

Rational vs Irrational Numbers

A **rational number** is a number that can be expressed as a fraction or **ratio**.
The numerator and the denominator of the fraction are both integers.

When the fraction is divided out, it becomes a terminating or repeating decimal.
(The repeating decimal portion may be one number or a billion numbers.)

6 or $\frac{6}{1}$	can also be written as	6.0
-2 or $\frac{-2}{1}$	can also be written as	-2.0
$\frac{1}{2}$	can also be written as	0.5
$\frac{-5}{4}$	can also be written as	-1.25
$\frac{2}{3}$	can also be written as	0.666666666... $0.\overline{6}$
$\frac{21}{55}$	can also be written as	0.38181818... $0.3\overline{18}$
$\frac{53}{83}$	can also be written as	0.62855421687... the decimals will repeat after 41 digits

*Be careful when using your calculator to determine if a decimal number is irrational. The calculator may not be displaying enough digits to show you the repeating decimals, as was seen in the last example to the left.

An **irrational number** cannot be expressed as a fraction.

Irrational numbers cannot be represented as terminating or repeating decimals.

$$\pi = 3.141592654\dots$$

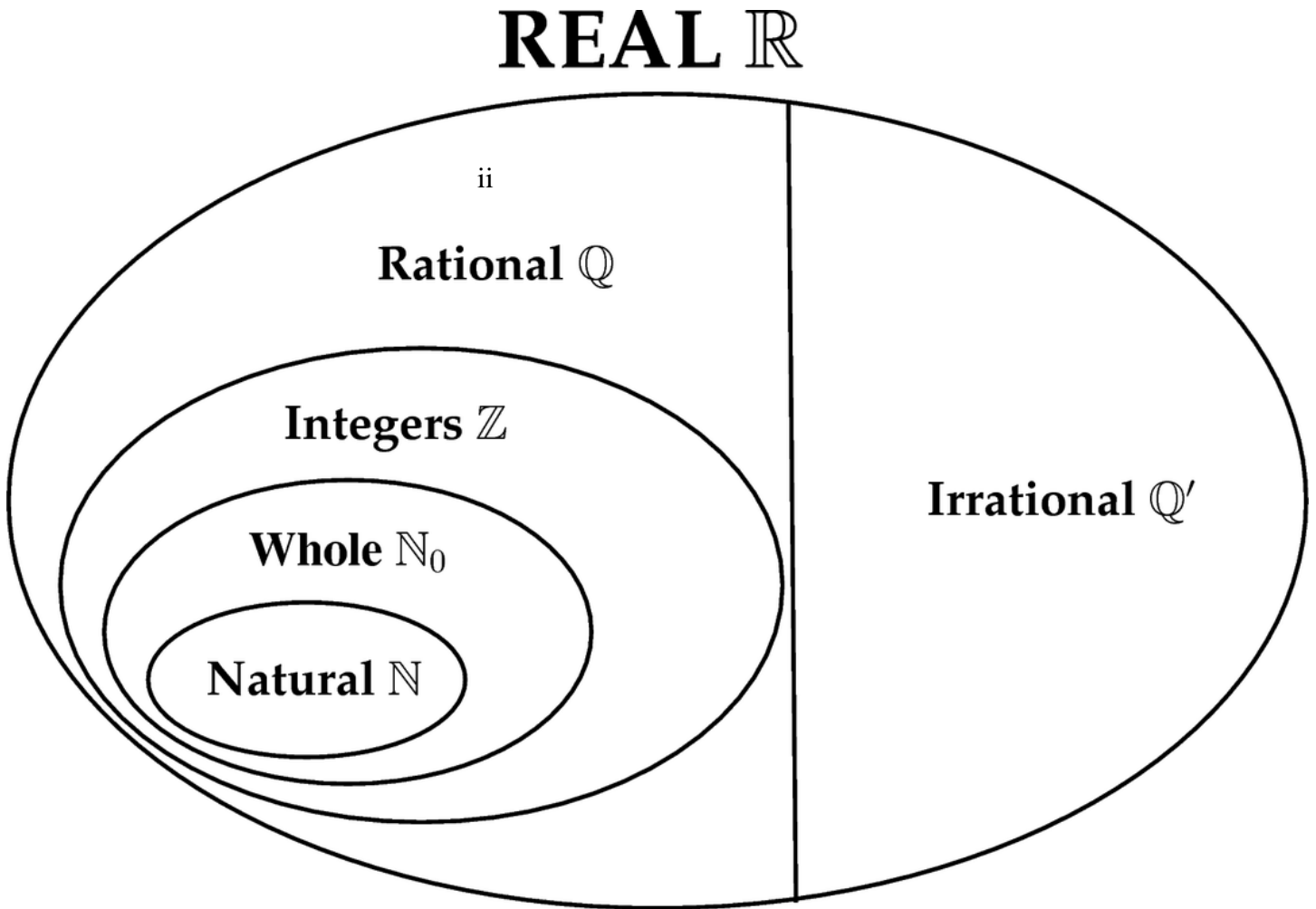
$$\sqrt{2} = 1.414213562\dots$$

Name three numbers that are rational and three numbers that are irrational.

Rational: _____, _____, _____

Irrational: _____, _____, _____

Graphic Organizer

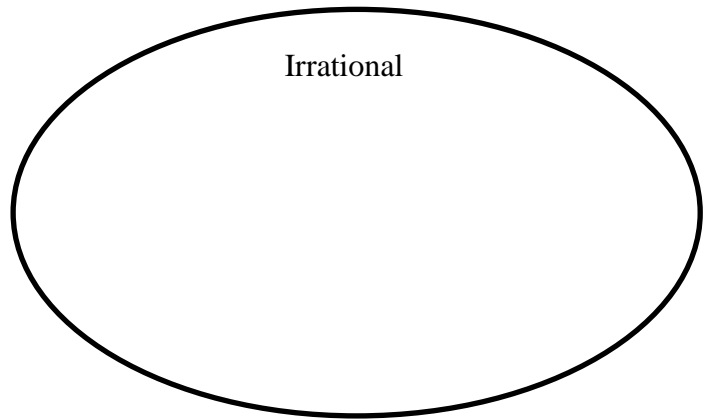
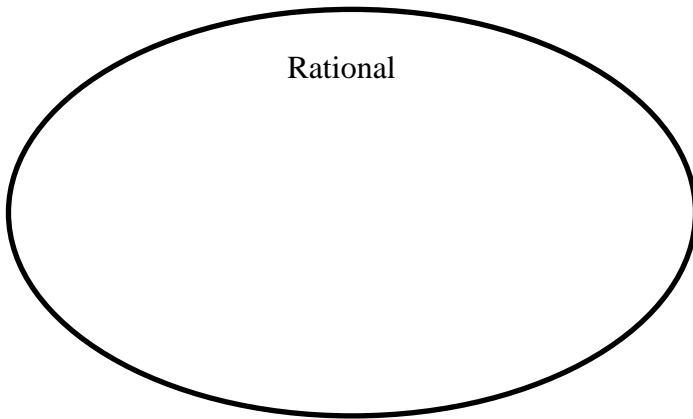


Rational and Irrational Numbers Independent Practice

1. Sort the numbers into 2 groups, rational or irrational. Write the numbers in the appropriate bubble.

0.8 $\sqrt{64}$ 0 $\sqrt{32}$ -19 $-\sqrt{100}$ 2.343443444...

$\frac{3}{7}$ $\sqrt{75}$ $6\frac{2}{7}$ $12.\overline{67}$ $\sqrt{121}$ $\frac{12}{5}$ π



2. Graph and label each number on the number line below. You may label the number with the letter.

A 0.75

B $\sqrt{3}$

C $\sqrt{9}$

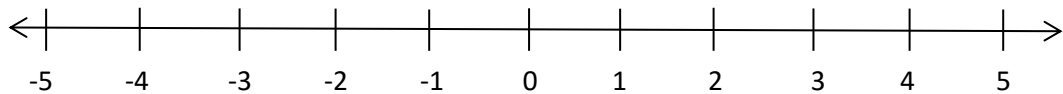
D $-2\frac{1}{2}$

E $-\frac{15}{10}$

F $2.\overline{6}$

G $-\sqrt{2}$

H π



Color each number according to the directions below. Be prepared to justify your reasoning.

0.25		1.76	$\frac{1}{5}$	$\sqrt{-36}$	$\frac{5}{8}$	2.75			
	$2\frac{5}{6}$	0.125	$\frac{8}{0}$	$\sqrt{17}$	$\sqrt{-4}$	$\frac{9}{11}$	0.45		$8\frac{1}{7}$
$0.\bar{3}$	5.9	$\sqrt{-83}$	.23924...	$\sqrt{6}$	$\sqrt{56}$	$\frac{15}{0}$	$\frac{1}{3}$	$0.\bar{6}$	$4.\bar{13}$
$\frac{3}{4}$	$\frac{25}{0}$	$\sqrt{84}$	$8\frac{5}{12}$	.78321...	7. $\bar{81}$	$\sqrt{21}$	$\sqrt{-49}$	$\sqrt{-23}$	$\frac{3}{0}$
$0.\bar{9}$	$5\frac{3}{7}$	.3295...	.9857...	$\sqrt{41}$	$\sqrt{37}$	.4837...	$\sqrt{26}$	$\sqrt{50}$	$\sqrt{67}$
$\sqrt{9}$	28	$\sqrt{145}$	$9.\bar{5}$	$\sqrt{5}$	127	$\sqrt{3}$	$\frac{5}{0}$	$\sqrt{-16}$	$\sqrt{-25}$
$\frac{12}{3}$	-6	.93823...	$\sqrt{15}$	$\sqrt{101}$	$\sqrt{16}$	.3825...	$\sqrt{-100}$	$\frac{9}{0}$	$\frac{1}{0}$

BLACK – Number that is Not Real
YELLOW – Real, Irrational Number

BLUE – Real, Rational Number
GREEN – Real, Rational Number, Integer

