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Review Paper

Numerical Analysis

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Abstract:
This paper contains some important statements/formulas based on some very basic concepts used in our day to day life. These statements will reduce the calculation and also reduce thinking time. Concepts such as HCF and LCM, numbers and sets are used in this paper. This paper explains how can we easily find the HCF or LCM of some certain defined numbers. (HCF or LCM of only 2 numbers). This paper also contains some fun facts about numbers. Such as how many digits can be made with the help of a fixed given digits.

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LCM and HCF
LCM is know as the Least Common Multiple. Suppose we have 2 or more than 2 numbers, then their common multiple with least value is know as the LCM of the numbers taken.
HCF is know as the Highest Common Factor. Suppose we have 2 or more than 2 numbers, then their common factor with least value is know as the HCF of the numbers taken.

Any 2 digit number multiplied by 101 is repeated.
For example:
56 × 101 = 5656
94 × 101 = 9494 , Similarly,
345 × 1001 = 345345
4768 × 10001 = 47684768
75932 × 100001 = 7593275932
We can write the same numbers like this-

$$56 \times \frac{707}{7} = 5656$$

$$94 \times \frac{505}{5} = 9494$$

$$345 \times \frac{2002}{2} = 345345$$

$$4768 \times \frac{30003}{3} = 47684768$$

$$75932 \times \frac{800008}{8} = 7593275932$$

From the above examples you have understood that if we multiply a number by 707, 505, 2002, 30003 and 800008 then we have to divide it by 7,5,2,3 and 8 respectively.

Now, let us understand some basic relations between LCM and HCF.
For any two positive integers a and b, HCF(a,b) × LCM(a,b) = a×b.

$$\mathrm{LCM}(a,b) = \frac{a \times b}{\mathrm{HCF}(a,b)}$$

$$\mathrm{HCF}(a,b) = \frac{a \times b}{\mathrm{LCM}(a,b)}$$

HCF(p,q,r) × LCM(p,q,r) ≠ p × q × r where p, q and r are positive integers.

$$\mathrm{LCM}(p,q,r) = \frac{p \times q \times r \times \mathrm{HCF}(p,q,r)}{\mathrm{HCF}(p,q) \times \mathrm{HCF}(q,r) \times \mathrm{HCF}(p,r)}$$

$$\mathrm{HCF}(p,q,r) = \frac{p \times q \times r \times \mathrm{LCM}(p,q,r)}{\mathrm{LCM}(p,q) \times \mathrm{LCM}(q,r) \times \mathrm{LCM}(p,r)}$$

According to my observation-
HCF(ab,xyx) where (a + x = 10) = x
HCF(54,606) = 6 (because last digit of 54 = 4 + 6 which is last and first digit of 606) = 10 (eg: 1)
HCF(676, 4004) = 4 because last and first digits of 676 = 6 + 4 which is last and first digit of 4004) = 10 (eg: 2)
Similarly,
HCF(2342,80008) = 8 (eg: 3)
HCF(57895,500005) = 5 (eg: 4)
HCF(764527,3000003) = 3 (eg: 5)

Now, we came to know the trick to find HCF, But what about LCM ?
We know that-

$$\mathrm{LCM}(a,b) = \frac{a \times b}{\mathrm{HCF}(a,b)}$$

Let us consider the above examples of HCF.

$$\mathrm{LCM}(54{,}606) = 54 \times \frac{606}{6} = 5454$$

$$\mathrm{LCM}(676{,}4004) = 676 \times \frac{4004}{4} = 676676$$

$$\mathrm{LCM}(2342{,}80008) = 2342 \times \frac{80008}{8} = 23422342$$

$$\mathrm{LCM}(57895{,}500005) = 57895 \times \frac{500005}{5} = 5789557895$$

$$\mathrm{LCM}(764527{,}3000003) = 764527 \times \frac{3000003}{3} = 764527764527$$

From the above examples, we can say that-
LCM(ab,c0c) = abab
LCM(aba,e00e) = abaaba
LCM(abca,d000d) = abcaabca.
Note: Here, (a+c) = (a+e) = (a+d) = 10.

Fun Fact on numbers
If I ask you to determine whether how many 3 digit numbers can be formed from these numbers= 9,6,7,5,4,3,2.
We can easily find out the answers to such questions with the help of this formula $D^n = n(S)^n$
Here, D^n means the number of digits. n(S) means number of elements in a set. Here, the set contains the numbers by which 2,3 or any other digit numbers are to be formed.

For example:
$S = \{ 5,3,7,8 \}$
Let us suppose that we have to form 2 digit numbers with the help of the above numbers.
Here, $n(S) = 4$
Now, let's use the formula.
$D^n = n(S)^n$
$D^2 = (4)^2$
$D^2 = 4 \times 4$
$D^2 = 16$
16 two-digit numbers can be formed with the help of the above numbers.

$S = \{ 3,2,1,4,7,8,9 \}$
Let us suppose that we have to form 4 digit numbers with the help of above numbers.
Here, $n(S) = 7$
Now, Let's use the formula.
$D^n = n(S)^n$
$D^4 = (7)^4$
$D^4 = 7\times7\times7\times7$
$D^4 = 2401.$
2401 four-digit numbers can be formed with the help of the above numbers.

$S = \{ 9,7,8,5,6,3,4,1,2,6,7,8,4,7,6 \}$
Let us suppose that we have to form 11 digit numbers with the help of above numbers.
Here, $n(S) = 15$
Now, let's use the formula.
$D^n = n(S)^n$
$D^{11} = (15)^{11}$
$D^{11} = 15\times15\times15\times15\times15\times15\times15\times15\times15\times15\times15.$
$D^{11} = 8649755859375.$
8649755859375 eleven-digit numbers can be formed with the help of above numbers.

Reference:

[1]. Maharashtra State Board, Navneet, std 10thMathematics Digest (part 1) book (Year of publication = 2022)–by Navneet.
[2]. Numerical Methods. (Year of publication = 2006) –by Dr P. Kandasamy, Dr K. Thilagavathy and Dr K. Gunavathi.
[3]. Encyclopaedia of Mathematics.