Warm Up

Change to a fraction

1. $2.0\overline{4}$

Solve

2. $1.1\overline{4} \times \frac{1}{4}$

3. $.0\overline{3} + 2\frac{1}{3}$

If your answer is given in the form $\frac{a}{b}$, with no common factors, what is the value of a?

1) $2.0\overline{4} = 20.\overline{4} = 20\frac{4}{9} = \frac{184}{9} \div 10 = \frac{184}{9} \times \frac{1}{10} = \frac{184}{90} = \boxed{\frac{92}{45}}$

($0.\overline{4} \xrightarrow{\times 10} 4.\overline{4}$)

2) $1.\overline{14} \times \frac{1}{4}$

($1.\overline{14} \xrightarrow{\times 10} 11\frac{4}{9}$)

$11\frac{4}{9}$

$\frac{103}{9} \div 10$

$\frac{103}{9} \times \frac{1}{10}$

$\frac{103}{90}$

$\frac{103}{90} \times \frac{1}{4} = \boxed{\frac{103}{360}}$

3) $0.0\overline{3} + 2\frac{1}{3}$

($0.0\overline{3} \xrightarrow{\times 10} 0.\overline{3}$)

$\frac{3}{9} + 2\frac{1}{3}$

$\frac{3}{9} + \frac{7}{3}$

$\frac{3}{9} + \frac{21}{9}$

$\frac{24}{9} \div 10$

$\frac{24}{9} \cdot \frac{1}{10}$

$\frac{24}{90}$

$\frac{8}{30}$

$\boxed{\frac{4}{15}}$

Homework

1. **The square below has an area of 29 square units.**

$A = s^2$
$29 = s^2$
$\sqrt{29} = \sqrt{s^2}$
$\sqrt{29} = s$

$\sqrt{25} < \sqrt{29} < \sqrt{36}$
$5 < \sqrt{29} < 6$

Which choice below is the best estimate of the side length of the square?

A. more than 5 units but less than 6 units
B. more than 7 units but less than 8 units
C. more than 14 units but less than 15 units
D. more than 25 units but less than 36 units

2. Which number below is between 8 and 10?

A. $\sqrt[3]{343}$

B. $\sqrt[3]{1,100}$

C. $\sqrt{38}$

D. $\sqrt{77}$

$\sqrt{64} < \sqrt{77} < \sqrt{100}$
$8 < \sqrt{77} < 10$

3. Which number is an example of a rational number?

A. $1.\overline{23}$ ← repeats

repeats or ends

B. π

C. $\sqrt{10}$

D. $\sqrt{18}$

4. Which number is an integer?

positive and negative whole numbers

A. $-\frac{1}{2}$

B. $\sqrt{\frac{4}{9}}$

C. -0.5

D. $\sqrt{64} = 8$

5. **Inez was chosen by her teacher to find the integer that has a square root closest to 3 without going over and write it on the board. Which correct answer did Inez write on the board?**

A. 6

B. 8

C. 10

D. 12

$\sqrt{?} = 3$

$\sqrt{9} = 3$

6. Which fraction is equivalent to $0.\overline{54}$?

$\frac{54}{99} = \frac{9(6)}{9(11)} = \frac{6}{11}$

A. $\frac{5}{9}$

B. $\frac{6}{11}$

C. $\frac{27}{50}$

D. $\frac{26}{48}$

7. **What is $0.\overline{45}$ expressed as a fraction in lowest terms?**

A. $\frac{9}{200}$

B. $\frac{9}{20}$

C. $\frac{5}{11}$

D. $\frac{5}{9}$

$\frac{45}{99} = \frac{9(5)}{9(11)} = \frac{5}{11}$

8. Which number is an irrational number?

A. $\sqrt{2}$ ← not a perfect square

does not end, does not repeat

B. $\frac{24}{37}$

C. $\sqrt{225}$

D. $\frac{125}{100}$

9. **Which of the following numbers is rational?** → ends or repeats

A. 0.31311...

B. $\sqrt{5}$ ← not a perfect square

C. $\sqrt{16} = 4$

D. $\sqrt{27}$ ← not a perfect square

10. Which set of numbers only contains rational numbers?

end or repeat

A. $\{\frac{1}{2}, \frac{2}{3}, \sqrt{3}\}$

B. $\{0, 4, \sqrt{9}\}$ → {0, 4, 3}

C. $\{5, \sqrt{6}, 7\}$

11. Which set of numbers contains only integers?

A. $\{-14, -0.3, 0, 2\}$

B. $\{-10, 3, 5, 2.75\}$

C. $\{0, 1, 2, \frac{21}{4}\}$

D. $\{\sqrt{1}, \sqrt{4}, \sqrt{25}, \sqrt{81}\}$ → {1, 2, 5, 9}

12. **Which term applies to the number shown below, if it is a non-repeating, non-terminating decimal?**

2.91547 . . .

A. imaginary
B. irrational
C. rational
D. integer

13. Which number below is greater than 2 but less than 5?

A. $\sqrt{2}$

B. $\sqrt{5}$

C. $\sqrt{26}$

D. $\sqrt{40}$

$2 < x < 5$

14. **The square root of 198 is between which two numbers?**

A. 12 and 13

B. 13 and 14

C. 14 and 15

D. 15 and 16

$14 \times 14 = 196$

$15 \times 15 = 225$

15. Which fraction is equivalent to $0.\overline{15}$?

A. $\frac{5}{33}$

B. $\frac{3}{20}$

C. $\frac{1}{6}$

$\frac{15}{99} = \frac{3(5)}{3(33)}$

16. Which fraction is equivalent to $0.1\overline{3}$?

A. $\frac{13}{100}$

B. $\frac{33}{250}$

C. $\frac{2}{15}$

D. $\frac{1}{3}$

$0.1\overline{3}$ ×10

$1.\overline{3}$

$1\frac{3}{9}$

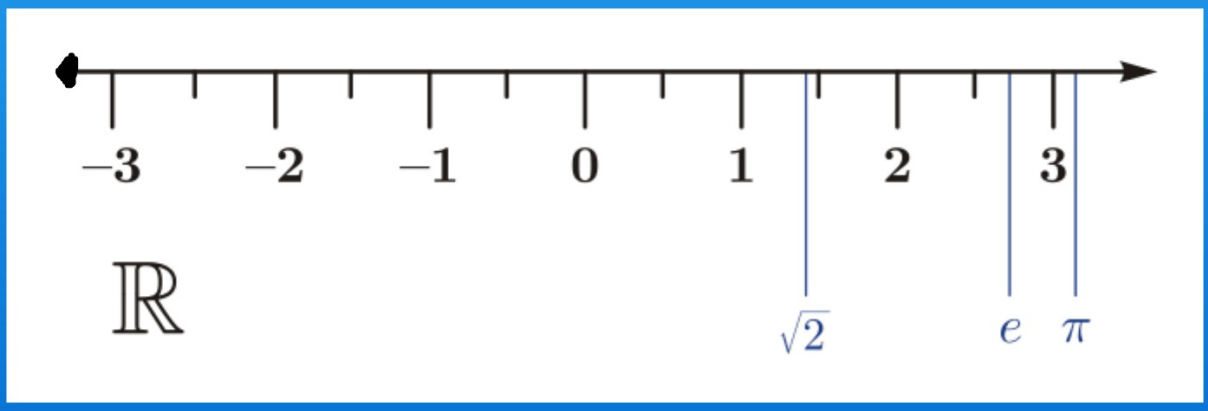
$\frac{12}{9} \div 10$

$\frac{12}{9} \times \frac{1}{10} = \frac{12}{90} = \frac{16(2)}{16(15)} = \frac{2}{15}$

Exploring Real Numbers

About Real Numbers

- "Real Numbers" are all the numbers that we deal with in math class and in life!
- Real Numbers can be thought of as all the points that fall along a number line.



Real Numbers (R)

all numbers that are points on a number line

Let's be rational...or irrational!

- Real numbers can be divided into two categories:

Rational Numbers (ℚ)

- any number that can be written as a fraction

  1/2 3.5 9/3 -1/3

- any decimal that terminates (ends) or repeats

  0.325 -0.3333333...

Real Numbers (R)

all numbers that are points on a number line

Rational Numbers (Q)

any number that can be written as a fraction (includes terminating and repeating decimals)

3.7

$\frac{1}{2}$

Irrational Numbers (I)*

- any number that can not be written as a fraction (as a ratio of 2 whole numbers)
- a non-repeating, non-terminating decimal

Real Numbers (R)

all numbers that are points on a number line

Irrational Numbers (I*)

any number that **cannot** be written as a fraction. Non-terminating, non-repeating decimals

$\sqrt{2}$

π

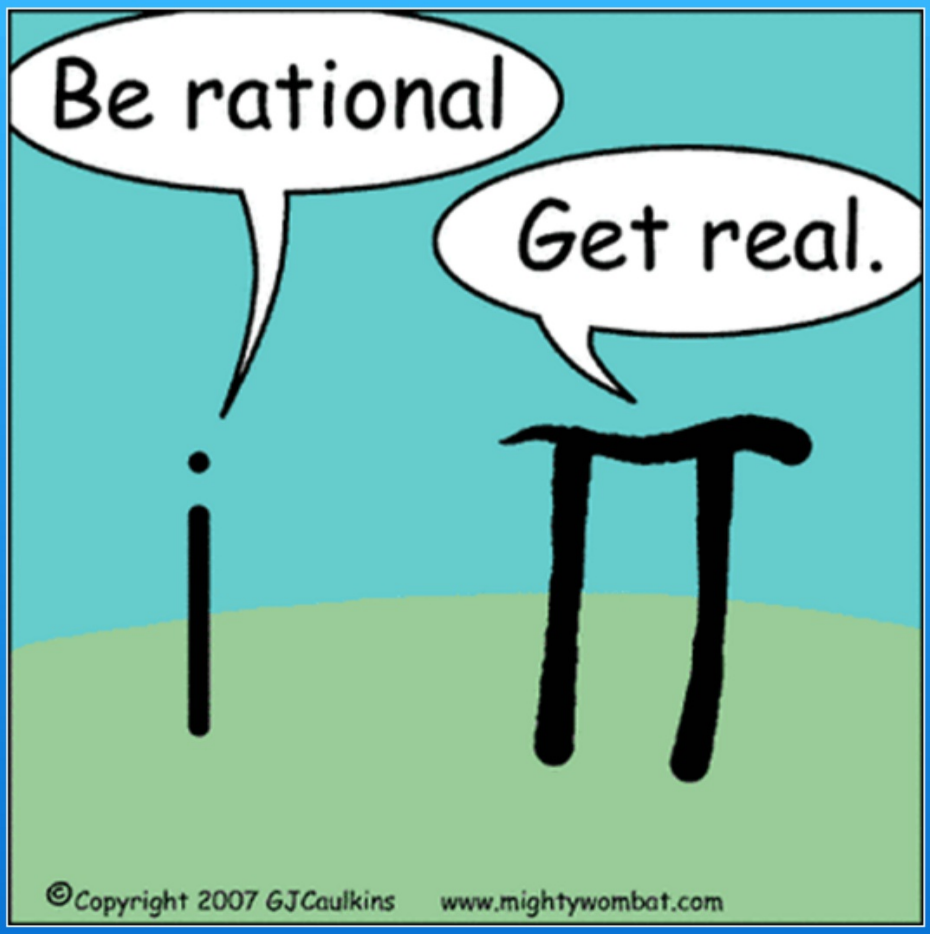
0.010010001...

Rational Numbers (Q)

any number that can be written as a fraction (includes terminating and repeating decimals)

3.7

$\frac{1}{2}$


Be rational
Get real.
i
π
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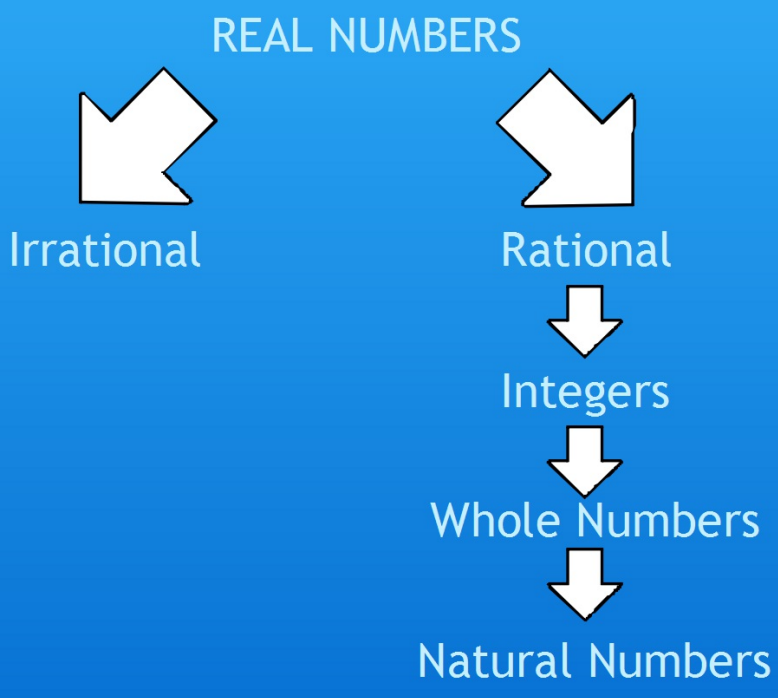
Rational Number Breakdown

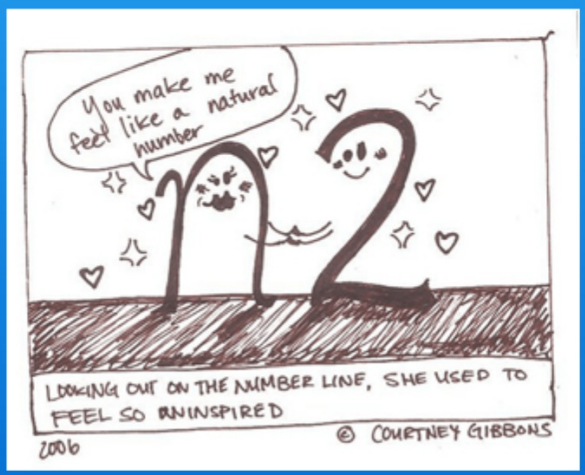
- Rational numbers can be divided into 3 categories

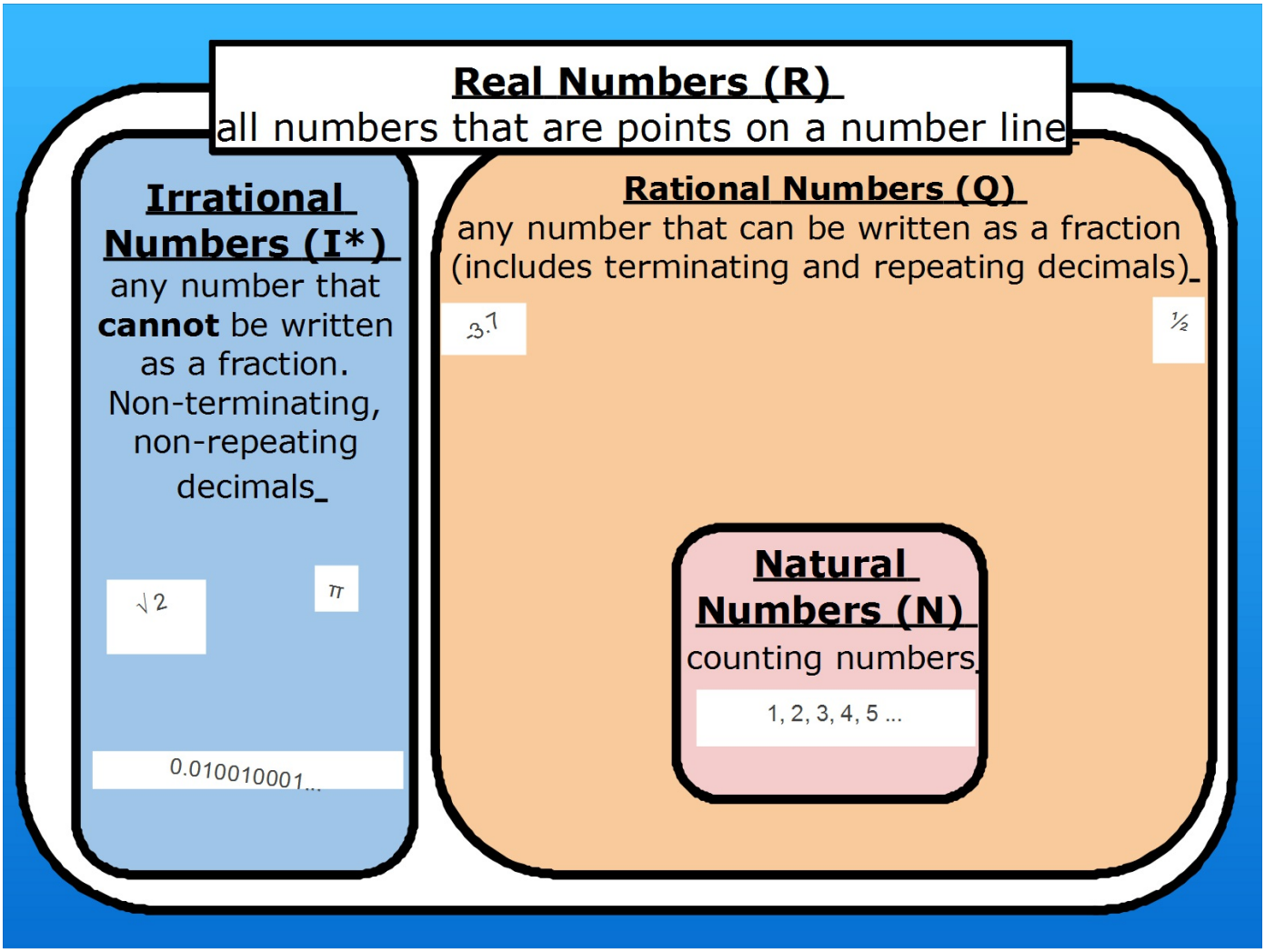


Natural Numbers ($\mathbb{N}$)

- Natural numbers are the counting numbers. They are probably the first numbers you learned about.

1, 2, 3, 4, 5 ...

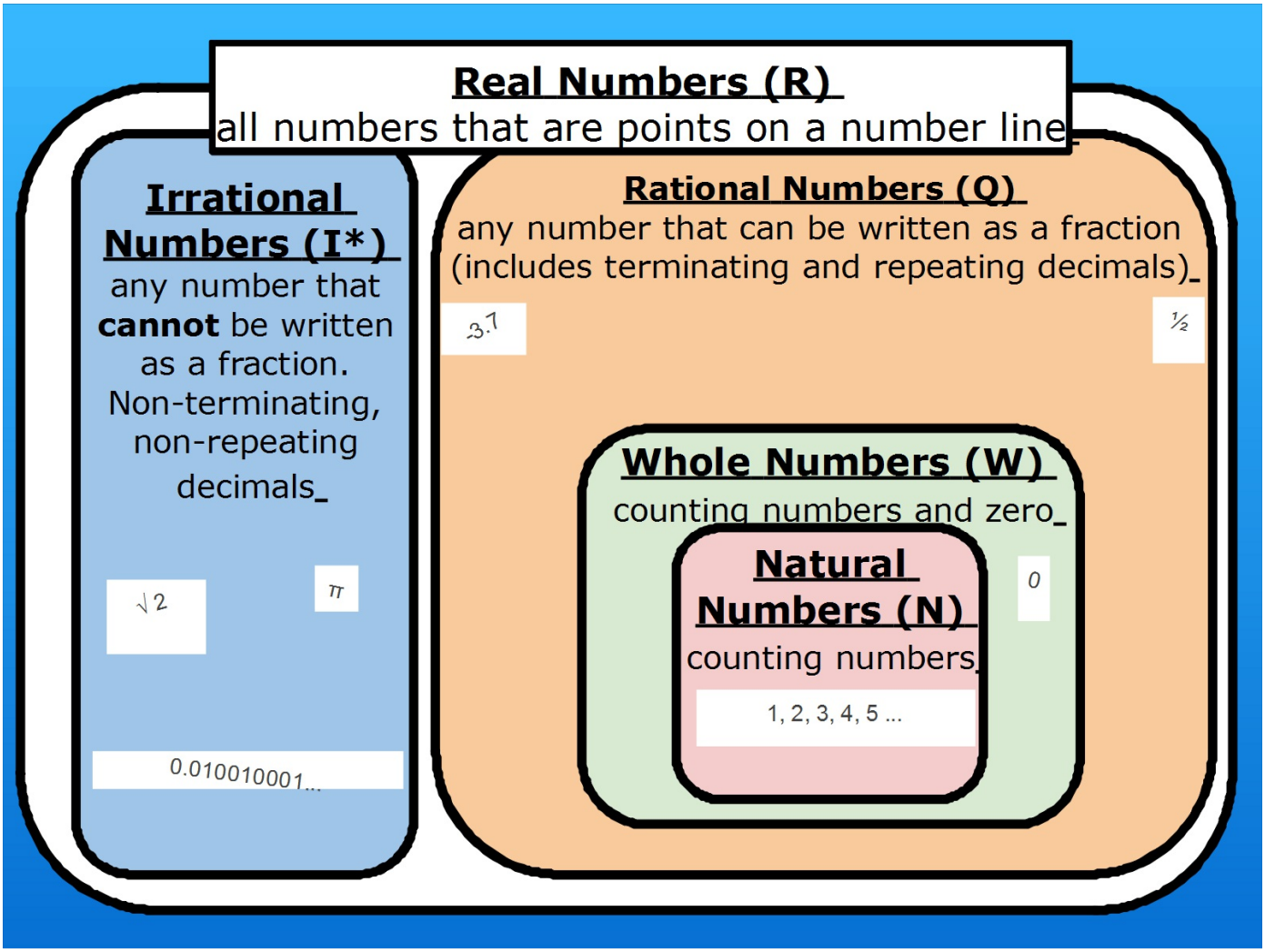



Real Numbers (R)
all numbers that are points on a number line
Irrational Numbers (I*)
any number that cannot be written as a fraction. Non-terminating, non-repeating decimals
√2
π
0.010010001...
Rational Numbers (Q)
any number that can be written as a fraction (includes terminating and repeating decimals)
3.7
½
Natural Numbers (N)
counting numbers
1, 2, 3, 4, 5 ...

Whole Numbers (W)

- Add a zero to the Natural Numbers and you'll get the set called "Whole Numbers"

0, 1, 2, 3, 4, 5 ...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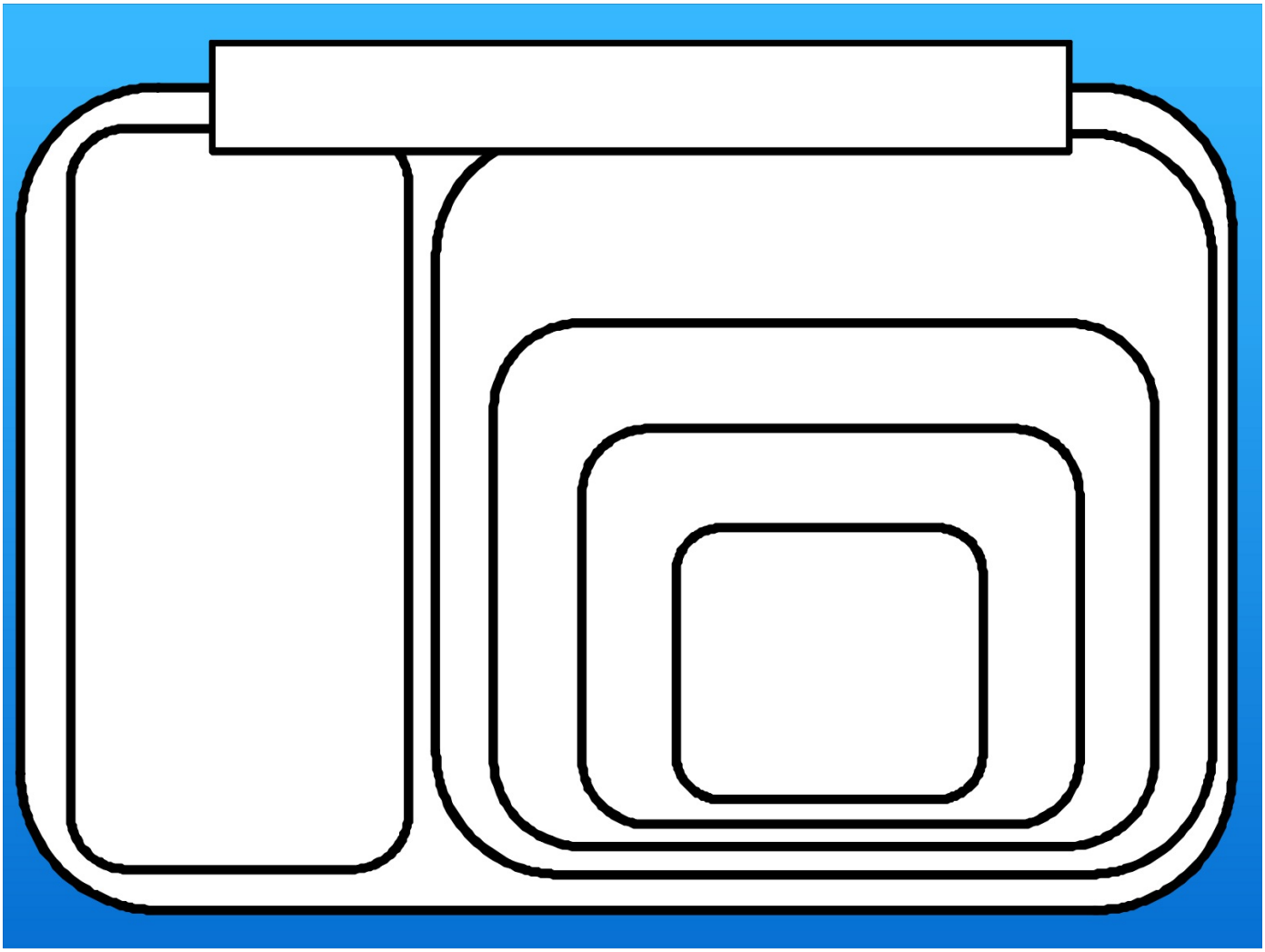
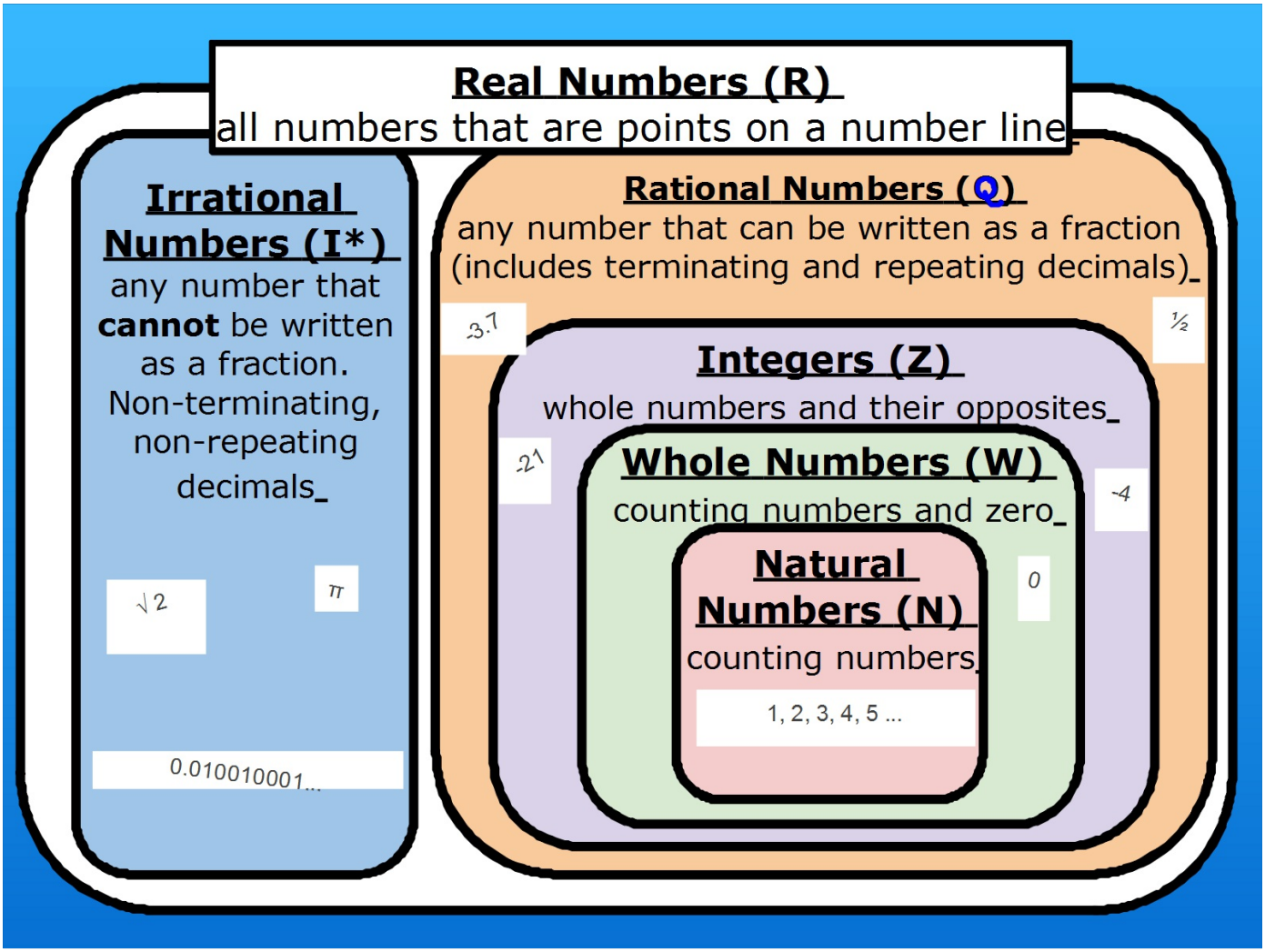
Irrational Numbers (I*)
any number that cannot be written as a fraction. Non-terminating, non-repeating decimals
√2
π
0.010010001...
Rational Numbers (Q)
any number that can be written as a fraction (includes terminating and repeating decimals)
3.7
½
Whole Numbers (W)
counting numbers and zero
0
Natural Numbers (N)
counting numbers
1, 2, 3, 4, 5 ...

Integers ($\mathbb{Z}$)

- Integers include all counting numbers, their opposites, and zero
- The opposites of the counting numbers are simply the negatives

... -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5 ...




Real Numbers (R)
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√2
π
0.010010001...
Rational Numbers (Q)
any number that can be written as a fraction (includes terminating and repeating decimals)
3.7
½
Integers (Z)
whole numbers and their opposites
-21
-4
Whole Numbers (W)
counting numbers and zero
0
Natural Numbers (N)
counting numbers
1, 2, 3, 4, 5 ...

Pop Quiz!

- Name the set(s) of numbers to which each number belongs.

-1

- [redacted]
- -4.8

[redacted]

-

-20/4

- [redacted]

7

[redacted]

You have been given a calculator scavenger hunt sheet.

With your group fill out the blanks. What you do not finish will be homework along with a rational and irrational worksheet

Exploring Real Numbers

THE END