Bank Job Lecture Sheet

Lecture 4

Lecture Contents

☑ Number Properties

Number Properties

Basic Concept of Number Properties:

To be memorized:

$\sqrt{2}$	1.4142
$\sqrt{3}$	1.7320
$\sqrt{5}$	2.2360
$\sqrt{7}$	2.6457
$\sqrt{8}$	2.8284
$\sqrt{10}$	3.1622

$1^2 = 1$	$2^2 = 4$	$3^2 = 9$	$4^2 = 16$
$5^2 = 25$	$6^2 = 36$	$7^2 = 49$	$8^2 = 64$
$9^2 = 81$	$(10)^2 = 100$	$(11)^2 = 121$	$(12)^2 = 144$
$(13)^2 = 169$	$(14)^2 = 196$	$(15)^2 = 225$	$(16)^2 = 256$
$(17)^2 = 289$	$(18)^2 = 324$	$(19)^2 = 361$	$(20)^2 = 400$
$(21)^2 = 441$	$(22)^2 = 484$	$(23)^2 = 529$	$(24)^2 = 576$
$(25)^2 = 625$	$(26)^2 = 676$	$(27)^2 = 729$	$(28)^2 = 748$
$(29)^2 = 841$	$(30)^2 = 900$		

$1^3 = 1$	$2^3 = 8$	$3^3 = 27$
$4^3 = 64$	$5^3 = 125$	$6^3 = 216$
$7^3 = 343$	$8^3 = 512$	$9^3 = 729$

Rules of divsibility (বিভাজ্যতার নিয়ম):

2 → সংখ্যাটির Last digit জোর হলে।

5 → সংখ্যাটির Last digit 0 বা 5 হলে।

3 → সংখ্যাটির সবগুলো digit এর যোগফল 3 দিয়ে ভাগ গেলে। যেমন- 123, 81, 567.

9 → সংখ্যাটির সবগুলো digit এর যোগফল 9 দিয়ে ভাগ গেলে। যেমন- 81, 567.

4 → সংখ্যাটির Last two-digit 4 দিয়ে ভাগ গেলে। যেমন- 3624, 1232.

8 → সংখ্যাটির Last three-digit 8 দিয়ে ভাগ গেলে। যেমন- 823424, 6424.

6 → সংখ্যাটি একইসাথে 2 ও 3 দিয়ে ভাগ গেলে। যেমন- 12.

7 → no rule.

Integer whole number (পূর্ণসংখ্যা): শূণ্য সহ দশমিক বা ভগ্নাংশ নয় এমন সকল ধনাত্মক ও ঋনাত্মক সংখ্যাকে Integer বা Whole number বলে। যেমন- – 7, – 6, – 3, 0, 1, 2, 11, 12 ইত্যাদি।

Natural Number (স্বাভাবিক সংখ্যা): সকল ধনাত্মক পূর্ণ সংখ্যাকে Natural Number বলে। যেমন- 1, 2, 3, ... ইত্যাদি।

Zero (শূন্য):

(i) একটি জোড় সংখ্যা

(ii) একটি পূর্ণসংখ্যা

(iii) ধনাত্মকও নয় বা ঋনাত্মকও নয়

Fraction (ভগ্নাংশ): দুটি সংখ্যাকে ভাগ আকারে বা $\frac{\text{লব}}{\text{হর}}$ আকারে প্রকাশ করাকে ভগ্নাংশ বলে।

Fraction দুই প্রকার। যথা-

(i) **Proper fraction (প্রকৃত ভগ্নাংশ):** যে ভগ্নাংশের মান 1 থেকে ছোট তাকে proper fraction বলে। যেমন- $\frac{1}{2}, \frac{2}{3}, \frac{4}{5}, \frac{5}{9}$.

(ii) **Improper Fraction (অপ্রকৃত ভগ্নাংশ):** যে ভগ্নাংশের মান 1 থেকে বড় তাকে Improper fraction বলে। যেমন- $\frac{3}{2}, \frac{5}{4}, \frac{9}{5}$.

Ration Number

মূলদ সংখ্যা : দুটি পূর্ণ সংখ্যাকে ভগ্নাংশ বা ভাগ আকারে প্রকাশ করাকে মূলদ সংখ্যা বলে। কিন্তু শর্ত হলো শূন্য হরে এ আসবে না।

অথবা, p ও q দুটি পূর্ণ সংখ্যা হলে $\frac{p}{q}$ কে মূলদ সংখ্যা বলে।

শর্ত: $q \neq 0$. যেমন- $\frac{1}{2}, \frac{3}{5}, \frac{4}{9}, 0, \frac{-2}{3}, 3, -2$ ইত্যাদি।

Note: $\frac{0}{\text{something}} = 0$ but $\frac{\text{something}}{0} = \text{undefined}$.

বৈশিষ্ট্য:

- ভাগ আকারে বা ভগ্নাংশ আকারে প্রকাশ করা যায়।
- সকল স্বাভাবিক সংখ্যা, পূর্ণসংখ্যা মূলদ সংখ্যা।
- সকল সসীম আবৃত দশমিক মূলদ সংখ্যা। যেমন- $\frac{10}{3} = 3.333 \approx 3.\dot{3}$
- মান নির্দিষ্ট থাকবে।
- পূর্বের অবস্থায় ফিরিয়ে আনা। যেমন- $\frac{3}{2} = 1.5$, $1.5 = \frac{15}{10} = \frac{3}{2}$.
- পূর্ণবর্গ সংখ্যার বর্গমূল মূলদ সংখ্যা।

Irrational Number (অমূলদ সংখ্যা): দুটি পূর্ণ সংখ্যাকে ভাগ আকারে প্রকাশ করা না গেলে এবং যার মান অনির্দিষ্ট বা অসীম তাকে অমূলদ সংখ্যা বলে। যেমন- $\frac{22}{7}$, সকল ধ্রুব সংখ্যা।

বৈশিষ্ট্য:

- মৌলিক সংখ্যার বর্গমূল অমূলদ সংখ্যা। যেমন- $\sqrt{2}, \sqrt{3}, \sqrt{7}$ ইত্যাদি।
- পূর্ণবর্গ নয় এমন সংখ্যার বগূমূল অমূলদ সংখ্যা। যেমন- $\sqrt{8}, \sqrt{15}, \sqrt{10}$ ইত্যাদি।
- সকল ধরনের ধ্রুব সংখ্যা অমূলদ। যেমন- $\pi, \lambda, \upsilon, \eta$ ইত্যাদি।
- অসীম আবৃত দশমিক অমূলদ সংখ্যা।

Prime number (মৌলিক সংখ্যা): 1 থেকে বড় যে সকল সংখ্যাকে ঐ সংখ্যা ছাড়া অন্য কোন সংখ্যা দিয়ে ভাগ করে যায় না বা যে সংখ্যা বিশ্লেষণ করা যায় না, তাকে মৌলিক সংখ্যা বলে। অথবা, যে সংখ্যার মাত্র দুটি উৎপাদক আছে তাকে মৌলিক সংখ্যা বলে। যেমন- 2, 3, 5, 7, 97 ইত্যাদি।

Note:

(i) ঋনাত্মক সংখ্যা মৌলিক সংখ্যা হতে পারে না।

(ii) মৌলিক সংখ্যা অবশ্যই 1 থেকে বড় হবে।

(iii) সবচেয়ে ছোট মৌলিক সংখ্যা হলো 2

(iv) একমাত্র জোড় মৌলিক সংখ্যা 1 বা হলো 2.

Co-Prime (সহ-মৌলিক): দুটি সংখ্যা সহ মৌলিক হবে যখন সংখ্যা দুটির গুণনীয়কগুলোর মধ্যে 1 ছাড়া কোন সাধারণ গুণনীয়ক থাকবে না। যেমন- 8 & 9, 8 গুণনীয়গুলো হলো 1, 2, 4, 8 এবং 9 এর গুণনীয়কগুলো হলো 1, 3, 9 যেহেতু 1 ছাড়া অন্য কোন সাধারণ গুণনীয়ক নেই। সুতরাং 8 & 9 সহ-মৌলিক।

Factor/Divison (গুণনীয়ক/ উৎপাদক/ ভাজক): একটি নির্দিষ্ট সংখ্যাকে যতগুলো সংখ্যা দিয়ে নিঃশেষ ভাগ যাবে, ততগুলো সংখ্যাকে ঐ নির্দিষ্ট সংখ্যার গুণনীয়ক বলে। যেমন- 12 একটি নির্দিষ্ট সংখ্যা। 12 কে 1, 2, 3, 4, 6. 12 দিয়ে নিঃশেষে ভাগ করা যায়। সুতরাং, 1, 2, 3, 4,, 6, 12 হলো 12 এর গুণনীয়ক।

Note: 3 যদি x এর গুণনীয়ক হয় তাহলে 3 অবশ্যই x কে নিঃশেষে ভাগ করবে। যেমন- 3 is a factor of x that means $\frac{x}{3}$.

Multiple (গুণিতক): একটি নির্দিষ্ট সংখ্যা গুণিতক হলো ঐ নির্দিষ্ট সংখ্যা যতগুলো সংখ্যাকে ভাগ করবে। যেমন- 3 এর গুণিতক হলো 3 যে সব সংখ্যাকে নিঃশেষে ভাগ করবে। 3 নিঃশেষে ভাগ করে 3, 6, 9, 12, 15 ..... ইত্যাদি। সুতরাং, 3, 6, 9, 12, 15, ... ইত্যাদি হলো 3 এর গুণিতক।

আরো সুন্দর করে বলা যায়, 3 এর গুণিতক হলো 3 ঘরের নামতা।

3 এর গুণিতক- 3, 6, 12, 15, 18, 21, 24, ... x.

Note: 12 এর গুণনীয়কসমূহ- 1, 2, 3, 4, 6, 12

12 এর গুণিতকসমূহ- 12, 24, 36, 48, 60..... ইত্যাদি।

Teacher's Discussion

1. **Think of a number and then double the number. Add 6 and then multiply the number by 10. Now divide the number by 20, then subtract the number you first thought of. What is the result?** [Combined 5 Banks Officer- 2022]

   A. 5 B. 4 C. 3 D. 2 **Ans:** C

2. **The sum of squares of two numbers is 48 and the square of their difference is 16. The product of the two number is:** [Combined 5 Banks Officer- 2022]

   A. 16 B. 17 C. 18 D. 32 **Ans:** A

3. **The price of two bananas is Tk. 40. And the sum of the prices of one banana and two kiwis is Tk. 50. The sum of the prices of two bananas and three kiwis is Tk:** [Combined 5 Banks Officer- 2022]

   A. 90 B. 100 C. 85 D. 50 **Ans:** C

4. **Which of the following numbers cannot be the last digit of a squared number?** [Combined 5 Banks Officer (General)- 2022]

   A. 0 B. 1 C. 2 D. 4 **Ans:** C

5. **If is an even integer and q is an odd integer, which of the following must be an odd integer?** [Combined 9 Banks Officer (General)- 2022]

   A. $\frac{p}{q}$ B. pq C. 2p + q D. 2(p + q) **Ans:** C

6. **The product p of two prime numbers is between 9 and 55. If one of the prime numbers is greater than 2 but less than 6 and the other is greater than 13 but less than 25, then p:** [Combined 9 Banks Officer (General)- 2022]

   A. 15 B. 33 C. 34 D. 51 **Ans:** D

7. **The largest prime factor of $(2^4)^2 - 1$ is:** [Combined 7 Banks Senior Officer- 2022]

   A. 3 B. 5 C. 17 D. 19 **Ans:** C

8. **If *t* is an odd integer, which of the following must be an even integer?** [Combined 7 Banks Senior Officer- 2022]

   A. t – 2 B. 2t + 3 C. 4t + 1 D. 3t + 1 **Ans:** D

9. **The LCM and HCF of two numbers are 90 and 15 respectively. If one number is 45, the other number is-** [Combined 7 Banks Senior Officer- 2022]

   A. 30 B. 60 C. 15 D. 75 **Ans:** A

10. **What is the largest number that divides 84, 144 or 36 without any remainder?** [Combined 7 Banks Senior Officer- 2022]

    A. 6 B. 12 C. 18 D. 24 **Ans:** B

11. **How many 5 will you pass on the way when you count from 1 to 100?** [Combined 7 Banks Senior Officer- 2022]

    A. 18 B. 19 C. 20 D. 21 **Ans:** C

12. **The sum of two integers is 36, and difference is 6. What is the smaller of the two numbers?** [Bangladesh Bank AD- 2021]

    A. 21 B. 15 C. 16 D. 18 **Ans:** B

13. **What is the unit digit in the product 84 × 59 × 13 × 76?** [Combined 7 Banks Senior Officer- 2022]

    A. 2 B. 4 C. 6 D. 8 **Ans:** D

14. What is the greatest common factor of 24 and 64? [Bangladesh Bank AD- 2021]

A. 8 B. 4 C. 12 D. 36 **Ans:** A

15. When a positive integer *m* is divided by another positive integer *n*, the remainder obtained is 8. If $\frac{m}{n}$ = 89.32, what is the value of *n*? [Bangladesh Bank AD- 2021]

A. 1 B. 25 C. 32 D. 100 **Ans:** B

16. The sum of the square of a number and 12 times the number is – 27. What is the smaller possible value of his number? [Bangladesh Bank AD- 2021]

A. – 3 B. – 9 C. 3 D. 9 **Ans:** B

17. The ratio of two numbers is 3 : 4 and their sum is 630. The smaller one of the two numbers is: [Bangladesh Bank AD- 2018]

A. 360 B. 270 C. 180 D. 120 **Ans:** B

18. The difference between two numbers is 5 and the difference between their squares is 65. What is the larger number? [Bangladesh Bank AD- 2018]

A. 13 B. 11 C. 8 D. 9 **Ans:** D

19. The sum of 3 consecutive integers is less than 75. What is the greatest possible value of the smallest one? [Bangladesh Bank AD- 2018]

A. 16 B. 19 C. 22 D. 23 **Ans:** D

20. If *n* is an even integer, which of the following must be an odd integer? [Bangladesh Bank Officer (General)- 2019]

A. $n^2 - n$ B. $n + 2$ C. $3n - 1$ D. $3n^3$ **Ans:** C

21. How many integers from 1 to 1000 are divisible by 30 but not by 16? [Bangladesh Bank Officer (General)- 19]

A. 29 B. 31 C. 32 D. 38 **Ans:** A

22. What is the H.C.F. of the numbers 36, 54 and 90? [Bangladesh Bank Officer (General)- 2019]

A. 6 B. 9 C. 12 D. 18 **Ans:** D

23. The smallest 6-digit number exactly divisible by 111 is: [Bangladesh Bank AD- 2016]

A. 111111 B. 110011 C. 100011 D. 110101 **Ans:** C

24. Find the smallest number by which 5808 should be multiplied so that the product becomes a perfect square. [Bangladesh Bank Officer- 2016]

A. 3 B. 7 C. 11 D. 2 **Ans:** A

25. What is the number of integers between 101 and 199 which exactly divisible by 5 or 7? [Janata Bank Ltd. Officer- 2011]

A. 31 B. 30 C. 32 D. 35 **Ans:** B

26. One third the sum of 13 and a certain number is the same as one more than twice the mumber. Find out the number- [Bangladesh Bank AD- 2012]

A. 6 B. 2 C. 5 D. 3 **Ans:** B

27. Mary says, "the number I am thinking of is divisible by 2 or it is dividible by 3." This statement is false if the number Mary is thinking of is: [Bangladesh Bank Officer- 2011]

A. 2 B. 6 C. 8 D. 11 **Ans:** D

28. If *n* and *p* are both odd numbers, which of the following must be an even number? [Bangladesh Bank AD- 2009]

A. $np + 2$ B. $n + p$ C. $n + p + 1$ D. np **Ans:** B

29. **What will be the least number which when doubled will be exactly divisible by 12, 18, 21 and 30?** [Bangladesh Bank Officer- 2016]

A. 630 B. 1260 C. 2520 D. 196 **Ans:** A

30. **If the product of 6 integers is negative, at most how many of the integers can be negative?** [Southeast Bank PO- 2020]

A. 7 B. 3 C. 4 D. 5 **Ans:** D

31. **How many times does the digit '4' come to write numbers from 10 to 100?** [Southeast Bank PO- 2020]

A. 10 B. 11 C. 15 D. 19 **Ans:** D

32. **In dividing a number by 585, a student employed the method of short division. He divided the number successively by 5, 9 and 13 (factors of 585) and got the remainders 4, 8, 12 respectively. If he had divided the number by 585, what would have been the remainder?** [UCB MTO- 2017]

A. 24 B. 144 C. 292 D. 584 **Ans:** D

33. **Suppose A is the product of all integers from 2 to 20 inclusive. If 2^x is a factor of A, what is the greatest possible value for interest x?** [Dutch Bangla Bank PO- 2019]

A. 10 B. 16 C. 18 D. 20 **Ans:** C

34. **When a positive integer x is divided by 5, the remainder is 1. When x is divided by 8, the remainder is 4. What is the smallest positive integer y, suchh that (x + y) is divisible by 40?** [Dutch Bangla Bank PO- 19]

A. 3 B. 4 C. 9 D. 13 **Ans:** B

35. **The number 3 divides X with a result of Y and a remainder of 2. The number 3 divides Y with a result of 2 and a remainder of 1. What is the value of X?** [UCB MTO- 2017]

A. 13 B. 17 C. 21 D. 23 **Ans:** D

36. **The difference of two numbers is 1365. On dividing the larger number by the smaller, we get 6 as quotient and the 15 as remainder. What is the smaller number?** [Dutch Bangla Bank AO- 2017]

A. 240 B. 270 C. 295 D. 300 **Ans:** B

37. **If a, b, c and d are different integers between – 6 and 10 inclusive, what is the least possible value of the product abed?** [Dutch Bangla Bank AO- 2017]

A. – 480 B. – 1800 C. – 3600 D. – 4320 **Ans:** D

38. **What is the greatest common factor of 24 and 64?** [Uttara Bank AO- 2022]

A. 8 B. 4 C. 12 D. 36 **Ans:** A

39. **The remainder when the positive integer m is divided by 7 is x. The remainder when m is divided by 14 is x + 7. Which one of the following could m equal?** [One Bank, Special Cadre Officer- 2022]

A. 45 B. 53 C. 72 D. 85 **Ans:** B

40. **For some integer n, the odd integer is represented in the form of:** [NRBC Bank, TO- 2022]

A. n B. n + 1 C. 2n + 1 D. 2n **Ans:** C

41. **The largest number that divides 70 and 125, which leaves the remainders 5 and 8 is:** [NRBC Bank, TO- 2022]

A. 65 B. 15 C. 13 D. 25 **Ans:** C

42. **Think of a number. Divided it by 4 and odd 9 to it. If the result is 15, what is number?** [NRBC Bank, TO- 2022]

A. 20 B. 22 C. 24 D. 25 **Ans:** C

43. **Choose the pair of numbers that is different from the others.** [NRBC Bank, TO- 2022]

A. 7 : 22 B. 8 : 33 C. 12 : 37 D. 15 : 46 **Ans:** B

Student's Drill

1. **When the positive integer x is divided by 9, the remainder is 5. Which of the following must be true?**
   (A) x is odd (B) x is even
   (C) x – 1 is divisible by 2 (D) x + 1 is divisible by 3 **Ans:** A/B
2. **When n is divided by 12, the remainder is 7 which of the following is not an even number?**
   (A) n + 5 (B) n – 5 (C) 5n + 3 (D) 3n + 2 **Ans:** D
3. **If x divided by 7 results in a remainder of 5, what will be the remainder when 3x is divided by 7?**
   (A) 1 (B) 2 (C) 3 (D) 4 **Ans:** A
4. **When a number is divided by 36, it leaves a remainder of 19. What will be the remainder when the number is divided by 12?**
   (A) 10 (B) 7 (C) 19 (D) 9 **Ans:** B
5. **When a certain number is divided by 7, the remainder is 0. If the remainder is not 0 when the number is divided by 14. Then the remainder must be-**
   (A) 7 (B) 5 (C) 3 (D) 8 **Ans:** A
6. **A number when divided by a divisor leaves a remainder of 24. When twice the original number is divided by the same divisor the remainder is 11 what is the value of the divisor?**
   (A) 13 (B) 59 (C) 35 (D) 37 **Ans:** D
7. **When positive integer x is divided by positive integer y, the remainder is 9. If x/y = 96.12, what is the value of y?**
   (A) 96 (B) 75 (C) 48 (D) 25 **Ans:** B
8. **The last digit of the positive even number n equals the last digit of n^2 which one of the following could be n?**
   (A) 12 (B) 14 (C) 15 (D) 16 **Ans:** D
9. **If a is an even integer and b is an odd integer, which of the following expression could be an even integer?**
   (A) 3a + 3b (B) 3a + 2b (C) 2a + 3b (D) 2a + b **Ans:** B
10. **If m and n are non-zero integers and 390m = 150n then mn must be divisible by-**
    (A) 10 (B) 45 (C) 50 (D) 65 **Ans:** D
11. **The least number by which 294 must be multiplied to make it a perfect square is**
    (A) 2 (B) 3 (C) 6 (D) 24 **Ans:** A
12. **If x is the smallest positive integer such that 4410 Multiplied by x is the square of an integer, then x must be**
    (A) 10 (B) 12 (C) 15 (D) 18 **Ans:** A
13. **What is the smallest positive integer n such that the product of 1152×n is a perfect square?**
    (A) 2 (B) 4 (C) 6 (D) 8 **Ans:** A
14. **2ab5 is a four-digit number divisible by 25. If the number formed from the two digits ab is a multiple of 13, then ab = ?**
    (A) 10 (B) 25 (C) 52 (D) 65 **Ans:** C
15. **The product of three positive integers is 600. If one of the integers is 5, what is the least possible value of the sum of the other two?**
    (A) 18 (B) 20 (C) 22 (D) 24 **Ans:** C

16. **Which one of the followings is the minimum value of the sum of two integers whose product is 36?**
(A) 37 (B) 20 (C) 15 (D) 12 **Ans:** D

17. **Ema had to do a multiplication. Instead of taking 35 as one of the Multipliers, she took53. As a result, the product went up by 540. What is the new product?**
(A) 1050 (B) 540 (C) 1440 (D) 1590 **Ans:** D

18. **What is the greatest positive integer n such that 2^n is a factor of 12^{10}?**
(A) 10 (B) 12 (C) 16 (D) 20 **Ans:** D

19. **Which of the following is NOT a factor of 252?**
(A) 2 (B) 3 (C) 6 (D) 8 **Ans:** D

20. **If a is a positive integer, and if the units' digit of a^2 is 9 and the units' digit of $(a + 1)^2$ is 4, what is the units' digit of $(a + 2)^2$?**
(A) 1 (B) 3 (C) 5 (D) 7 **Ans:** A

Solution of Student's Drill

1. $9 \overline{|\ x\ |} \square$ (5)
$\therefore x = 9 \times \square + 5$
$= 14, 23, 32$
x = odd/even **(Ans.)**

2. $12 \overline{|\ n\ |} \square$ (7)
$\therefore n = 12 \times \square + 7$
$= 19, 31, 43, \ldots..$
n = odd $\therefore 3n + 2$ **(Ans.)**

3. $7 \overline{|\ x\ |} \square$ (5)
$\therefore x = 7 \times \square + 5$
$= 12, \ldots\ldots\ldots$
Ans: (A)

$7 \overline{|\ 3x\ |}$
$7 \overline{|\ 36\ |} 5$
35
1

4. $36 \overline{|\ x\ |} \square$ (19)
$\therefore x = 36 \times \square + 19$
$= 55, \ldots\ldots\ldots$
Ans: (B)

$12 \overline{|\ 55\ |} 4$
48
7

5. $7 \overline{|\ x\ |} \square$ (0)
$\therefore x = 7 \times \square + 0$
$= 7, 14, 21, \ldots\ldots\ldots$
Ans: (A)

$7 \overline{|\ 14\ |} 2$
14
0

$14 \overline{|\ 21\ |} 2$
14
7

6. $y \overline{|\ x\ |} \square$ (24) $\quad y \overline{|\ 2x\ |} \square$ (11)

Remainder হওয়ার কথা ছিল 48।
তাই divisor = 48 – 11 = 37 **(Ans.)**

7. $y \overline{|\ x\ |} \square \frac{9}{y}$ (9) $\quad \frac{x}{y \overline{|\ 2x\ |} 9.12}$

$\frac{\text{Remainder}}{\text{Divisor}}$ = Decimel part
$\therefore \frac{9}{y} = .12$
$\Rightarrow .12y = 9$
$\Rightarrow y = \frac{9}{.12} = 75$ **(Ans.)**

8. Last digit of x = last digit of x^2
option (a) $16 = (1\underline{6})^2 \Rightarrow 25\underline{6}$ $\therefore$ Ans: 16

9. a → even, b → odd
(B) 3 a + 2 b
↓ ↓ ↓
a e + e = e
Ans: (B)

10. 390m = 150n
$\Rightarrow$ 13m = 5n
$\therefore$ m = 5, n = 13
mn = 5 × 13 = 65 **Ans:** (D)

11. Similar to 35
$2 \overline{|\ 294}$
$3 \overline{|\ 147}$
$7 \overline{|\ 49}$
7
$\therefore$ পূর্ণবর্গ হতে 2 দিয়ে গুণ করতে হবে।

12.

2|4410
5|2205
3|441
3|147
7|49
7

পূর্ণবর্গ সংখ্যার prime factor গুলো জোড়ায় জোড়ায় থাকে। এখানে 2 ও 5 এর জোড়া নেই। সুতরাং 4410 কে 2 ও 5 দিয়ে গুণ করলে পূর্ণবর্গ হবে। সুতরাং সঠিক Ans: $2 \times 5 = 10$

13. Similar to 35

2|1152
2|576
2|288
2|144
2|72
2|36
2|18
3|9
3

∴ পূর্ণবর্গ হতে 2 দিয়ে গুণ করতে হবে।

14. $\frac{3ab5}{25}$. যেহেতু ab হলো 13 এর multiple, সুতরাং ab এর মান হবে 13 দিয়ে ভাগ যায় এমন সংখ্যা। সুতরাং Ans: 52।

15. $xyz = 600$

$\Rightarrow xy \times 5 = 600$

$\Rightarrow xy = 120$

দুটি সংখ্যার গুণফল দেয়া থাকলে সংখ্যা দুটির সর্বোচ্চ যোগফল পেতে হলে সংখ্যা দুটি মান সমান বা কাছাকাছি ধরতে হবে।

$\therefore x + y = 10 + 12 = 22$ **(Ans.)**

16. $xy = 36$

$\therefore x + y = 6 + 6 = 12$ **(Ans.)**

17. ধরি, x একটি সংখ্যা। একে 35 দিয়ে গুণ না করে ভুল করে 53 দিয়ে গুণ করা হয়েছে।

সুতরাং, $53x - 35x = 540$

$\Rightarrow 18x = 540$

$\Rightarrow x = 30$

∴ New product $= 53x = 53 \times 30 = 1590$ **(Ans.)**

18. 3, 12 এর factor হলে 12 কে অবশ্যই 3 দিয়ে ভাগ যাবে।

যেহেতু 2^x is a factor of 12^{10}

$\therefore \frac{12^{10}}{2^x} = \frac{(3 \times 4)^{10}}{2^x}$

$= \frac{(3 \times 2^2)^{10}}{2^x} = \frac{3^{10} \times 2^{20}}{2^x}$ ∴ $x = 20$ **(Ans.)**

19. 252 কে যেটা দিয়ে ভাগ যায় না, সেটা কখনও factor হবে না। সুতরাং Ans: 8।

20. যেহেতু a^2 এর unit digit 9। সুতরাং, a = 7 (ধরি)

$(a + 1)^2 = (7 + 1)^2 = 8^2 = 64$

$(a + 2)^2 = (7 + 2)^2 = 9^2 = 8$

Ans: 1

Home Practice

1. If x is an even number, which one of the following is an odd number?

I. $(3x + 1)$ ii. $(5x^2 + 2)$ iii. $(x + 1)^2$

(A) i only (B) iii only (C) i and ii only (D) I and iii only **Ans:** D

2. If t is any integer, which of the following represents an odd number?

(A) 2t (B) 2t + 13 (C) 3t (D) 2t + 12 **Ans:** B

3. If n^3 is odd, which of the following statements are true?

i. n is odd ii. n^2 is odd iii. n^2 is even

(A) i only (B) ii only (C) i and ii only (D) I and iii only **Ans:** C

4. If m and n are positive integers, which of the following must be an even integer?

(A) n (m - 1) (B) (n – 1) m (C) (m – 1) (n – 2) (D) n(n – 1) (m – 1) **Ans:** D

5. If x is an odd integer, which of the following is even?

(A) 2x + 1 (B) x+1 (C) x + x – 1 (D) (x – 2)(x + 2) **Ans:** B

6. **If x and y are integers and (xy + x) is odd which of the following must be even?**

(A) x + y (B) xy – x (C) x (D) y **Ans:** D

7. **When a number is divided by 36, it leaves a remainder of 19. What will be the remainder** when the number is divided by 12?

(A) 10 (B) 7 (C) 19 (D) 9 **Ans:** B

8. **When a certain number is divided by 7, the remainder is 0. If the remainder is not 0 when the number is divided by 14. Then the remainder must be**

(A) 7 (B) 5 (C) 3 (D) 8 **Ans:** A

9. **A certain number n when divided by 5 yields a remainder of 4, which of these cannot be an integer?**

(A) $\frac{n}{4}$ (B) $\frac{n}{6}$ (C) $\frac{n}{7}$ (D) $\frac{n}{10}$ **Ans:** D

10. **A number when divided by a divisor leaves a remainder of 24. When twice the original number is divided by the same divisor the remainder is 11 what is the value of the divisor?**

(A) 13 (B) 59 (C) 35 (D) 37 **Ans:** D

11. **Two numbers when divided by a certain divisor leave remainder of 271 and 159 respectively when the sum of these two numbers is divided by the same divisor, the remainder is 147. What is the divisor?**

(A) 205 (B) 237 (C) 258 (D) 283 **Ans:** D

12. **When positive integer x is divided by positive integer y, the remainder is 9. If x/y= 96.12, what is the value of y?**

(A) 96 (B) 75 (C) 48 (D) 25 **Ans:** B

13. **When 10 is divided by a positive integer n, the remainder is n–4, which of the following could be the value of n?**

(A) 3 (B) 4 (C) 7 (D) 8 **Ans:** C

14. **The last digit of the positive even number n equals the last digit of n^2. which one of the following could be n?**

(A) 12 (B) 14 (C) 15 (D) 16 **Ans:** D

15. **When a number is divided by 5, the remainder is 3. If the square of this number is divided by 5, then what is the remainder?**

(A) 5 (B) 4 (C) 7 (D) 1 **Ans:** B

16. **If n is an even integer, which of the following must be an odd integer?**

(A) 7n–2 (B) 5(n–2) (C) (16n + 24)/8 (D) (6n + 12)/3 **Ans:** C

17. **If m and n are non-zero integers and 390m = 150n, then mn must be divisible by**

(A) 10 (B) 45 (C) 50 (D) 65 **Ans:** D

18. **If x and y are positive integers each greater than 1, and If 13 (x – 1) = 17 (y – 1), what is the least possible value of (x + y)?**

(A) 32 (B) 30 (C) 26 (D) 25 **Ans:** A

19. **If x is the smallest positive integer such that 4410 Multiplied by x is the square of an integer, then x must be**

(A) 10 (B) 12 (C) 15 (D) 18 **Ans:** A

20. **The least number by which 294 must be multiplied to make it a perfect square is**

(A) 2 (B) 3 (C) 6 (D) 24 **Ans:** C

21. **What is the smallest positive integer n such that the product of 1152×n is a perfect square?**

(A) 2 (B) 4 (C) 6 (D) 8 **Ans:** A

22. **2ab5 is a four-digit number divisible by 25. If the number formed from the two digits ab is a multiple of 13, then ab = ?**

(A) 10 (B) 25 (C) 52 (D) 65 **Ans:** C

23. **The product of three positive integers is 600. If one of the integers is 5, what is the least possible value of the sum of the other two?**

(A) 18 (B) 20 (C) 22 (D) 24 **Ans:** C

24. **Which one of the followings is the minimum value of the sum of two integers whose product is 36?**

(A) 37 (B) 20 (C) 15 (D) 12 **Ans:** D

25. **The three digits of a number add to 11. The number is completely divisible by 5. The first digit is double the second digit. what is the product of the three digits?**

(A) 27 (B) 36 (C) 39 (D) 40 **Ans:** D

26. **Ema had to do a multiplication. Instead of taking 35 as one of the Multipliers, she took53. As a result, the product went up by 540. What is the new product?**

(A) 1050 (B) 540 (C) 1440 (D) 1590 **Ans:** D

27. **How many positive integers less than 20 are equal to the sum of a positive multiple of 3 and a positive multiple of 4?**

(A) Eleven (B) Five (C) Seven (D) Ten **Ans:** D

28. **What is the greatest positive integer n such that 2^n is a factor of 12^{10} ?**

(A) 10 (B) 12 (C) 16 (D) 20 **Ans:** D

29. **Which of the following is NOT a factor of 252?**

(A) 2 (B) 3 (C) 6 (D) 8 **Ans:** D

30. **$(4^{41} + 4^{42} + 4^{43})$ is divisible by-**

(A) 7 (B) 13 (C) 15 (D) 17 **Ans:** D

31. **Which of the following numbers is divisible by 24?**

(A) 76,300 (B) 78,132 (C) 80,424 (D) 81,234 **Ans:** C

32. **What is the unit digit in 7^{105}?**

(A) 1 (B) 5 (C) 7 (D) 9 **Ans:** C

33. **If a is a positive integer, and if the units' digit of a^2 is 9 and the units' digit of $(a + 1)^2$ is 4, what is the units' digit of $(a + 2)^2$?**

(A) 1 (B) 3 (C) 5 (D) 7 **Ans:** A

34. **If x and y are two consecutive odd integers and $x + y = 2(x – y)^2$, what is the value of $x + y$?**

(A) 2 (B) 4 (C) 8 (D) 12 **Ans:** C

35. **What is the least odd integer, greater than 1, that is both the square of an integer and the cube of an integer?**

(A) 9 (B) 27 (C) 729 (D) 243 **Ans:** C

36. **Which of these numbers is a whole number?**

(A) – 3.5 (B) 0 (C) 0.1212 (D) 3.14 **Ans:** B

37. **Which of these numbers is an irrational number?**

(A) – 23 (B) 0 (C) 112 (D) π **Ans:** D

38. **Which is a FALSE statement?**

(A) A whole number is an integer. (B) An irrational number is a real number.

(C) A whole number is a rational number. (D) An integer is an irrational number. **Ans:** D

39. Which number shows 4,316.4725 rounded to the nearest hundredth?

(A) 4,300 (B) 4,300.4725 (C) 4,316.47 (D) 4,316.48 **Ans:** C

40. The number 89.789 rounded off to the nearest tenth is equal to which of the following?

(A) 90.0 (B) 89.9 (C) 89.8 (D) 89.99 **Ans:** C

41. When 16 and 9 are divided by n, the remainder is 2. What is n?

(A) 3 (B) 4 (C) 5 (D) 7 **Ans:** D

42. If the sum of five consecutive integers is 40, what is the smallest of the five integers?

(A) 4 (B) 5 (C) 6 (D) 7 **Ans: C**

43. If n = 15 × 28 × 26 which of the following is not an integer?

(A) $\frac{n}{15}$ (B) $\frac{n}{15}$ (C) $\frac{n}{32}$ (D) $\frac{n}{35}$ **Ans:** C

44. Which of the following numbers is divisible by 24?

(A) 13944 (B) 15746 (C) 15966 (D) 16012 **Ans:** A

45. Which of the following is a multiple of both 7 and 13?

(A) 52 (B) 65 (C) 77 (D) 182 **Ans:** D

46. If n and p are both odd numbers, which of the following numbers must be an even number?

(A) np (B) np+2 (C) n + p (D) 2n+p **Ans:** C

47. How many of the positive integers less than 25 are 2 less than an integer multiple of 4?

(A) 3 (B) 4 (C) 5 (D) 6 **Ans:** D

48. The number .01 is how many times as great as the number .000001?

(A) 10^2 (B) 10^4 (C) 10^6 (D) 10^8 **Ans:** B

49. What is the .423658 rounded to the nearest thousandth?

(A) .42 (B) .423 (C) .424 (D) .4236 **Ans:** C

50. If the product of five integers is an odd integer, exactly how many of the five must be odd.

(A) 2 (B) 5 (C) 6 (D) 7 **Ans:** B

51. Seven is equal to how many thirds of seven?

(A) $\frac{1}{3}$ (B) 1 (C) 3 (D) 7 **Ans:** C

52. Which of the following is not a divisor of 264?

(A) 4 (B) 8 (C) 9 (D) 11 **Ans:** C

53. If x is an integer and y = 9x + 13, what is the greatest value of x for which y is less than 100?

(A) 12 (B) 11 (C) 10 (D) 9 **Ans:** D

54. What fractional part of a week is 98 hours?

(A) $\frac{7}{24}$ (B) $\frac{1}{2}$ (C) $\frac{4}{7}$ (D) $\frac{7}{12}$ **Ans:** D

55. $\frac{5}{8}$ of 24 is equal $\frac{15}{7}$ of what number?

(A) 7 (B) 8 (C) 15 (D) $\frac{7}{225}$ **Ans:** A

56. If 7a = 3 and 3b = 7, what is the value of $\frac{a}{b}$?

(A) $\frac{9}{49}$ (B) $\frac{3}{7}$ (C) 1 (D) $\frac{7}{3}$ **Ans:** A

57. One day at Lincoln High School, $\frac{1}{12}$ of the students were absent, and $\frac{1}{5}$ of those present went on a field trip. If the number of students staying in school that day was 704, how many students are enrolled at Lincoln High?

(A) 840 (B) 960 (C) 1080 (D) 1600 **Ans:** B

58. For what value of x is $\frac{(34.56)(7.89)}{x} = (.3456)(78.9)$?

(A) .001 (B) .01 (C) .1 (D) 10 **Ans:** D

59. Which of the following is largest? **Ans:**

(A) $\frac{4}{19}$ (B) $\frac{6}{17}$ (C) $\frac{6}{19}$ (D) $\frac{6}{29}$ **Ans:** C

60. Of the following fractions, which has the least value?

(A) 8/7 (B) 8/9 (C) 5/6 (D) $\frac{7}{8}$ **Ans:** D

61. $\frac{1}{3} + \frac{1}{3}$ equals how many twelfths?

(A) 2 (B) 4 (C) 6 (D) 8 **Ans:** D

62. Of a set of 36 pencils, $\frac{1}{3}$ are blue. If exactly 8 of the blue pencils do not have erasers, then how many of the blue pencils have erasers?

(A) 4 (B) 8 (C) 12 (D) 20 **Ans:** A

63. Which of the following is lowest?

(A) $\frac{3}{13}$ (B) $\frac{4}{15}$ (C) $\frac{4}{17}$ (D) $\frac{3}{11}$ **Ans:** A

64. Which fraction of the following is lowest? **Ans:**

(A) $\frac{1}{17}$ (B) $\frac{9}{17}$ (C) $\frac{9}{19}$ (D) $\frac{5}{17}$ **Ans:** B

65. Find the square root of $\frac{.081}{.0064} \times \frac{.484}{6.25}$?

(A) .99 (B) .18 (C) 1.02 (D) .85 **Ans:** A

66. What is the value of the quotient $(60 \times 10^5)/(2\times10^{-2})$?

A. 3×10^7 B. 3×10^8 C. 3×10^3 D. 3×10^{-7} **Ans:** B

67. If n is an even integer, which of the following must be an odd integer?

A. 7n–2 B. (6n + 12)/3 C. (16n + 24)/8 D. 5(n–2) **Ans:** C

68. If n and p are both odd numbers, which of the following numbers must be an even number?

A. np B. n+p+1 C. 2n+p D. n+p **Ans:** D

69. If f and g are distinct prime numbers less than 10, which of the following cannot be the product of f and g?

A. 6 B. 9 C. 10 D. 14 **Ans:** B

70. What is $4{,}563{,}021 \div 10^5$ rounded to the nearest whole number?

A. 46 B. 5 C. 0 D. 456 **Ans:** A

71. If $x = \frac{.00081}{.09}$, What is the value of x?

A. .0009 B. .009 C. .09 D. .90 **Ans:** B

72. **If the sum of five consecutive integers is 40, what is the smallest of the five integers?**
A. 5 B. 6 C. 7 D. 8 **Ans:** B

73. **If x = – 0.5, then which of the following has the smallest value?**
A. $\frac{21}{x}$ B. x – 1 C. x – 2 D. 2x **Ans:** A

74. **Decimal number 0.420 may be written as:**
A. 4.2×10^{-1} B. 42×10^{-3} C. 4.2×10^{-2} D. None of these **Ans:** A

75. **How many of the integers between 110 and 120 are prime number?**
A. 0 B. 1 C. 2 D. 3 **Ans:** B

76. **Which following is nearest to the square root of 10.5?**
A. 3 B. 4 C. 5 D. 8 **Ans:** A

77. **Sum of three consecutive whole numbers is 45, then what is one-third of the middle number?**
A. 6 B. 3 C. 5 D. 1 **Ans:** C

78. **How many even integers are there between 2 and 100, not including 2 and 100?**
A. 48 B. 49 C. 51 D. 58 **Ans:** A

79. **If a number divisible by 102, then this is also divisible by:**
A. 12 B. 23 C. 11 D. 2 **Ans:** D

80. **What is the sum of first 200 integers?**
A. 13550 B. 30100 C. 20100 D. 10100 **Ans:** C

81. **The sum of the two numbers is 23 and the difference is 21. Find out the smallest one of the two numbers.**
A. 2 B. 4 C. 1 D. 3 **Ans:** C

82. **How many prime numbers are there between 55 and 100?**
A. 9 B. 8 C. 10 D. 11 **Ans:** A

83. **If integer A is divisible by both 3 and 14, which of the following must not be true?**
A. A is divisible by 6 B. A is divisible by 7
C. A is divisible by 21 D. A is prime **Ans:** D

84. **If n is odd, p is even, and q is odd, what is 3n + 4p + 2q?**
A. prime B. odd C. Even D. None **Ans:** B

85. **$2^b – (8^6 + 8^8)$ which value of b will be the closest to 0 for the question?** [BUP (FBS): 2021-22]
A. 24 B. 25 C. 26 D. 42 **Ans:** A

86. **From 101 to 200, how many are the prime number?** [BUP (FBS): 2021-22]
A. 24 B. 25 C. 21 D. 22 **Ans:** C

87. **5 odd consecutive series, there 6^{th} number is 15.4^{th} number was?** [BUP (FBS): 2021-22]
A. 11 B. 13 C. 17 D. 19 **Ans:** A

88. **If x and y are positive integers, each greater than 1 and if 13(x – 1) = 17(y – 1), what is the least possible value of (x + y)?** [BUP (FBS): 2020-21]
A. 32 B. 30 C. 26 D. 25 **Ans:** A

89. **Find the least number exactly divisible by 12, 15, 20 and 27.** [BUP (FBS): 2020-21]
A. 540 B. 430 C. 320 D. 300 **Ans:** A

90. **Tk. 7500 is divided in the ratio 1:2:3:4:5. Find the difference between highest and lowest value?** [BUP (FBS): 2020-21]
A. 1500 B. 2000 C. 2600 D. 2700 **Ans:** B

91. **What is the least integer that is a sum of three different primes eachgreater than 20?** [BUP (FBS): 19-20]
A. 69 B. 73 C. 75 D. 83 **Ans:** D

92. **If the sum of 3 consecutive integers is 150, then the sum of the two smaller integers is:** [BUP (FBS): 2019-20]
A. 99 B. 139 C. 110 D. None of these **Ans:** B

93. **What number should be divided by $\sqrt{0.25}$ to give the result as 25?** [BUP (FBS): 2019-20]
A. 12.5 B. 2.5 C. 50 D. 125 **Ans:** A

94. **The first 5 numbers in a regular sequence are 4, 10, 22, 46 and 94. What is the next number i the sequence?** [BUP (FBS): 2019-20]
A. 190 B. 182 C. 176 D. 154 **Ans:** A

95. **If the sum of four consecutive even integers is s, what is the greatest of the integers in terms of s?** [BUP (FBS): 2019-20]
A. $\frac{(s+12)}{4}$ B. $\frac{(s-12)}{4}$ C. $\frac{(s+6)}{4}$ D. $\frac{(s-6)}{4}$ **Ans:** A

96. **The sum of a number and its inverse (or reciprocal) is equal to twice the number. What is the number?** [BUP (FBS): 2019-20]
A. 1 Or –1 B. –2 C. 1 D. –1 **Ans:** A

97. **If both x and y are integers and x = 24y + 12, then which of the following must be-** [BUP (FBS): 19-20]
A. $\frac{x}{12}$ is even B. $\frac{x}{6}$ is even C. $\frac{(x+4)}{8}$ is odd D. $\frac{(x+4)}{8}$ is even **Ans:** B

98. **If the sum of five consecutive positive integers is A, then the sum of the next five consecutive integers in terms of A is:** [BUP (FBS): 2019-20]
A. A + 1 B. A + 5 C. A + 25 D. 2A **Ans:** C

99. **If an integer y is subtracted from an integer x, and the result is greater than x, then y must be:** [BUP (FBS): 2019-20]
A. Equal to x B. Less than O C. Less than x D. Greater than O **Ans:** B

100. **The positive difference between the squares of any two consecutive integers is always-** [BUP (FBS): 2019-20]
A. an even integer B. an odd number C. a prime number D. the square of an integer **Ans:** B

101. **Find the value of (0.1 × 0.01 × 0.001) ÷ (0.2 × 0.02 × 0.002)** [BUP (FBS): 2019-20]
A. 14 B. 18 C. 21 D. None **Ans:** D

102. **The product of two consecutive negative even integers is 24. What is the larger number?** [BUP (FBS): 2020-21]
A. –4 B. –6 C. 4 D. 6 **Ans:** A

103. **If k is an integer and (.0010101 × 10 k) is greater than 1000, what is the least possible value of k?** [BUP (FBS): 2019-20]
A. 2 B. 3 C. 4 D. 6 **Ans:** D

104. **When a positive integer x is divided by a positive integer y the remainder is 9. If x = 96.12 then what is the value of y?** [BUP (FBS): 2019-20]
A. 96 B. 25 C. 75 D. None **Ans:** D

105. **If 1.4 is halfway between two points x and y what are the possible values of x and y?** [BUP (FBS): 19-20]
A. –1.4 and 2.4 B. –1 and 2 C. 0.3 and 3.1 D. 0.15 and 1.55 **Ans:** C

106. **If n is an even integer which of the following must be an odd integer?** [BUP (FBS): 2019-20]
A. 3(n + 1) B. n – 2 C. 3n + 2 D. n^3 **Ans:** A

107. **If the average of four numbers k, 2k + 3, 3k – 5, and 5k + 1 is 63. What is the value of k?** [BUP (FBS): 2019-20]
A. 11 B. 15.75 C. 22 D. 23 **Ans:** D

108. **What is the total number of integers between 100 and 200 that are divisible by 3?** [BUP (FBS): 2019-20]
A. 33 B. 32 C. 31 D. 30 **Ans:** A

109. **If the sum of (8, 5 and x) is 21, then the average of (8, 5 and x) is-** [BUP (FBS): 2019-20]
A. 7 B. 9 C. 2 D. 3.5 **Ans:** A