Rational Numbers
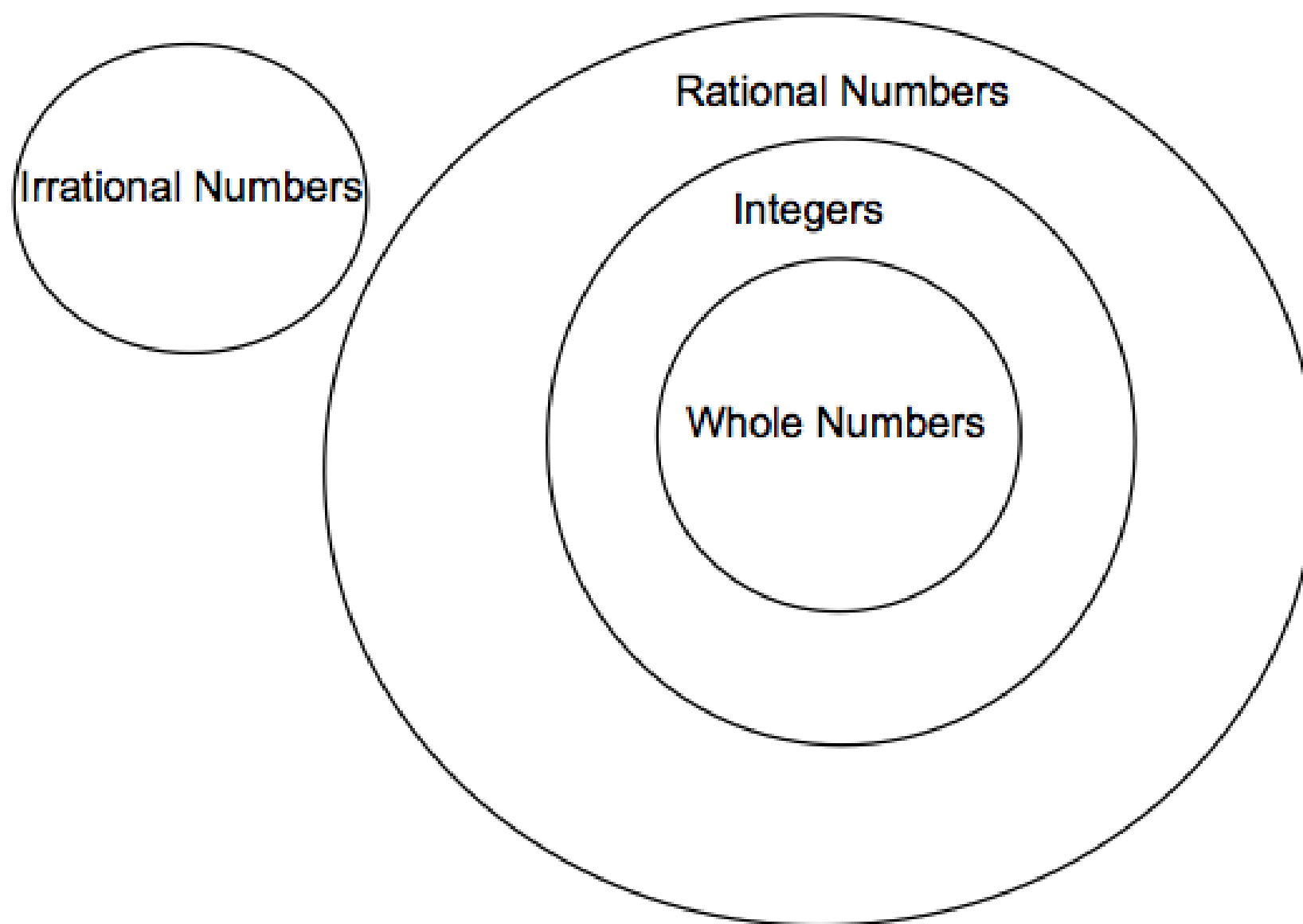
- any number that can be written as a fraction where the numerator and denominator are integers.

Examples: 0.87, -23, 4, 2/3, $2.\overline{78}$, 8/3, and $7\frac{1}{3}$

Venn Diagram showing different sets of numbers.

Irrational Numbers

Rational Numbers

Integers

Whole Numbers

Two types of decimals are **rational** numbers.
    1) Terminating Decimals - decimals that end.
    2) Repeating Decimals - decimals that repeat and require bar notation.

Decimals that never repeat or terminate are called **irrational** numbers.

Going from a fraction to a decimal.
    Method 1 - Long division.
    Method 2 - Using a calculator and rounding correctly if necessary.

Going from a decimal to a fraction or mixed number.
    Terminating Decimals - use place value and the denominator as 10, 100, 1000, etc.
    Repeating Decimals - use place value and a denominator as a 9, 99, 999, etc.

*** reduce fractions to lowest terms whenever possible.

Write each fraction as a decimal. Use bar notation to show repeating. No calculators.

1) $\frac{7}{20}$

$$
\begin{array}{r}
0.35 \\
20\overline{)7.0} \\
-\ 6\ 0\ \downarrow \\
\hline
100 \\
-100 \\
\hline
0
\end{array}
$$

2) $\frac{3}{16}$

$$
\begin{array}{r}
0.1875 \\
16\overline{)3.0} \\
-1\ 6 \\
\hline
140 \\
-128 \\
\hline
120 \\
112 \\
\hline
80 \\
80
\end{array}
$$

Write each fraction as a decimal. Use bar notation to show repeating. No calculators.

3) $\dfrac{6}{11}$

$$\begin{array}{r} 0.\overline{54} \\ 11\overline{)6.0} \\ -55 \\ \hline 50 \\ -44 \\ \hline 60 \\ -55 \\ \hline 50 \\ -44 \\ \hline \end{array}$$

4) $\dfrac{-7}{9}$

$$\begin{array}{r} -.77 \\ 9\overline{)-7.0} \\ -63 \\ \hline 70 \\ -63 \\ \hline 7 \end{array}$$

$-.\overline{7}$

5) Devinn's volleyball team won 32 out of 44 games last year. To the nearest thousandth, find the winning percentage. Calculators allowed.

$$32 \div 44$$

$$.\overline{72} \qquad .\overline{7272}$$

Rounded .727

6) Order from least to greatest. Calculator allowed.

$$2.67 \qquad 2\frac{3}{5} \qquad 2\frac{2}{3}$$

Hint : make these all _decimals_

$$2.67 \qquad 2.6 \qquad 2.\overline{6}$$

L to G $\quad 2\frac{3}{5}, \ 2\frac{2}{3}, \ 2.67$

Write each decimal as a fraction or mixed number in simplest form.

7) 0.84

$$\frac{84}{100}$$ reduce

$$\frac{42}{50}$$ reduce

$$\frac{21}{25}$$

8) 5.875

$$5\frac{875}{1000}$$ reduce

$$5\frac{175}{200}$$ reduce

$$5\frac{35}{40}$$ reduce

$$5\frac{7}{8}$$

Write each decimal as a fraction or mixed number in simplest form.

9) $-2.\overline{5}$

$$-2\frac{5}{9}$$

10) $0.\overline{09}$

$$\frac{09}{99} = \frac{9}{99} \quad reduce$$

$$\frac{1}{11}$$