HCF, LCM And Simplification

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How to find HCF?

Finding HCF by:

- **Prime factorisation:** Write the numbers as a product of prime factors and select common factors for all the numbers.

- **Division Method:** For HCF of two numbers, divide the larger by smaller one. Then divide the divisor by remainder. Repeat this process till the remainder is zero. Thus, the last divisor will be the HCF of the given numbers.
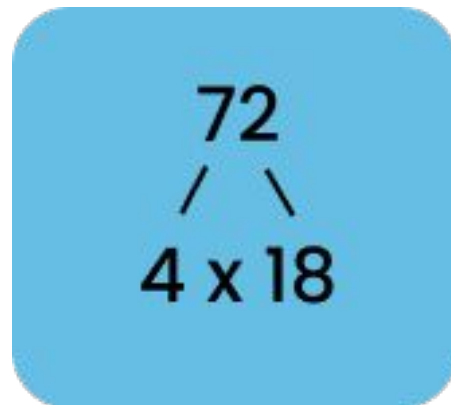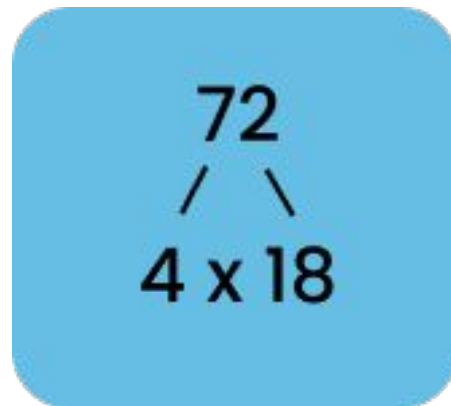
HCF

- Find HCF of 13281 and 15844.

- Find HCF of 2261, 2527 and 1653.

- Find HCF of 1751, 1957, 2369, 2987.

13281, 15844

HCF
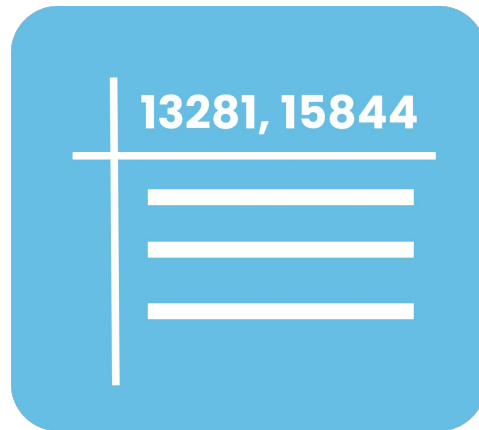
How to find LCM?

Finding LCM by:

- **Prime factorisation:** Write the numbers as a product of prime factors and find the product of the highest power of all the factors

- **Division Method:** To find the LCM by division method, we write the given numbers in a row separately by commas, then divide the numbers by a common prime number. We stop dividing after reaching the prime numbers. The product of common and uncommon prime factor is the LCM of given numbers

LCM/HCF

- Find the LCM of 2, 6, 4, 8, 10, 12.

- Find LCM of 60, 32, 45, 80, 36, 120.

- Find LCM of 91, 65, 75, 39, 77, 130.

- Find the LCM and HCF of 0.4, 0.12, 0.018.

- Find the LCM and HCF of 4/ 24, 6/18, 10/50.

2, 4, 6, 8, 10, 12

LCM

LCM/HCF (CASES)

- To find the greatest number that will divide x, y, and z, find HCF (x, y, z)

- To find the greatest number that will divide x, y, and z leaving remainders a, b, and c, respectively, find HCF (x-a, y-b, z-c)

- To find the greatest number that will divide x, y and z, leaving the same remainder "r" in each case, find HCF (x-r, y-r, z-r)

- To find the greatest number that will divide x, y and z leaving the same remainder, find HCF (x-y, y-z, z-x). Note: Take positive differences always.

- To find the least number that is divisible by x, y and z, find LCM (x, y, z)

- To find the least number divisible by x, y and z leaving remainder "r" in each case, find LCM (x, y, z) + r

- To find the least number divisible by x, y and z leaving remainders a, b and c respectively, In such case, it is observed that x-a = y-b = z-c = k (say). Required number is LCM (x, y, z) – k

a, b, c

x, y, z

LCM/HCF (Sample Questions)

7   Find the least number which when divided by 12, 18, 24 and 48 leaves a constant remainder 7 in each case.

- - -   Find the greatest number which when divides 63, 138 and 228 leaves a constant remainder throughout.

4, 5, 7   Find the greatest number which when divides 142, 166 and 237 leaves 4, 5 and 7 as remainders.

LCM/HCF (Sample Questions)

Three plots of area 132, 204, 228. sq. mt. sub divided into vegetable beds of equal area. If the width of a bed is 3 met, find the maximum length of any bed.

X

The sum of two numbers is 96 and their HCF is 12. Find the number.

x, y

If products of two numbers is 432 and their HCF is 6. Find the numbers.

?

Find the two numbers whose LCM is 308 and HCF is 11.

LCM/HCF (Sample Questions)

1. The greatest number which will divide 772 and 2778 so as to leave the remainder 5 in each case, is

A. 57

B. 59

C. 42

D. None of these

2. The greatest number which divides 152, 277 and 427 leaving equal remainder, is

A. 25

B. 50

C. 55

D.35

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LCM/HCF (Sample Questions)

3. The smallest 4 digits number which is divisible by 4, 6, 8 and 10, is

A. 1000

B. 9000

C. 1080

D. 1040

4. The smallest 4 –digit number, such that when divided by 12, 18, 21 and 28, it leaves remainder 3 – in each case, is
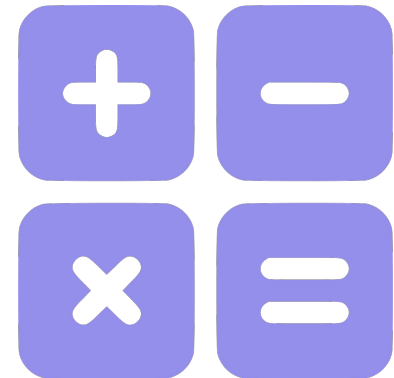
A. 1000

B. 1040

C. 1011

D. 1080

LCM/HCF (Sample Questions)

5. The LCM of three numbers which are in the ratio of 3 : 4 : 5 and is 2400. Their HCF is

A. 200

B. 40

C. 80

D. 120

6. Four bells begins to toll at a time and then at intervals of 6, 7, 8 and 9 seconds. The numbers of times they will toll together in 2 hours is

A. 14

B. 15

C. 13

D. 11

LCM/HCF (Sample Questions)

7. A red-light flashes three times per minute and a green light flashes five times in two minutes at regular intervals. If both lights flash at the same time, how many times do they flash together in each hour?

A. 30

B. 24

C. 20

D. 60

8. Three wheels can complete 60, 36 & 24 revolutions per minute respectively. There is a red spot on each wheel that touches the ground at time zero. At what time would all the three spots simultaneously touch the ground again.

A. 5/ 4 sec.

B. 5/ 3 sec.

C. 5 sec.

D. 7.5 sec.

LCM/HCF (Sample Questions)

9. Find the greatest number consisting of six digits which on being divided by 6, 7, 8, 9 and 10 leaves remainders 4, 5, 6, 7 and 8 respectively.

A. 997918

B. 9999718

C. 998278

D. None of these

10. HCF of two numbers is 8 and Sum is 136. If one number is multiple of 11, find the other number.

A. 96

B. 92

C. 46

D. None of these.

LCM/HCF (Sample Questions)

11. Three persons had 32, 56 and 72 coins respectively. They wanted to distribute equal number of coins to some beggars such that each beggar gets maximum number of coins. If none of them had any coin left with him, how many beggars got coins?

A. 8

B. 12

C. 16

D. 20

SIMPLIFICATION

VBODMAS: -

"VBODMAS" decides the order of operation, if more than one operation is available.

V ➜ Viniculum

B ➜ Brackets

O ➜ of

D ➜ Division

M ➜ Multiplication

A ➜ Addition

S ➜ Subtraction

SIMPLIFICATION (Sample Questions)

Find the value of:

(a) 25 * 24 + 28 * 10 − 45 ÷ 15

(b) 240 ÷ 60 + 120 ÷ 15 * 3 + 5

(c) 18 * 12 + 16 ÷ 8 − 14

(d) 3 * 7 + [15 ÷ 45 * 9 + (21 ÷ 7)]

(e) 4.59 * 1.8 ÷ 3.6 + 5.4 ÷ 1.8 − 1.5

(f) 0.5 ÷ 12.5 + 0.25 * 0.05 − 0.0125

SIMPLIFICATION (Sample Questions)

Simplify:

(i) [0.9 – {2.3 - 3.2 – (7.1 – 5.4 – 3.5)}]

    (a) 0.18   (b) 1.8   (c) 0   (d) 2.6

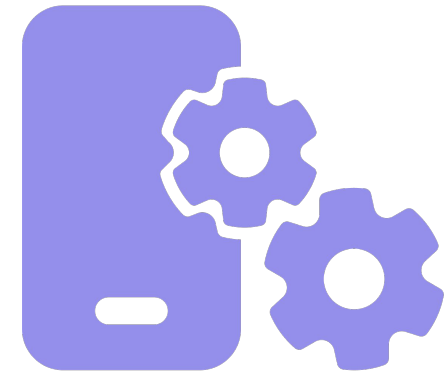(ii) 8.7 – [7.6 – {6.5 – (5.4 - $\overline{4.3 - 2}$)}]

    (a) 2.5   (b) 3.5   (c) 4.5   (d) 5.5

(iii) 4 * [3 ÷ 4 {4 * 3 ÷ (3 * 3)}]

    (a) 3   (b) 9   (c) 12   (d) None

(iv) 1 ÷ [1 + 1 ÷ {1 + 1 ÷ (1 + 1 ÷ 2)}]

    (a) 1   (b) 5/8   (c) 2   (d) 1/2

QUESTIONS BASED ON FRACTIONS:

Find the simplest value of following:

(a) $5\dfrac{2}{3} \times 3\dfrac{1}{6} + 2\dfrac{1}{3}$

(b) $(1/2 \div 1/2 \text{ of } 1/2) \div (1/2 + 1/2 \text{ of } 1/2)$

(c) $6\dfrac{1}{2} + 3\dfrac{1}{4} \div 2\dfrac{3}{5} \times 4/5$

(d) $2\dfrac{3}{4} \div 4\dfrac{5}{4} \text{ of } 2\dfrac{3}{8} \times 3\dfrac{4}{5}$

ALGEBRAIC IDENTITIES

QUESTIONS BASED ON ALGEBRAIC IDENTITIES

$(a^2 - b^2) = (a + b)(a - b)$

$(a^2 - b^2) = (a - b)(a^2 + ab + b^2)$

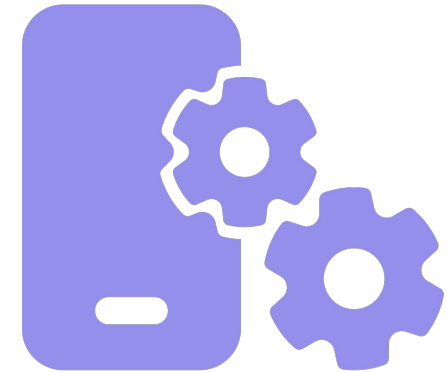$(a^2 + b^2) = (a + b)(a^2 - ab + b^2)$

(a+b)^2= a^2+ b^2 + 2ab

(a-b)^2= a^2+ b^2 -2ab

Example: Find the simplest value of following

(a) 0.0064-0.0016/0.08-0.04

(b) 1.8×1.8×1.8-1.3×1.3×1.3/1.8×1.8+1.8×1.3+1.3×1.3

(c) 0.512+0.729/0.64-0.72 + 0.81

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In the next class, we will focus on:

% Percentages

Ratio and Proportion