

RRB/RRC GROUP – D

MATHEMATICS GUIDE

Chapter-wise Practice Exercise



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Covers 100 % Syllabus

RRB/RRC GROUP – D

MATHEMATICS GUIDE

Team Prabhat



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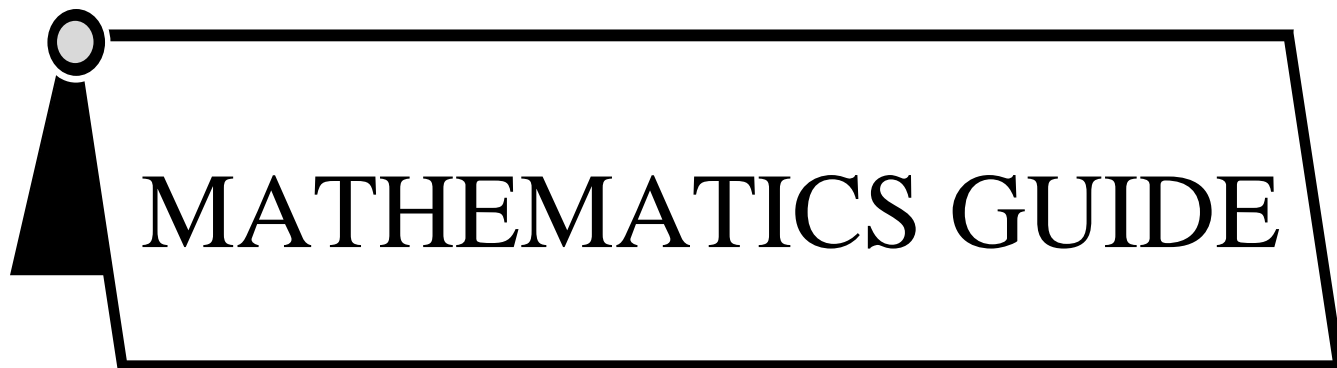
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MATHEMATICS GUIDE

1

NUMBERS AND FRACTIONS

- **Natural:** In Hindu Arabic system, we use ten symbols, numeral 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9. We call them digits. A number is denoted by a group of digits, called numeral.
- **Place value:** In a numeral 176524, we have
Place value of 4 = $(4 \times 1) = 4$
Place value of 2 = $(2 \times 10) = 20$
Place value of 5 = $(5 \times 100) = 500$
Place value of 6 = $(6 \times 1000) = 6000$
Place value of 7 = $(7 \times 10000) = 70000$
Place value of 1 = $(1 \times 100000) = 100000$
- **Face value:** The face value of a digit in a numeral is the value of the digit itself. Wherever it may be in the place value chart.
In the numeral 17625, the face value of 5 is 5, the face value of 2 is 2, the face value of 6 is 6 and so on.

Types of numbers:

- (i) **Natural numbers:** The counting numbers are called natural numbers.
Thus, $N = \{1, 2, 3, 4, 5, 6, 7, \dots\}$ is the set of natural numbers.
- (ii) **Whole numbers:** All natural numbers together with zero (0) form the set W of all whole numbers.
 $W = \{0, 1, 2, 3, 4, 5, 6, 7, \dots\}$ is the set of all whole numbers.
Note:
 - Every natural number is a whole number.
 - 0 is a whole number which is not a natural number.
- (iii) **Integers:** All natural numbers, negatives of natural number and 0, together form the set I of all integers.
Thus, $I = \{\dots, -4, -3, -2, -1, 0, 1, 2, 3, 4, \dots\}$, I is the set of all negative and positive integers.
- (iv) **Even numbers:** A number divisible by 2 is called an even number.
Thus, $\{2, 4, 6, 8, 10, 12, 14, 16, \dots\}$ is the set of all even numbers.
- (v) **Odd numbers:** A number not divisible by 2 is called an odd number.
Thus, $\{1, 3, 5, 7, 9, 11, 13, 15, \dots\}$ is the set of odd numbers.
- (vi) **Prime numbers:** A number greater than 1 having exactly two factors, namely 1 and itself is called a prime number.
- (vii) **Rational numbers:** A number of the form $\frac{p}{q}$ is called Rational number, (where p and q are integers and $q \neq 0$)

Thus, $\frac{3}{4}, \frac{5}{6}, \frac{6}{7}$ etc. are rational numbers.

- (viii) **Irrational numbers:** A number which is not of the form of $\frac{p}{q}$ is called irrational number (where p and q are integers and $q \neq 0$)

Thus $\sqrt{3}, \sqrt{5}, \pi$ etc. are Irrational numbers.

- (ix) **Composite numbers:** Numbers greater than 1 which are not prime, are called composite numbers.
Thus, 4, 6, 8, 9, 10 and 12 etc. are composite numbers.
Note: (i) 1 is neither prime nor composite.
(ii) 2 is the only even number which is prime.
- (x) **Co-prime:** Two natural numbers a and b are said to be co-prime if their HCF is 1.
Thus, (2, 3), (4, 5), (7, 9) etc. are pairs of co-primes.

Division on numbers: Dividend, Divisor, Quotient and Remainder.

Let a number a is divided by another number b and we get quotient q and remainder r.

Then, Dividend = Divisor \times Quotient + Remainder
[$a = bq + r$] where ($a \leq r < b$)

Test of divisibility:

- (i) **Divisibility by 2:** A number is divisible by 2 if its units digit is any of 0, 2, 4, 6 and 8.
Example: 342, 4616, 52316 etc.
- (ii) **Divisibility by 3:** A number is divisible by 3 if the sum of its digits is divisible by 3.
Example: 96342, 462372 etc.
- (iii) **Divisibility by 4:** A number is divisible by 4 if the number formed by the last two digits is divisible by 4.
Example: 1728, 16520, 17624 etc.
- (iv) **Divisibility by 5:** A number is divisible by 5, if its unit's digit is either 0 or 5.
Example: 625, 15725, 100000 etc.
- (v) **Divisibility by 6:** A number is divisible by 6 if it is divisible by both 2 and 3.
Example: 6432, 74936 etc.
- (vi) **Divisibility by 8:** A number is divisible by 8, if the number formed by the last three digits of the given number is divisible by 8.
Example: 175248, 976488 etc.
- (vii) **Divisibility by 9:** A number is divisible by 9, if the sum of its digits is divisible by 9.
Example: 6372, 5943276 etc.