## Math 9

## 3.1 - What is a Rational Number?

Ex. 1: Convert the following decimals to fractions, in simplified form:
a. 0.7
b. $10 . \overbrace{}^{25}$
c. $0 . \overline{3}=0.3333$.
d. $8 . \overline{5}$
e. $2 . \overline{1} \overline{8}=2.1818181818 \ldots$
$\frac{1025 \div 25}{100 \div 25}$
$2 \frac{18}{99}=2 \frac{2}{11}$

$$
=\frac{41}{4}
$$

$\frac{7}{10}$
$\frac{3}{9}=\frac{1}{3}$
$8 \frac{5}{9}$

## Name:

$\qquad$
Date: $\qquad$

Ex. 2: Convert the following fractions to decimals:
a. $\frac{3}{10} \sqrt{3} \div 10$
b. $\frac{125}{100}$
c. $\frac{5}{9}$
d. $3 \frac{2}{7}$
e. $-2 \frac{3}{5}=-2 \cdot 6$
$=0.3$
1.25
0.5
3.29

$$
\begin{gathered}
\frac{0.285}{712.000} \\
-14 \downarrow \\
-60 \\
\frac{56}{40} \\
\hline 30
\end{gathered}
$$

$$
\begin{gathered}
0.6 \\
5 \longdiv { 3 - 0 } \\
30
\end{gathered}
$$

30

Ex. 3: Determine the values of the following quotients. What do you notice?
a. $\frac{-2}{10}=-0.2$
b. $\frac{2}{-10}=-0.2$
c. $-\frac{2}{10}=-0.2$
$\Rightarrow \frac{-a}{b}=\frac{a}{-b}=-\frac{a}{b}$

A Rational Number is any number that can be written as a FRACTION, like: $\frac{m}{n}$ where, $Q$ $m$ and $n$ are both integers and $n \neq 0$

Are the following numbers Rational Numbers or not?

Integers and Fractions
$4=\frac{4}{1}$
$-3=\frac{-3}{1}$
${\underset{x}{2}+\frac{3}{5}}_{+}^{x}=\frac{13}{5}$
$2 \cdot 6=$

## Terminating Decimals

$0.9=\frac{9}{10}$
$0.45=\frac{45}{100}$
$4.3=\frac{43}{10}$

Repeating Decimals
$0 . \overline{3}=\frac{3}{9}=\frac{1}{3} \quad 0 . \overline{1}=\frac{1}{9}$
$0 . \overline{3} \overline{8}=\frac{38}{99}$
$0 . \overline{10} \overline{8}=\frac{108}{999}$
$1 . \overline{4}=1 \frac{4}{9}$

Numbers that can not be written in fraction form are called $\qquad$ IRRATIONAL $\bar{Q}$

Label the number line below using INTEGERS:


For every POSITIVE INTEGER, there is a corresponding $\qquad$ Negative Integer

Label the number line below using FRACTIONS:


For every POSITIVE FRACTION, there is a corresponding Negative Frachon
Since every fraction can be written as a decimal,
For every POSITIVE DECIMAL, there is a corresponding $\qquad$ Negative Decimal

Ex. 4: Graph the following Rational Numbers on the number line:
a. $0.35,2.5,-0.6,1.7,-3.2,-0 . \overline{6}$
$<\left.\right|_{-5}$
$<-4$
-3.2 $-0.6$
$-0 . \overline{6}=-0.6666 \ldots \neq-0.67$
b. $-\frac{3}{8}, \frac{5}{9},-\frac{10}{4},-1 \frac{1}{4}, \frac{7}{10}, \frac{8}{3}$
$-0.6=-0.60$

(4) $-1 \frac{1}{4}=-1.25$
(D) $-\frac{10}{4}=-2 \frac{2}{4}=-2 \frac{1}{2}=-2.5$
(B) $\frac{5}{9}=0 . \overline{5}$
(E) $\frac{7}{10}=0.7$
(c) $\frac{8}{3}=2 \frac{2}{3}=2.67$

$$
8 \longdiv { 3 . 0 }
$$

(c) $\frac{8}{3}=2 \frac{2}{3}=2.67$

$$
\text { (F) } \quad-\frac{3}{8} \doteq-0.3
$$

$8 \longdiv { \begin{array} { c } { 3 . 0 } \\ { 2 4 } \end{array} }$ 24

Ex. 5: Write 3 rational numbers between each pair of numbers and graph on a number line:
a. 1.25 and -3.26

$-3,-2,-1,0,1$
b. -0.25 and -0.26

$-0.259,-0.258,-0.257, \ldots,-0.251$
c. $-\frac{1}{2}$ and $\frac{1}{4}$
$\frac{2}{4}$

d. $-\frac{1}{2}$ and $-\frac{1}{4}$

Common denominator

$$
\begin{array}{ll}
-\frac{1}{2} & -\frac{1}{4} \\
=-\frac{2}{4} & -\frac{1}{4} \\
=-\frac{4}{8} & -\frac{2}{8}
\end{array}
$$

$$
-\frac{4}{8}<-\frac{3}{8}<-\frac{2}{8}
$$

$$
\begin{array}{rlr} 
& =-\frac{4}{8} & -\frac{2}{8} \\
& =-\frac{8}{16} \quad \frac{-4}{8}<-\frac{3}{8}<-\frac{2}{8} \\
-\frac{3}{8},-\frac{7}{16},-\frac{5}{16} & \text { are between } & -\frac{1}{2} \quad \text { and }-\frac{8}{16}
\end{array}
$$

Ex. 6: Order the following numbers from least to greatest: $0.65,2.8,-0.7,-3.24,-0 . \overline{7}$
Smallest
$-3.24,-0 . \overline{7},-0.7,0.65,2.8$

Ex. 7: Order the following numbers from greatest to least: $-\frac{3}{8}, \frac{5}{9}, \frac{10}{-4},-1 \frac{1}{4}, \frac{7}{10}, \frac{8}{3}$
Convert to decimals:
$1-\frac{3}{8} \doteq-0.3$
$8 \longdiv { 3 . 3 } \begin{array} { r } { 0 . 3 } \\ { 2 4 } \end{array}$
$\frac{\text { order: }}{\frac{8}{3}}$
$\sqrt{5}=0 . \overline{5}$
$\frac{10}{-4}=-2.5$
$4 \longdiv { 2 . 5 }$
$\frac{7}{10}$
$\frac{8}{20}$
$\frac{5}{9}$
$S-1 \frac{1}{4}=-1.25$
20

$$
\frac{-3}{8}
$$

$\frac{7}{10}=0.7$

$$
-1 \frac{1}{4}
$$

$$
\begin{aligned}
& \frac{7}{10}=0.7 \\
& \frac{8}{3}=2 \frac{2}{3}=2.67
\end{aligned}
$$



