

GENERAL APTITUDE

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What is **Aptitude?**

It is your natural ability to learn or excel in a certain area.

For example, you could have an aptitude for math and logic.

Key to success

- 1. Problem Recognition
- 2. Speed
- 3. Practice



Link for **English Basics**

- https://www.myenglishpages.com/english/exercises.php
- https://www.grammarbank.com/
- https://www.really-learn-english.com/english-grammar-exercises.html
- https://www.really-learn-english.com/english-reading-comprehension-text-and-exercises.html
- Practice Synonyms and Antonyms regularly.
- Read Idioms and Phrases.
- Book Word Power Made Easy by Norman Lewis
- Book English Grammar by Wren and Martin



Basic MATHS

- Tables at least from 1-25
- Squares from 1-25
- Prime numbers from 1-100
- Divisibility rules for 1-20

- Methods for typical multiplications & divisions
- Methods for finding HCF & LCM
- Methods for finding squares & square roots

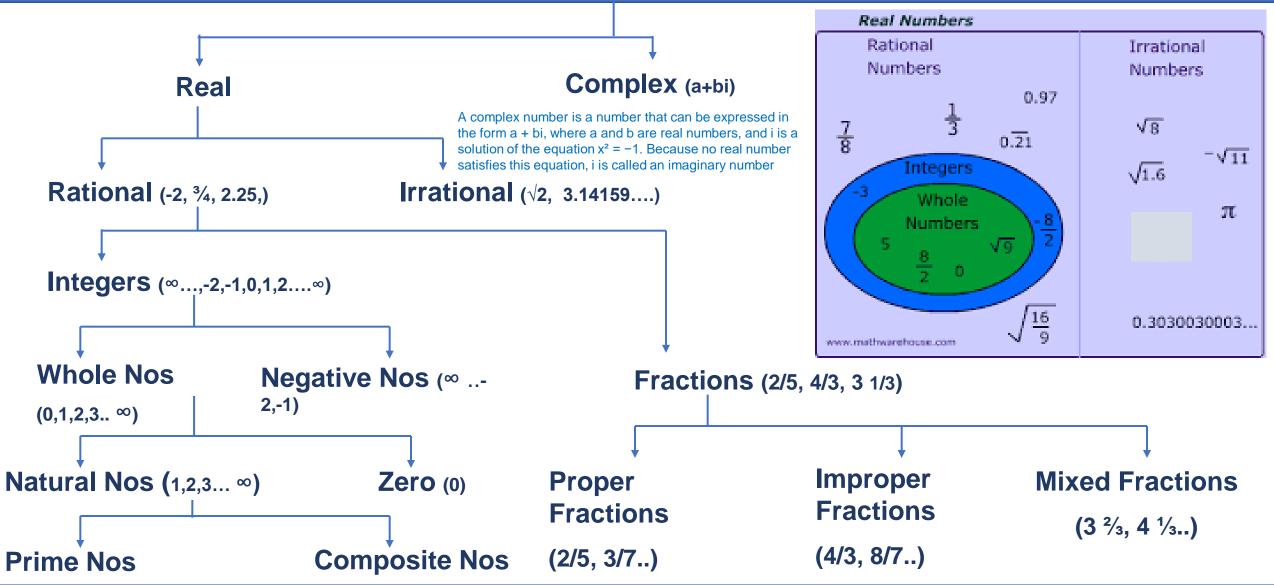


Topic Wise Test Plan

| TEST NAME | TOPICS |
|-----------|--|
| APTI 1 | Numbers + LCM + HCF + Ages + Averages |
| APTI 2 | Percentages + Alligations & Mixtures + Profit & Loss |
| APTI 3 | Time & Work + Pipes & Cisterns + Chain Rule |
| APTI 4 | Time & Distance + Trains + Boats + Interest |
| APTI 5 | Clock + Calendar + Probability + Permutation Combination |



Numbers





What is the Difference Between Rational Numbers and Irrational Numbers?

| Rational Numbers | Irrational Numbers |
|---|--|
| Numbers that can be expressed as a ratio of two numbers (p/q form) are termed as a rational number. | Numbers that cannot be expressed as a ratio of two numbers are termed as an irrational number. |
| Rational Number includes numbers, which are finite or are recurring in nature. | These consist of numbers, which are non-terminating and non-repeating in nature. |
| If a number is terminating number or repeating decimal, then it is rational. e.g: $1/2 = 0.5$ | If a number is non-terminating and non-repeating decimal, then it is irrational. e.g: 0.31545673 |
| Example: - 1/2, 3/4, 11/2, 0.45, 10, etc. | example:-Pi (π) = 3.14159, Euler's Number (e) = (2.71828), and $\sqrt{3}$, $\sqrt{2}$. |



Basic MATHEMATICAL operations

- BODMAS
- B Bracket (), {}, []
- O Order
- D Division
- M Multiplication
- A AdditionS Subtraction.



BASIC FORMULAE

- 1. $(a + b)^2 = a^2 + b^2 + 2ab$
- 2. $(a b)^2 = a^2 + b^2 2ab$
- 3. $(a + b)^2 (a b)^2 = 4ab$
- 4. . $(a + b)^2 + (a b)^2 = 2 (a^2 + b^2)$
- 5. $(a^2 b^2) = (a + b) (a b)$
- 6. $(a + b + c)^2 = a^2 + b^2 + c^2 + 2$ (ab + bc + ca)
- 7. $(a^3 + b^3) = (a + b) (a^2 ab + b^2)$
- 8. $(a^3 b^3) = (a b) (a^2 + ab + b^2)$
- 9. $(a^3 + b^3 + c^3 3abc) = (a + b + c) (a^2 + b^2 + c^2 ab bc ca)$
- 10. If a + b + c = 0, then $a^3 + b^3 + c^3 = 3abc$



Basic NUMBER Representation

- Place Value: Units, Tens, Hundreds,
- Value of a 2 digit no. 'ab' where both a & b are natural numbers = 10(a) + b
- The number with reversed digits will be 'ba' & the value of the number will be = 10(b) + a



Numbers

Q. A number consists of two digits.

Sum of the digits is 9. If 63 is subtracted from the number its digits are interchanged. Find the number.

A. 72

B. 90

C. 63

D. 81

Solution:

Let the tens digit be a & units digit be b a + b = 9(1) 10a + b - 63 = 10b + a9a - 9b = 63(2) (1)x99a + 9b = 81(3) (2) + (3) $18a = 144 \rightarrow a = 8$, b= 1 Number = 81

Ans: D



Sum of Natural Numbers

- Rule 1 : Sum of first n natural numbers = $\frac{n(n+1)}{2}$ e.g. sum of 1 to 74 = 74 x (74+1)/2 = 2775.
- Rule 2 : Sum of first n odd numbers = n²
- e.g. sum of first seven odd numbers
- $=(1+3+5+7+9+11+13)=49=7^{2}$.
- Rule 3 : Sum of first n even numbers = n (n+1)
- e.g. sum of first 9 even numbers
 - = (2+4+6+8+10+12+14+16+18) = 90
 - $= 9 (9+1) = 9 \times 10 = 90$



Sum of Natural Numbers

• Rule 4 : Sum of squares of first n natural numbers = $\frac{n(n+1(2n+1))}{6}$

e.g. sum of squares of first 8 natural numbers

$$= (1 + 4 + 9 + 16 + 25 + 36 + 49 + 64) = 204$$

$$= 8 (8+1)(16+1)/6 = 8 \times 9 \times 17/6 = 204$$

• Rule 5 : Sum of cubes of first n natural numbers = [n(n+1)/2]2

e.g. sum of cubes of first 4 natural numbers

$$=(1+8+27+64)=100$$

$$= [4 (4+1)/2]^2 = 100$$



MULTIPLICATION

1. To multiply by 9, 99, 999....

Place as many zeroes to the right of multiplicand as there are 9s and subtract the multiplicand itself.

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e.g. 26234 x 999 = ?

26234000

- 26234

26207766
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Multiples

 Multiples of number are obtained by multiplying that number by natural numbers.

e.g. Multiples of 3 are 3, 6, 9, 12,

If we want to find no of multiples of 6 less than 255 255 / 6 = 42 (remainder 3) So there are 42 such multiples.



DIVISION

- DIVISION by ZERO is NOT POSSIBLE
- If two numbers are divisible by a number then their sum & difference is also divisible by the number.
- E.g. For 63 is divisible by 9. 27 is also divisible by 9.
- So 63 + 27 = 90 is also divisible by 9
- And 63 27 = 36 is also divisible by 9



- 2: Unit place is even or zero(last digit should be divisible by 2)
- 3: Sum of the digits is divisible by 3. e.g: 324
- 4: Last 2 digits are divisible by 4 or last 2 digits are 0. e.g: 324
- 5: Unit digit is 5 or 0
- **6**: Divisible by co primes **2** & **3**. e.g : 324
- 8: Number formed by last 3 digits is divisible by 8 or last 3 digits are 0.
 - e.g: 1088
- 9: Sum of all digits is divisible by 9. e.g: 324
- 10: Units digit is 0.



• 11: Difference between sum of digits in odd & even places should either be zero or divisible by 11

e.g: 8283

e.g: 918071

- 12 : Divisible by co primes 3 & 4 e.g : 324
- 14: Divisible by co primes 2 & 7
- 15 : Divisible by co primes 3 & 5
- 16: No formed by last 4 digits divisible by 16/ last 4 digits 0.
- 18: Divisible by co primes 2 & 9
- 20 : Units digit 0 & tens digit is even.



• 7: The difference between the two alternate groups taking 3 digits at a time should either be zero or multiple of 7.

eg-550500006

eg-7370356

• 13: The difference between the two alternate groups taking 3 digits at a time should either be zero or multiple of 13.

eg-200174



- 17: A number is divisible by 17 if you multiply the last digit by 5 and subtract that from the rest. If that result is divisible by 17, then your number is divisible by 17.
- For example, for 986, then: 98 (6 x 5) = 68.
- Since, 68 is divisible by 17, then 986 is also divisible by 17.
- Also, 876 is not divisible by 17 because $87 (6 \times 5) = 57$ and 57 is not divisible by 17.

- 19: To determine if a number is divisible by 19, take the last digit and multiply it by 2. Then add that to the rest of the number. If the result is divisible by 19, then the number is divisible by 19.
- For example, 475 is divisible by 19 because $47 + (5 \times 2) = 57$, and 57 is divisible by 19.
- But , 575 is not divisible by 19 because $57 + (5 \times 2) = 67$, and 67 is not divisible by 19.



PROPERTIES OF DIVISIBILITY

To find a number completely divisible by another:

A) Greatest 'n' digit number exactly divisible by a Number :

Method: By subtracting the remainder

e.g a) Greatest 3 digit number divisible by 13

Greatest 3 digit number = 999. 999/13 gives remainder 11.

999-11 = 988 = Greatest 3 digit number divisible by 13

B) Least 'n' digit number exactly divisible by a Number :

Method: By adding the (divisor – remainder)

e.g b) Least 3 digit number divisible by 13

Least 3 digit number = 100. 100/13 gives remainder 9

100 + (13 - 9) = 104 = Least 3 digit number divisible by 13



PROPERTIES OF DIVISIBILITY

Q. On dividing a number by 999, the quotient is 366 and the remainder is 103. The number is:

A.364724

B.365387

C.365737

D.366757

E. None of these

Soln-

dividend = divisor x quotient + remainder

Required number = 999 x 366 + 103

 $= (1000 - 1) \times 366 + 103$

= 366000 - 366 + 103

= 365737

Ans: C



PRIME NUMBERS

- A number that is divisible only by itself and 1 (e.g. 2, 3, 5, 7, 11).
- There are 25 prime numbers between 1 100
- 1 is neither prime nor composite number.
- 2 is the only prime number which is even.
- A number having more than 2 factors is a composite number
- Find prime numbers between 101 and 200??
- There are 21 prime numbers between 101 200



Co-Prime

• When two numbers (they may not be prime) do not have any common factor other than one between them they are called co-prime or relatively prime.

• It is obvious that two prime numbers are always co-prime. e.g: 17 and 23

• Two composite numbers can also be co-prime. e.g: 16 & 25 do not have any common factor other than one.

• Similarly 84 and 65 do not have any common factor and hence are co-prime.



Prime Number

Q. Find whether 467 is prime or not

Step 1 : Sq root of 467→ Between 21 (441) and 22 (484)

Step 2: 467 is not divisible by 2, 3, 5, 7, 11, 13, 17, 19. Next prime is 23 which exceeds the square limit.

Therefore 467 is prime.



Prime Number(Assignment)

Q. Which of the following is a prime number?

A. 303

Ans: C

B. 477

C. 113

D. None of these



Which of the following is the output of $57 \times 57 + 43 \times 43 + 2 \times 57 \times 43$?

A. 10000

B. 5700

C. 4300

D. 1000

Ans: A



Q. Which of the following is the output of 6894 x 99?

A. 685506

B. 682506

C. 683506

D. 684506

Ans: B



Q. What is the unit digit in 584 x 428 x 667 x 213 ?

A. 2

B. 3

C. 4

D. 5

Ans: A



Q. The sum of reciprocals of two consecutive numbers is 15/56. The first number is

A. 8

B. 7

C. 6

D. 15.

Ans: B



Divisibility (Assignment)

Q. What percentage of the numbers from 1 to 50 have squares ending in the digit 1?

A. 1 B. 10 C. 11

D. 20

Ans: D





