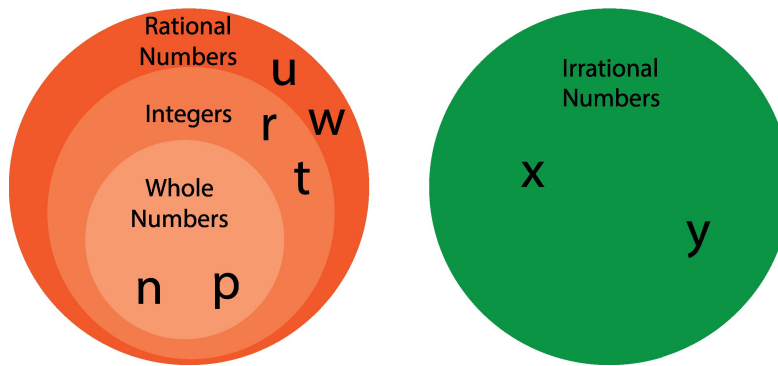


Sets and Subsets of Real Numbers Sample Problems

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Real Numbers



The diagram above shows how some of the subsets of the set of real numbers are related. The letters represent members of the sets. Judy wants to replace the letters

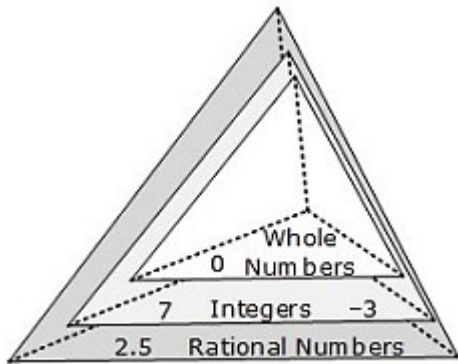
with actual numbers. Which letter could be replaced with the number $\frac{2}{3}$?

- A n
- B w
- C r
- D x

Since $\frac{2}{3}$ is a number written in the form of $\frac{a}{b}$ it is a rational number by definition. Therefore, it is a real number but is not a whole number nor an integer. So the only two options would be for $\frac{2}{3}$ to either be letter u or w . The answer choice must be B for the letter w .

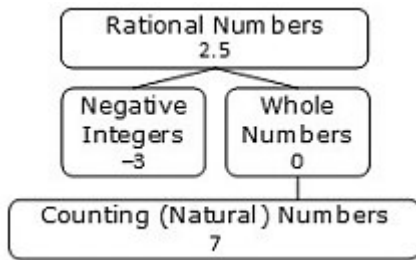
2 Which diagram is NOT a correct representation of the relationship between the sets and subsets of rational numbers?

A



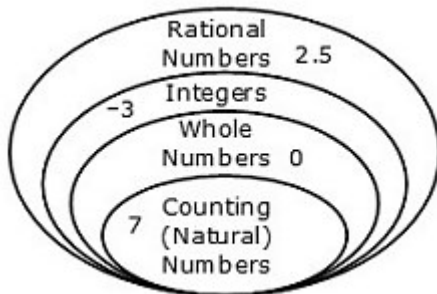
This answer choice is correct as the order of the triangles is correct as all whole numbers are integers and all integers are rational numbers. The numbers represented in the chart are also correct as 2.5 is a rational number, then 7 and -3 are integers which are also rational numbers, and 0 is a whole number which is also an integer and a rational number.

B



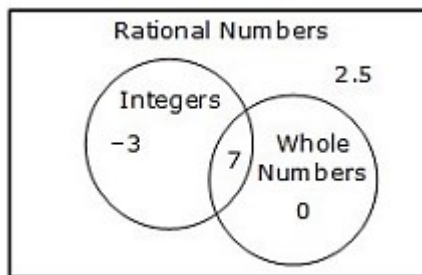
This answer choice is correct as the order of the sets is correct. Rational numbers are also negative integers and whole numbers and whole numbers are counting(natural) numbers. The numbers are also in the right place as 2.5 is a rational number, -3 is a negative integer, 0 is a whole number, and 7 is a counting(natural) number.

C



This answer choice is correct as the order of the circles are correct as all counting(natural) numbers are whole numbers, all whole numbers are integers, and all integers are rational numbers. The numbers are also in the right place as 2.5 is a rational number, -3 is an integer, 0 is a whole number, and 7 is a counting(natural) number.

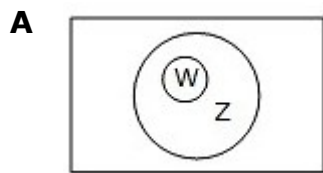
D



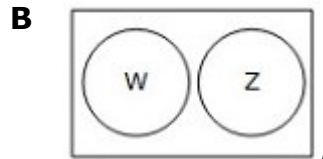
This answer choice is incorrect. All whole numbers are also integers which is not suggested in this example. Also, the number 0 is both a whole number and an integer and this example shows it to only be a whole number and rational number.

The correct answer choice to this problem would be D as it is NOT a correct relationship between the sets and subsets of real numbers.

3 Which Venn diagram correctly describes the relationship between the set of Integers, Z, and the set of Whole Numbers, W?

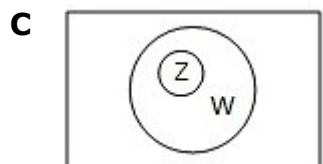


This is the correct answer choice as all whole numbers(W) are integers(Z) as suggested by the diagram.



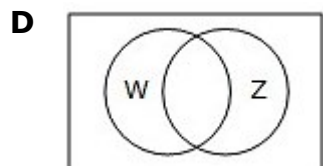
, because whole numbers and integers have no elements in common

This answer choice is incorrect because all whole numbers(W) are also integers(Z).



, because all integers are whole numbers

This answer choice is incorrect because all integers(Z) are not also whole numbers(W). For example, the number -2 could not belong in both circles because -2 is not a whole number by definition.



, because some whole numbers are not integers

The answer choice is incorrect.

Therefore, the correct answer choice for this problem is A.

4 Which shows the number subsets to which the number $-\sqrt{144} = -12$ belongs?

- A** integer, irrational, real
- B** integer, rational, real
- C** whole number, integer, rational, real
- D** whole number, integer, rational, real

Square root of 144 is twelve times (-1) would be -12. Therefore, by definition is must be an integer, rational, and real number. It cannot be a whole number as whole numbers do not include negative numbers and it cannot be an irrational number as it is a perfect square and is a number that can be written in the form of a/b.

The correct answer choice for this problem would be B.

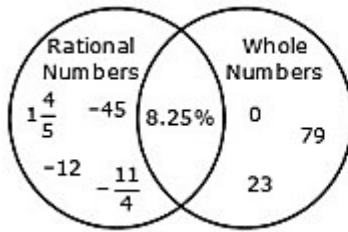
5 A list of numbers is shown.

23, -45, 0, -12, $-\frac{11}{4}$, 8.25%, $1\frac{4}{5}$, 79

23 - Counting, whole, rational
 -45 - Integer, rational
 0 - whole, integer, rational
 -12 - integer, rational
 -11/4 - rational
 8.25% - rational
 1 4/5 - rational
 79 - counting, whole, rational

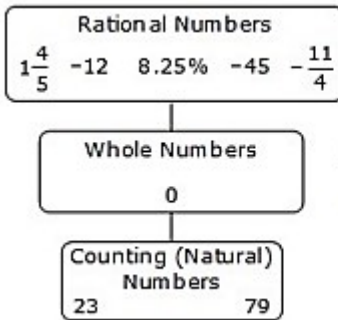
Which diagram shows the correct placement of these numbers?

A



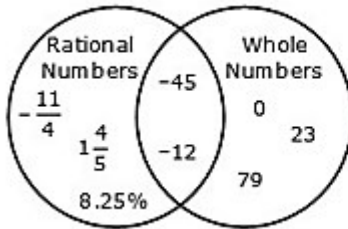
Not correct as 8.25% is not a whole number.
 , because 8.25% is the only number that is both a rational number and a whole number.

B



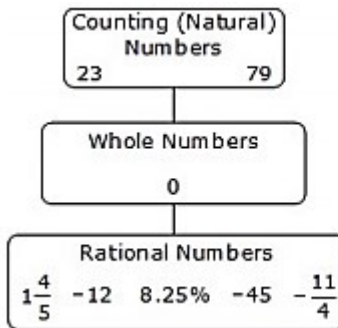
Correct
 , because all counting (natural) numbers are whole numbers, and all whole numbers are rational numbers.

C



Not correct as -45 and -12 are not whole numbers.
 , because -12 and -45 are the only numbers that are both rational numbers and whole numbers.

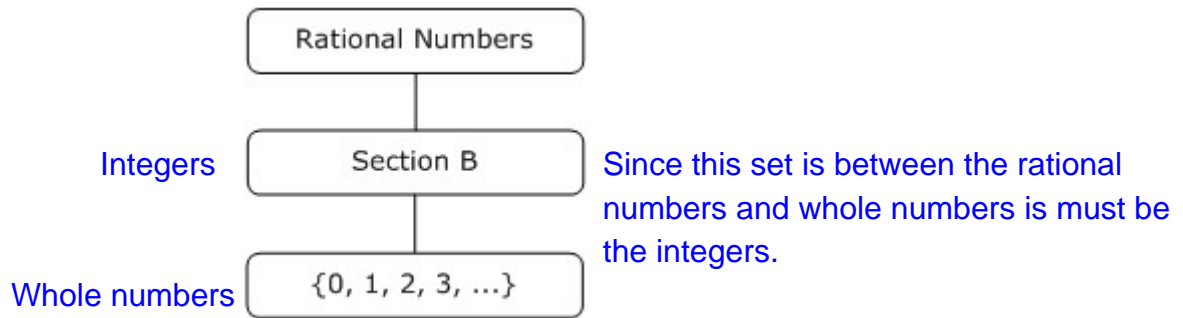
D



Not correct as the order is wrong. All rational numbers are not whole numbers nor are all whole numbers counting(rational) numbers.
 , because all rational numbers are whole numbers, and all whole numbers are counting (natural) numbers.

Therefore, the correct answer choice is B for this problem.

- 6 The diagram below represents the relationships between the sets and subsets of rational numbers.

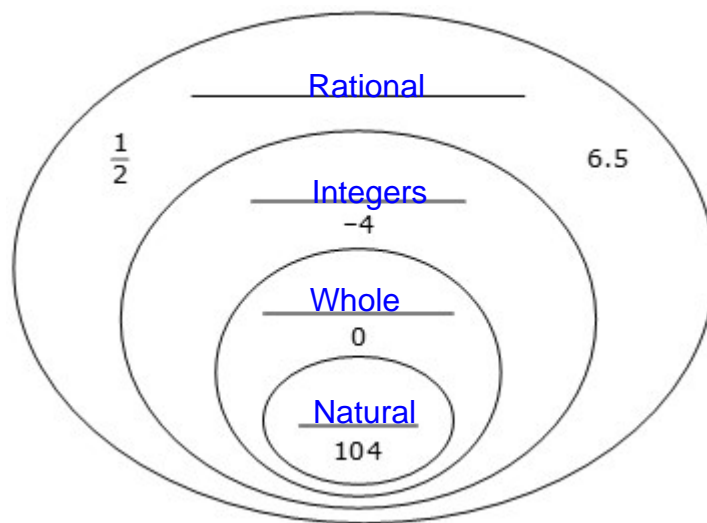


Which group of numbers could be placed in Section B?

- A** $-\frac{7}{8}$, -2.5, -4 $-\frac{7}{8}$ and -2.5 are not integers.
- B** $\frac{7}{8}$, 2.5, 4 $\frac{7}{8}$ and 2.5 are not integers.
- C** -7, 8, -4 -7, 8, and -4 are integers
- D** Not here

Therefore, the correct answer choice is C for this problem.

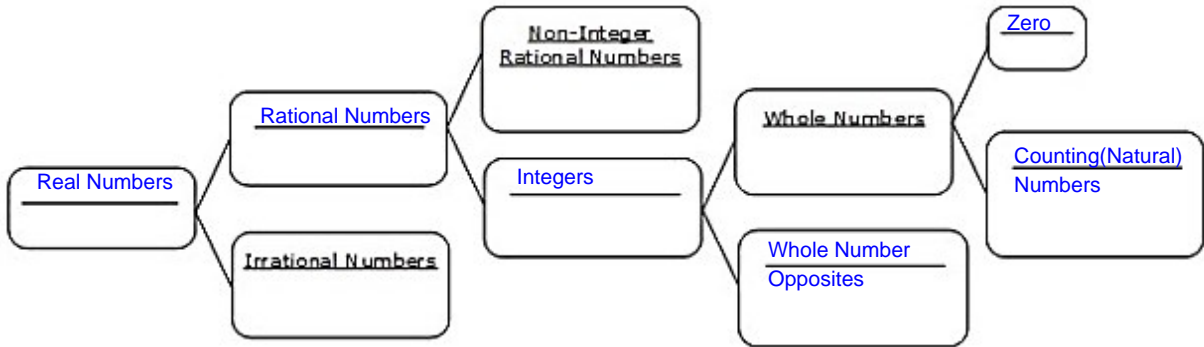
7 The Venn diagram represents the relationships between the sets and subsets of rational numbers.



Analyze the relationships within the Venn diagram to identify the appropriate number sets using each of the following labels:

- Natural (Counting) Numbers
- Integers
- Rational Numbers
- Whole Numbers

- 8 The tree diagram represents the relationships between the sets and subsets of Real numbers.



Part A

Analyze the relationships within the tree diagram to identify the appropriate number sets using each of the following labels:

- Counting (Natural) Numbers
- Zero
- Real Numbers
- Integers
- Rational Numbers
- Whole Number Opposites