Divisibility-

Solution: 1. **(d) 114345.**

Solution: 2. **Remainder = 0**

Solution: 3. The two nearest numbers to 19506 which are divisible by **9** are **19503** and **19512.**

Solution: 4. The value of **M = 7** and **N = 2.**

Solution: 5. There are **5 pairs** of X and Y that make the number **763X4Y2** divisible by 9.

Solution: 6. **Remainder = 2**

Solution: 7. **P = 3**

Solution: 8. The smallest whole number in place of **X = 6.**

Solution: 9. **(d) n + 60**

Solution: 10. The largest and smallest possible values of M are **9 and 0**, respectively. The product of these values is equal to **0** times **9** which equals to **0**.

Factors-

Solution: 1. The number of prime factors in the expression **6^4 x 8^6 x 10^8 x 14 x 10^ x 22^12** is **72.**

Solution: 2. The number of perfect square factors of N is equal to **16.**

Solution: 3. The exponent of two in 12^3 x 30^4 x 35^2 is (3 + 4 + 0) = **7**. Therefore, there are (7 + 1) = **8** even factors.

Solution: 4. The minimum exponents for each prime factor in N and M are:

- For two: min(7,4) = 4.
- For three: min(4,2) = 2.
- For five: min(0,1) = 0.

Therefore, there are (4 + 1)(2 +1)(0 +1) = **15** common factors between N and M.

Solution: 5. The number (N - 1) has **4 factors** .

Solution: 6. The smallest possible value of A is **33.**

Solution: 7. The total number of factors of **10!** is equal to **792.**

Solution: 8. Even perfect squares factors are = **16.**

Solution: 9. The number **480** can be written as a product of two natural numbers in **20 ways**.

Solution: 10. The factors of **2^5 x 3^4 x 5^3** that are not the factors of **2^3 x 5^4 x 7^5** are **= 48**.

Unit digits (Cyclicity)-

Solution: 1. The unit digit in the product **(3^65 x 6^59 x 7^71)** is 4**.**

Solution: 2. The unit digit of the product **(173)^45 x (152)^77 x (777)^999** is **2.**

Solution: 3. The unit's digit of the number **6^256 - 4^256** is **2.**

Solution: 4. The unit's digit in the sum **264^102 + 264^103** is **0.**

Solution: 5. The unit digit of **(316)^3n + (1)** is 7**.**

Solution: 6. The unit digit in (7^95 - 3^58) is **4.**

Solution: 7. The rightmost non-zero digit of the number 30^2720 is **6.**

Solution: 8. The last digit of the number obtained by multiplying the numbers **81*82*83*84*86*87*88*89 is 2.**

Solution: 9. The last three-digits of the product: 12345x54321 is **666045.**

Solution: 10. 1^5 + 2^5 + 3^5 + 4^5 + 5^5 + 6^5 + 7^5 + 8^5 + 9^5 = **330,794.**

Remainders-

Solution: 1. The remainder when 7^25 is divided by 6 is **1.**

Solution: 2. The remainder when 3^45 is divided by 8 is **3.**

Solution: 3. The remainder when 4^96 is divided by 6 is **4.**

Solution: 4. The remainder is 4**.**

Solution: 5. The remainder when 67^99 is divided by 7 is **4.**

Solution: 6. The remainder is **32.**

Solution: 7. The remainder is **5.**

Solution: 8. The remainder is **16.**

Solution: 9. The remainder is **0.**

Solution: 10. The remainder is **5.**

Factorials-

Solution: 1. The highest power of 21 that divides 20! is 0.

Solution: 2. The highest power of 32 that divides 31! is 0.

Solution: 3. The largest number less than 28 which divides 28! is 27.

Solution: 4. The number of zeroes at the end of 97! is 22.

Solution: 5. The highest power of 12 that divides 54! is 13.

Solution: 6. The least value of x such that 60!/2^x is an odd number is 57.

Solution: 7. The least value of 'n' if no factorial can have 'n' zeroes is 4.

Solution: 8. The highest power of 7! dividing 50! completely is 7.

Solution: 9. The number of trailing zeroes in 625! is 156.

Solution: 10. There are ****24**** zeroes at the end of this product.

HCF/LCM-

Solution: 1. **(c) 9600**

Solution: 2. **(c) 308**

Solution: 3. **(c) 15**

Solution: 4. **(a) 4**

Solution: 5. **(a) 4**

Solution: 6. **(b) 107**

Solution: 7. **(c) 120**

Solution: 8. **(c) 0.18**

Solution: 9. **(b) 2**

Solution: 10. **(b) 94**

Solution: 11. **(b) 13**

Solution: 12. **(c) 2523**

Solution: 13. **(b) 42 m 36 s**

Solution: 14. **(c) 322**

Solution: 15. **(c) 1260**

Solution: 16. **(b) 21 cms**

Solution: 17. **(d) 89**

Solution: 18. **(b) 127**

Solution: 19. **(c) 40**

Solution: 20. **(c) 35 cms**

Solution: 21. **(d) 2**

Solution: 22. **(c) 99**

Solution: 23. **(a) 55/601**

Solution: 24. **(a) 91**

Problem on Numbers-

Solution: 1. The number of ones that the girl wrote while writing all the numbers from 100 to 200 is 121.

Solution: 2. The number of 8's that will be used to write this large natural number is 40.

Solution: 3. The value of a is 26.

Solution: 4. The number is 37.

Solution: 5. The remainder when the number formed by writing 1 to 29 side by side as: 12345678910… is divided by 9 is 3.

Solution: 6. The ratio of the unit's digit to the ten's digit in the original number is 2 😊.

Solution: 7. The number is 89.

Solution: 8. The largest number that divides the product of four consecutive even numbers completely is 48.