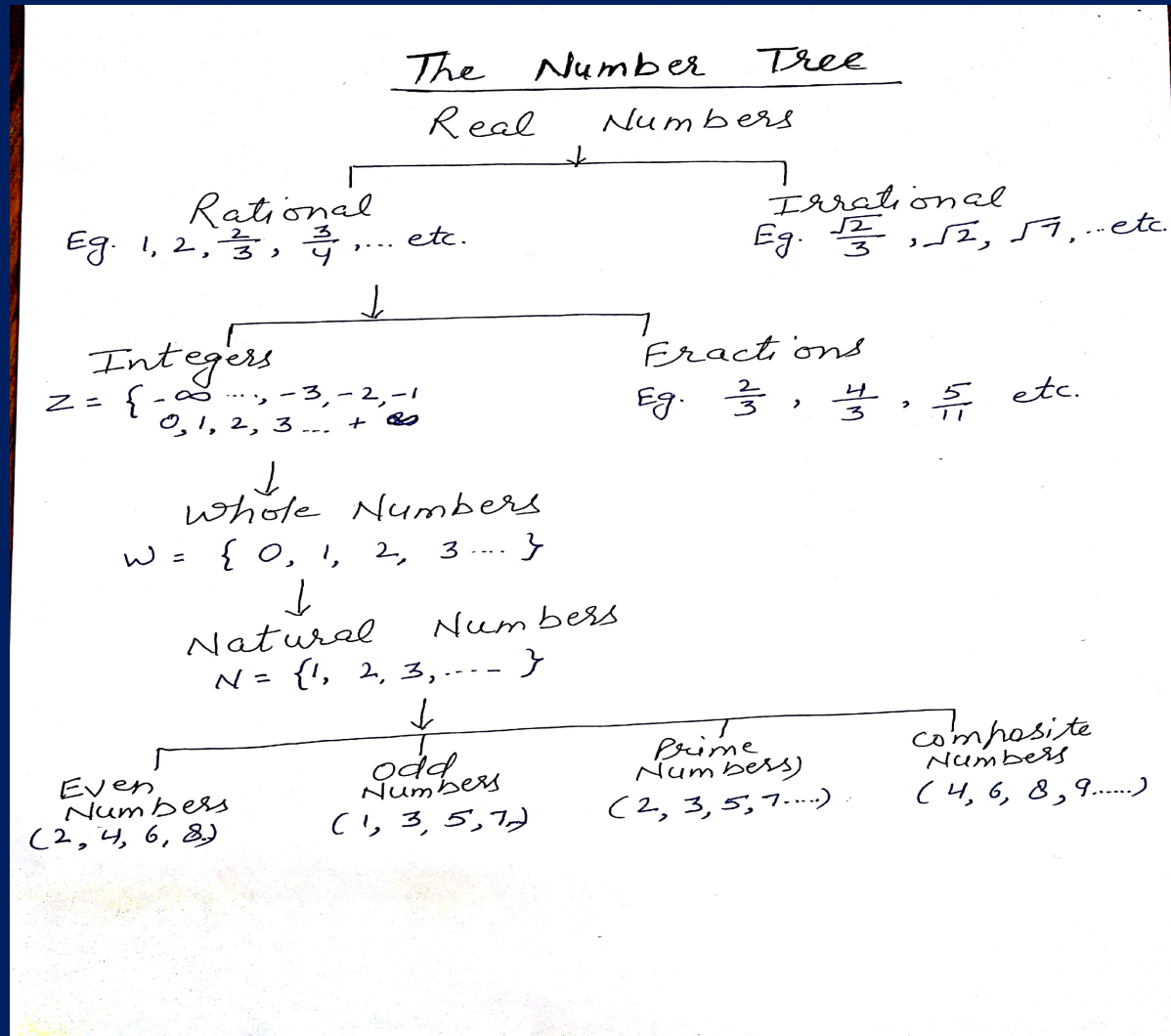


RBI PHASE 1 RECAP

2ND JULY '18

QUANT – NUMBER SYSTEM

NUMBER SYSTEM



NUMBER SYSTEM



Relative primes

Two numbers are said to be relative or co-prime if they do not have any common factor other than 1. As 15 and 16 do not have any common factors and hence they are relative primes or co-primes.

Multiples

If one number is divisible exactly by a second number, then the first number is said to be a multiple of the second number. As 15 is a multiple of 5.

Factors

If one number divides a second number exactly, then the first number is said to be a factor of the second number. As 5 is a factor of 15.

NUMBER SYSTEM

Even and odd numbers

Numbers divisible by 2 are called even numbers whereas numbers that are not divisible by 2 are called odd numbers.

Example for even numbers are 2, 4, 6, 8, etc.

Examples for odd numbers are 1, 3, 5, 7, etc.

Things to be remember while solving the sums related to even and odd numbers.

*the sum of any number of even numbers is always even.

*the sum of odd number of odd numbers (i.e., the sum of 3 odd numbers, the sum of 4 odd numbers) is always odd.

*the sum of even number of odd numbers (i.e., the sum of 2 odd numbers, the sum of 4 odd numbers, etc.) is always even.

*the product of any number of odd numbers is always odd.

*the product of any number of numbers where there is at least one even number is even.

Perfect numbers

A number is said to be a perfect number if the sum of all its factors excluding itself (but including 1) is equal to the number itself.

NUMBER SYSTEM

Q.1) Let a , b and c be distinct integers, a and b are both odd and c is even. Which of the following expressions is always false?

- [a] $(a + c)^3 a$ is odd**
- [b] $(a + c) a^3$ is odd**
- [c] $(a + c) c$ is even**
- [d] $(a + b) a$ is odd**

Solution (d)

We have to consider all the options:

Choice [a]:

As a is odd and c is even $a + c$ is odd.

Hence, $a (a+c)^3$ is odd. Hence choice [a] is true.

Choice [b]:

As a is odd, $a+c$ is odd, a^3 is odd.

Hence, choice [b] is true.

Choice [c]:

As, $a + c$ is odd. As c is even, so $(a+c) \times c$ is even. Choice [c] is true.

Choice [d]:

As a and b are both odd so, $a+b \times a$ is even. Hence, choice [d] is false.

NUMBER SYSTEM

Q.2) what is the last digit in the product of the first 30 odd natural numbers?

[a] 5

[b] 7

[c] 9

[d] none of these

Solution (a)

5 is present in the first 30 odd numbers. All odd multiples of 5 end with 5.

Hence, the product of the first 30 odd numbers ends with 5.

NUMBER SYSTEM

Q.3) Which of the following is necessarily true regarding prime and composite numbers?

- [a] sum of a prime number and composite number cannot be an even integer.**
- [b] product of the prime number and composite number cannot be an even integer.**
- [c] If a is a composite number and b is a prime number, then $(a+b) / b$ cannot be an even integer.**
- [d] none of the above statement is true.**

Solution (d)

Let p and c denote prime and composite numbers.

Choice [a]:

Take $p = 3, c = 9, p+c = 12$, an even integer. So, [a] is false.

Choice [b]:

Take $p=3, c=4, pc =12$, an even integer. So, [b] is false.

Choice [c]:

Take $p=9, b=3, \text{ then } (9+3) / 3 =4$. An even integer. So, [c] is false.

None of the above statement is true.

NUMBER SYSTEM

Q.4) If X, Y and Z are prime numbers, and $Y = X + 2$, $Z = Y + 2$, then the number of possible solutions for (X, Y, Z) is:

- [a] 0**
- [b] 1**
- [c] 2**
- [d] 3**

Solution (b)

The only possible solution for (X, Y, Z) is (3, 5, 7) which satisfies all the given conditions. So, number of solutions is only one.

NUMBER SYSTEM

Q.5) P is a composite integer, which is not a perfect square. Consider the following:

- (i) P has a factor lying between 1 and \sqrt{P} .**
- (ii) P has a factor lying between \sqrt{P} and P.**

- [a] both (i) and (ii) are true.**
- [b] both (i) and (ii) are false.**
- [c] (i) is true but (ii) is false.**
- [d] (i) is false but (ii) is true.**

Solution (a)

Any composite number P, has at least one factor (m) between 1 and \sqrt{P} and the corresponding factor (p/m) between \sqrt{P} and P.

For ex. 50

The factors are 1, 2, 5, 10, 25 and 50.

The factors 2 and 5 lie between 1 and $\sqrt{50}$ while 10 and 25 lie between $\sqrt{50}$ and 50.

NUMBER SYSTEM

Q.6) Let A be the set of prime numbers less than 50. We multiply all the elements of A to obtain a number B. with how many consecutive zeroes will B end?

- [a] 11**
- [b] 5**
- [c] 2**
- [d] 1**

Solution (d)

A= (2, 3, 5, 7, 11, 13, 17.....47).

i.e., A has only one even integer, and only one integer ending with 5.

A has no integer ending with 0.

So, the product of elements of A will end with only one zero.

So, B ends with one zero.

NUMBER SYSTEM

Q.7) Ram wrote first 50 natural numbers on a blackboard. Then he erased two numbers say p and q , and replaced them by a single number N . He performed this operation repeatedly until a single number was left. For all odd values of n , in the n^{th} operation, he chose N to be $P+q+1$ and for all even values of n , he chose N to be $p+q-1$. Find the final number which remained.

- [a] 1275
- [b] 1276
- [c] 1274
- [d] 1225

Solution (b)

At the beginning, there are 50 numbers

After the first replacement, there are 49. Therefore, after 49 replacements, there will be a single number.

Also, let the sum of all the 50 numbers be S . after the first replacement, the total is $S+1$ and after the second it is again S . after an even number of replacement it is S and after an odd number of replacement, it is $S+1$.

So, after 49 replacements, it is $S+1$.

As $S = 50(51)/2 = 1275$, the number left at the end is 1276.

NUMBER SYSTEM

Q.8) Mr. X forgot his telephone number. All he remembers is that the 1st digit of the number is an even prime number and the rest of the telephone number is square of a number comprising first four natural number in ascending number. What is his telephone number?

[a] 31522756

[b] 21567432

[c] 21730400

[d] 21522756

Solution (d)

1st digit being an even prime number, is 2. Hence option [a] is ruled out.

The next digit is square value of 1234. So it should end in 6. Hence answer is [d].

Alternatively,

1st digit is 2 and next part = $(1234)^2$ 1522756

Hence, the number is 21522756.

NUMBER SYSTEM

Q.9) Anil wants to divide RS. 100 into a number of bags so that one can ask for any amount between RS.1 and RS. 100, he can give the proper amount by giving certain number of these bags without taking out the amount from them. What is the minimum number of bags he will require if each bag has whole number of rupees?

- [a] 5**
- [b] 6**
- [c] 7**
- [d] 8**

Solution (c)

If Anil has to give 1 rupee he needs a bag with RS. 1. For 2 rupees he had two bags with RS. 1 each or RS. 2 bags. To have minimum bags he has a bag with RS.2. now with the two bags he can give RS. 3. So next he will require a bag with RS. 4. With these three he can give RS. 5, RS.6 and RS.7 and next bag will be one containing RS. 8 and so on. Thus, he would have bags with RS. 1, 2, 4, 8, 16, 32. Sum of which is 63 and remaining 37 can be put in the last bag. So, total number of bags is 7.

NUMBER SYSTEM

Q.10) Sachin writes all the numbers from 1 to 1000 on a paper in order. Find the 2883rd digit written by him.

- [a] 0
- [b] 9
- [c] 7
- [d] 8

Solution (c)

The number of digits written by Sachin can be divided into one digit, two digit and three digit numbers.

	Numbers written	Number of digits written
One digit	1 to 9	9
Two-digit	10 to 99	180
Three-digit	100 to 999	2700

Thus, from 1 to 999 he has written written 2889 digits. Now, last three numbers till 999 are 997, 998, 999. Thus, 2883rd digit will be 7.