{21}{99} = 3\frac{7}{33}$ $= \frac{41}{333}$

or $\frac{106}{33}$

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Ex 3: Special Case

a) $0.25555... = \dfrac{23}{90}$

b) $0.1\overline{2} = \dfrac{11}{90}$

c) $0.1\overline{23} = \dfrac{122}{990} = \dfrac{61}{495}$

Textbook Questions:

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