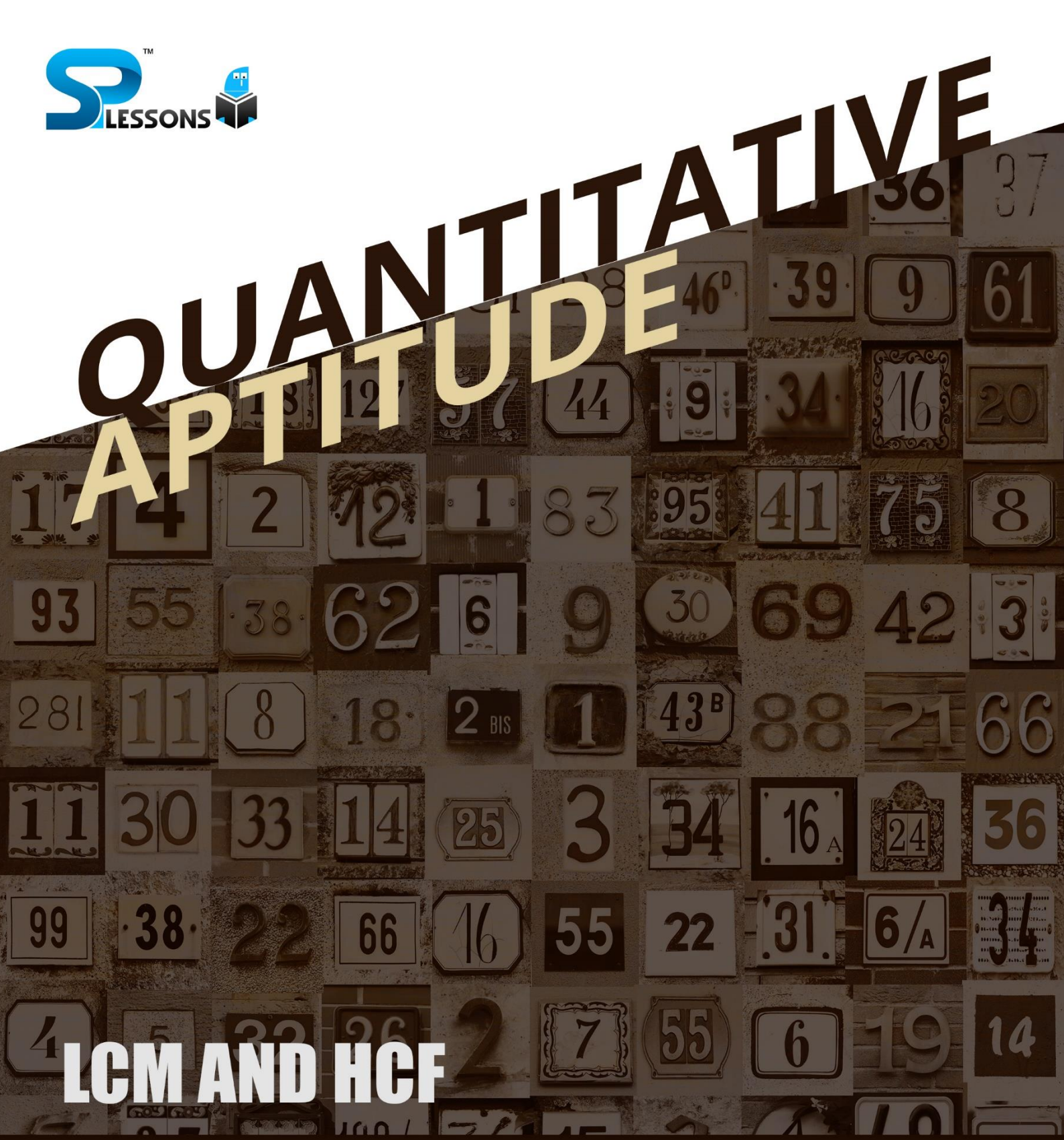

QUANTITATIVE APTITUDE

LCM AND HCF

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Quantitative Aptitude – LCM and HCF – Formulas

Introduction to Quantitative Aptitude:

Quantitative Aptitude is an important section in the employment-related competitive exams in India. Quantitative **Aptitude** Section is one of the key sections in recruitment exams in India including but not limited to **Banking, Railways, and Staff Selection Commission, Insurance, Teaching, UPSC** and many others. The Quantitative Aptitude section has questions related to **Profit and Loss, Percentage and Discount, Simple Equations, Time and Work and Quadratic Equations, Pipes and Cisterns, LCM and HCF etc.**

LCM and HCF – Important Terms:

1. **What is LCM?**

   Lowest Common Multiple (LCM): The least or smallest common multiple of any two or more given natural numbers are termed as LCM. For example, LCM of 10, 15, and 20 is 60.

2. **What is HCF?**

   Highest Common Factor (HCF): The largest or greatest factor common to any two or more given natural numbers is termed as HCF of given numbers. Also known as GCD (Greatest Common Divisor). For example, HCF of 4, 6 and 8 is 2.

   $4 = 2 \times 2$

   $6 = 3 \times 2$

   $8 = 4 \times 2$

   Here, the highest common factor of 4, 6 and 8 is 2.

   Both HCF and LCM of given numbers can be found by using two methods; they are division method and prime factorization.

3. **What are Multiples?**

   Multiple are series of numbers that are exactly divisible by a particular number. e.g. 8, 12, 16, 20 …. are the multiples of 4.

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4. What are Factors?

Factors for a given number are the list of numbers that would divide the larger number without leaving any remainder (Except 1 and number itself) eg. for 12 the factors would be 2, 3, 4, 6

For 6 – 12, 18, 24, 30 will be called as multiple of 6.

For 24 – 6 and 12 are Factors of 24.

5. What is LCM Lowest Common Multiple?

As the name suggests LCM is the lowest common multiple of two or more Natural Numbers for e.g. for 15 and 20, 60 is LCM (Don't worry we will explain how we calculated this)

6. What is HCF Highest Common Factor or Greatest Common Divisor (GCD)?

The Largest (Highest) common Factor of two or more numbers will be called as HCF of the number. E.g. for 12 and 15. 3 will be the HCF.

1. PRIME FACTORS

These are unique list prime numbers that divide the greater number e.g. for 20 – 2, 5 are the prime Factors (Don't worry below you will find how to get these)

Calculating Prime Factors:

In this method, you take the lowest prime number and see if the greater number is divisible by it. If it's not divisible then you move to the higher prime number.

Let us show you how to calculate the prime factors for number step by step.

Prime Factors of 12:

Lowest Prime number 2, 12 ÷ 2 = 6

Again 6 ÷ 2 = 3

Again 3 ÷ 2 is not possible so next prime number is 3

Again 3 ÷ 3 = 1

We can write this as

$12 = 2x2x3 = 2^2 \times 3$

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2. LEAST COMMON MULTIPLE (L.C.M)

* L.C.M is least common multiple, the smallest number which is exactly divisible by all the given numbers.

There are two methods to find L.C.M of given numbers, they are:

i. **Prime factorization method.**
ii. **Division Method.**

How to find L.C.M of given numbers by prime factorization method?

Follow the steps below to find L.C.M of given numbers by prime factorization method.

1. Express the given numbers as product of their prime factors.

2. Find highest index in all the prime factors of given numbers.

3. The product of all the prime factors with respective highest indices is the L.C.M of given numbers.

Ex: L.C.M of 14, 42, 36

1. Express the numbers as product of prime factors.

2 2

14 2*7

36 3 *2

42 2*3*7

2. The highest index of 2, 3, 7 are 2, 2, 1 respectively

3. The product of all the prime factors with the respective highest indices.

L.C.M of 14, 36, 42 =

2 2 2 *3 *7

= 252

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How to find L.C.M of given numbers by division method?

Follow the steps below to find L.C.M of given numbers by division method.

1. Divide all the numbers with the common prime factors.

2. The division process continues until there is no common factor to the numbers.

3. The product of divisors and remaining numbers with no common factor is the L.C.M of given numbers.

Ex: L.C.M of 12, 98, 188

2|12,98,188
2|6,49,94
|3,49,47

The product of divisors and remaining numbers = 2*2*3*49*47 = 27636

Hence, the L.C.M of 12, 98, 188 = 27636

Finding LCM of two Numbers:

Let us take an example HCF of 15 and 20, first we list out all the prime factors of each

15 = 3 x 5

20 = 2 x 2 x 5 = 22 × 5

Then multiply each factor by the greatest number of times it occurs in either number.

2 – Occurs 2 times

3 – Occurs 1 time

5 – Occurs 1 time

So LCM is (2×2) x (3×1) x (5×1) = 60

L.C.M of given fractions

$$\text{LCM of given fractions} = \frac{\text{L.C.M.of numerators}}{\text{H.C.F of denominators}}$$

Ex: Find the L.C.M of the fractions

$\frac{2}{3}, \frac{7}{18}, \frac{11}{12}$

According to the formula, L.C.M of numerators 2, 7, 11

As the numerators are all prime numbers, L.C.M of numerators = 2*7*11 = 154

H.C.F of denominators 3, 18, 12

So, H.C.F of denominators 3, 18, 12 = 3

$3 = 3^1$

$18 = 2 * 3^2$

$12 = 2^2 * 3$

So, H.C.F of denominators 3, 18, 12 = 3

Therefore, L.C.M of given fractions = $\frac{\text{L.C.M of numerators}}{\text{H.C.F of denominators}} = \frac{154}{3}$

TM

How to compare fractions by using L.C.M of denominators

* Comparison of fractions

1. Find L.C.M of the denominators in given fractions

2. Find the resultant fraction for all the numbers with above L.C.M as denominator

3. Arrange the corresponding fractions in the order of their numerators of resultant fractions

Ex: Arrange the fractions in descending order

$\frac{7}{3}, \frac{12}{5}, \frac{1}{9}$

The L.C.M of denominators

$3, 5, 9 = 3^2 * 5 = 45$

Convert each fraction with the L.C.M as equivalent denominator,

, fraction is

$\frac{7}{3}=\frac{x}{45}\Rightarrow x=105$, fraction is $\frac{105}{45}$

$\frac{12}{5}=\frac{y}{45}\Rightarrow y=108$, fraction is $\frac{108}{45}$

$\frac{1}{9}=\frac{y}{45}\Rightarrow y=5$, fraction is $\frac{5}{45}$

$\frac{108}{45}>\frac{105}{45}>\frac{5}{45}$ so the corresponding fractions are $\frac{12}{5}>\frac{7}{3}>\frac{1}{9}$

HIGHEST COMMON FACTOR (H.C.F):

* H.C.F is the highest common factor or also known as greatest common divisor, the greatest number which exactly divides all the given numbers.

There are two methods to find H.C.F of given numbers, they are:

i. **Prime factorization method.**
ii. **Division Method.**

How to find H.C.F of given numbers by prime factorization method?

Follow the steps below to find H.C.F of given numbers by prime factorization method.

1. Express the given numbers as product of their prime factors

2. Check for the common prime factors and find least index of each common prime factor in the given numbers.

3. The product of all common prime factors with the respective least indices is H.C.F of given

Numbers

Ex: H.C.F of 12, 36, 48

1. Express the numbers as product of prime factors

$12=3*2^2$

$36=3^2*2^2$

$48=3*2^4$

2. The common prime factors are 2 and 3 and the corresponding least indices are 2 and 1 respectively

3. The product of all the common prime factors with the respective least indices

H.C.F of 12, 36, 48 = $2^2 * 3 = 12$

How to find H.C.F of two numbers by division method?

Follow the steps below to find H.C.F of two numbers by division method

1. Divide higher number with the smaller number

2. Divide smaller number with the remainder of above division

3. Then second remainder divides first remainder and the process of division continues till remainder is zero.

4. Last divisor of division is the H.C.F of two numbers

Ex: H.C.F of 12 and 56

$$
\begin{array}{r}
12\overline{)56} \\
\underline{48} \\
8\overline{)12} \\
\underline{8} \\
4\overline{)8} \\
\underline{8} \\
0
\end{array}
$$

The last divisor in the above division is 4.

Hence, H.C.F of 12 and 56 = 4

Finding HCF of two Numbers:

Let us take an example HCF of 18 and 24, we already have listed out all the prime factors of each number

18 = 2 x 3 x 3

24 = 2 x 2 x 2 x 3 = 23 × 3

Now we find the factor that exists at least once in both of them.

HCF of given fractions

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HCF of given fractions $= \frac{\text{H.C.F of numerators}}{\text{L.C.M of denominators}}$

Ex: Find the H.C.F of the fractions

$$\frac{4}{9}, \frac{16}{15}, \frac{12}{21}$$

According to the formula, H.C.F of numerators 4, 16, 12

$4 = 2^2$

$16 = 2^4$

$12 = 2^2 * 3$

L.C.M of denominators 9, 15, 21

$9 = 3^2$

$15 = 3 * 5$

$21 = 3 * 7$

So, the L.C.M of denominators

$= 3^2 * 5 * 7 = 315$

$$\text{Therefore, H.C.F of given fractions} = \frac{\text{H.C.F of numerators}}{\text{L.C.M of denominators}} = \frac{4}{315}$$

Quick Looks

1. L.C.M of given fractions $= \frac{\text{L.C.M.of numerators}}{\text{H.C.F of denominators}}$

2. H.C.F of given fractions $= \frac{\text{H.C.F of numerators}}{\text{L.C.M of denominators}}$

3. Product of two numbers = H.C.F *L.C.M of the two numbers (NOTE: applicable only for two numbers)

Property 1 – LCM x HCF = Product of two number

Property 2 – LCM ≥ Numbers ≥ HCF

Property 3- LCM is a multiple of HCF

Property 4– If the HCF of two numbers is 1 then they are Co-Primes.

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How to calculate LCM and HCF, is given below later on this page.

SOME IMPORTANT LCM AND HCF TRICKS

i. The greatest number dividing a, b and c leaving remainders of x1, x2 and x3 is the HCF of (a-x1x1), (b-x2x2) and (c-x3x3).

ii. The greatest number dividing a, b and c (a<b<c) leaving the same remainder each time is the HCF of (c-b), (c-a), (b-a) ....

iii. If a number, N, is divisible by X and Y and HCF (X, Y) = 1. Then, N is divisible by X*Y...

LCM AND HCF PREVIOUS YEAR AND LATEST QUESTIONS

1. The H.C.F. and L.C.M. of, two numbers are 8 and 48 respectively. If one of the numbers is 24, then the other number is

A. 48
B. 36
C. 24
D. 16

Answer: D

Explanation:

Given

Numbers- First = 24 Second = x (suppose)

H.C.F. of numbers = 8 L.C.M. of numbers = 48

As we know: H.C.F.* L.C.M. = Product of numbers

Hence 48*8 = 24*x

x = 16

2. Two numbers are in the ratio 3:4. Their L.C.M. is 84. The greater number is

A. 21
B. 24
C. 28
D. 84

Answer: C

Explanation:

Let the numbers be 3x, 4x

LCM of 3x and 4x is = 12x

So the number 84 is divisible by 12

$\frac{84}{12}$ = 7

The numbers are 7×3 = 21, 7x 4 = 28

The greatest number is 28

3. The sum of two numbers is 36 and their H.C.F and L.C.M. are 3 and 105 respectively. The sum of the reciprocals of two numbers is

A. $\frac{2}{35}$
B. $\frac{3}{25}$
C. $\frac{4}{35}$
D. $\frac{2}{25}$

Answer: C

Explanation:

Let's say numbers are x and y

Hence sum of the reciprocals will be $\frac{1}{X} + \frac{1}{y}$

Or $\frac{x+y}{xy}$

As x+y = 36 (given)

And xy = HCF×LCM

= 3×105=315

After putting the values we will get summation of reciprocals equals to $\frac{4}{35}$

4. L.C.M. of two numbers is 120 and their H.C.F. is 10. Which of the following can be the sum of those two numbers?

- **A.** 140
- **B.** 80
- **C.** 60
- **D.** 70

Answer: D

Explanation:

We assume that numbers are hr_1 and hr_2 (where h= H.C.F. of numbers and r1 and r2 are prime factors)

So L.C.M. will be = $hr_1r_2 = 120$

or $r_1r_2 = 12$

So r_1 =4 and r_2 = 3; numbers will be 40 and 30, sum is 70

Or r_1 = 12 and r_2 = 1; numbers will be 120 and 10, sum is 130

Hence only option D justifies.

5. Product of two cop rime numbers is 117. Then their LCM is

- **A.** 9
- **B.** 13
- **C.** 39
- **D.** 117

Answer: D

Explanation:

Let the two numbers be a, b.

Hence a * b = L.C.M (a, b) * G.C.D (a, b)

It is given that a, b are co-primes, implies G.C.D (a, b) = 1 Hence from the above equation we get L.C.M (a, b) = a*b = 117

6. HCF and LCM of two numbers are 11 and 825 respectively. If one number is 275 find the other number

A. 53
B. 45
C. 33
D. 43

Answer: C

Explanation:

Let the number = x

HCF = 11 and LCM = 825

Product of HCF and LCM = Product of the two numbers

⇨ X x 275 = 11 x 825
⇨ X = $\frac{11 \text{ X } 825}{275}$
⇨ X = $\frac{825}{25}$ = 33

7. What is the LCM (least common multiple) of 57 and 93?

A. 1767
B. 1567
C. 1576
D. 1919

Answer: A

Explanation:

Prime factorization of 57 = 3 × 19

Prime factorization of 93 = 3 × 31

=> L.C.M. of 57 and 93 = 3 × 19 × 31

= 57 × 31 = 1767

8. What is the HCF (highest common factor) of 57 and 513?

A. 10
B. 57
C. 3
D. 27

Answer: B

Explanation:

Factors of 57 = 1, 3, 19, 57

Factors of 513 = 1, 3, 9, 19, 27, 57, 171, 513

The common factors are = 1, 3, 19, 57

=> Highest common factor = 57

9. The two numbers are 63 and 77, HCF is 7, Find the LCM.

- **A.** 668
- **B.** 693
- **C.** 674
- **D.** 680

Answer: B

Explanation:

H.C.F. (a, b) × L.C.M. (a, b) = a × b

The numbers a = 63 and b = 77 and HCF = 7

=> L.C.M. = $\frac{a \times b}{HCF}$

= $\frac{63 \times 77}{7}$ = 63×11

= 693

10. What is the HCF (highest common factor) of 77 and 275?

- **A.** 12
- **B.** 11 1
- **C.** 7
- **D.** 25

Answer: B

Explanation:

Factors of: 77 = 1, 7, 11, 77

275 = 1, 5, 11, 25, 55, 275

The common factors are 1 and 11

And HCF = 11

11. The two numbers are 55 and 99; HCF is 11, what is their LCM?

- **A.** 486
- **B.** 479
- **C.** 476
- **D.** 495

Answer: C

Explanation:

Let the LCM = x

Numbers are = 55, 99

Also, product of numbers = HCF × LCM

=> 55×99=11x X

=> x = $\frac{55\times99}{11}$ = 5 x 99

=> x = 495

12. What is the HCF (highest common factor) of 133 and 112?

- **A.** 15
- **B.** 7
- **C.** 19
- **D.** 16

Answer: B

Explanation:

Prime factorization of

133 = 7 × 19

112 = 2^4 × 7

There is only 1 common factor, and thus the HCF

13. Find the HCF of $\frac{2}{3}, \frac{1}{2}, \frac{3}{5}$

A. 6
B. $\frac{1}{30}$
C. $\frac{1}{15}$
D. $\frac{1}{10}$

Answer:

Explanation:

HCF = $\frac{\text{HCF of numerators}}{\text{LCM of denominators}}$

HCF of 1, 2, 3 = 1 LCM of 3, 2, 5 = 30

Hence, $\frac{1}{30}$

14. What is the LCM of 64 and 56?

A. 448
B. 488
C. 484
D. 408

Answer: A

Explanation:

So LCM of 64 & 56 is = 8*8*7 = 448

So the answer is option A

15. What is the HCF of $\frac{7}{9}, \frac{2}{3}, \frac{5}{8}$ and $\frac{7}{12}$?

A. $\frac{1}{18}$
B. $\frac{1}{36}$
C. $\frac{1}{144}$
D. $\frac{1}{72}$

Answer: D

Explanation:

HCF of fractions = $\frac{\text{HCF of numerators}}{\text{LCM of denominators}}$.

HCF of 7,2,5 and 7 is 1.

LCM of 9, 3, 8 and 12 is 72.

Therefore, the HCF of the given fractions is $\frac{1}{72}$

16. The LCM of two numbers is 4 times their HCF. The sum of LCM and HCF is 125. If one of the numbers is

- **A.** 5
- **B.** 25
- **C.** 100
- **D.** 125

Answer: B

Explanation:

Let one of the numbers = x and other number = 100

Let L.C.M = L and H.C.F = H

According to ques, => L=4H ————–(i)

and L+H=125

Substituting value from equation (i), we get : 4H+H=5H=125

=> H = $\frac{125}{5}$=25

=> L = 4× 25 =100

Thus, product of numbers = L×H

=> 100×x=100×25

=> x=25

17. Find the HCF of $\frac{2}{3}$, $\frac{6}{8}$, $\frac{7}{12}$ and $\frac{2}{5}$

- **A.** $\frac{1}{120}$
- **B.** $\frac{1}{60}$
- **C.** $\frac{1}{30}$
- **D.** $\frac{1}{240}$

Answer: B

Explanation:

HCF of fractions = $\frac{\text{HCF of numerators}}{\text{LCM of denominators}}$

All the fractions must be in their empirical form to apply this formula.

$\frac{6}{8}$ can be written as $\frac{3}{4}$.

The given fractions are $\frac{2}{3}, \frac{3}{4}, \frac{7}{12}$ and $\frac{2}{3}$.

HCF of the numerators = 1.

LCM of (3, 4, 12 and 5) is 60.

Therefore, the HCF of the given fractions is $\frac{1}{60}$

18. Find the HCF of $\frac{8}{3}, \frac{12}{7}$ and $\frac{13}{12}$

- **A.** $\frac{1}{504}$
- **B.** $\frac{1}{126}$
- **C.** $\frac{1}{84}$
- **D.** $\frac{1}{1008}$

Answer: C

Explanation:

HCF of fractions = $\frac{\text{HCF of numerators}}{\text{LCM of denominators}}$

All the fractions must be in their empirical form to apply this formula.

HCF of the numerators (8, 12, 13) is 1.

LCM of the (3, 7, 12) is 84

Therefore, the HCF of the given fraction is $\frac{1}{80}$.

19. Find the LCM of $\frac{3}{4}, \frac{5}{8}$ and $\frac{9}{27}$

- **A.** 15
- **B.** 45

C. $\frac{1}{24}$

D. $\frac{1}{48}$

Answer: A

Explanation:

LCM of fractions = $\frac{\text{LCM of numerators}}{\text{HCF of denominators}}$

All the fractions must be in their empirical form to apply this formula.

$\frac{9}{27}$ can be reduced to $\frac{1}{3}$

The given fractions are $\frac{3}{4}$, $\frac{5}{8}$, and $\frac{1}{3}$

Therefore, LCM of numerators (3, 5, 1) is 1.

HCF of denominators (4, 8, 3) is 1.

Therefore, the LCM is $\frac{15}{1}$ = 15

20. Find the HCF of 0.8, 0.125, 0.625 and 0.5.

A. 0.1

B. $\frac{1}{40}$

C. $\frac{1}{20}$

D. $\frac{1}{80}$

Answer: B

Explanation:

HCF of fractions = $\frac{\text{HCF of numerators}}{\text{LCM of denominators}}$

All the fractions must be in their empirical form to apply this formula.

0.8 = $\frac{4}{5}$

0.125 = $\frac{1}{8}$

0.625 = $\frac{5}{8}$

0.5 = $\frac{1}{2}$

The given numbers can be written as $\frac{4}{5}, \frac{1}{8}, \frac{5}{8}, \frac{1}{2}$.

HCF of the numerators = 1.

LCM of the denominators (5, 8, 2) = 40.

Therefore, the HCF of the given numbers will be $\frac{1}{40}$ or 0.025.

21. Find the HCF of $\frac{3}{8}, \frac{17}{19}$ and $\frac{21}{23}$

- **A.** $\frac{1}{2392}$
- **B.** $\frac{1}{3192}$
- **C.** $\frac{1}{3128}$
- **D.** $\frac{1}{3496}$

Answer: D

Explanation:

HCF of fractions = $\frac{\text{HCF of numerators}}{\text{LCM of denominators}}$

All the fractions must be in their empirical form to apply this formula.

The HCF of (3, 17, 21) is 1

The LCM of (8, 19, 23) is 3496.

Therefore, the HCF of the given fractions is $\frac{1}{3496}$

22. The sum of two numbers is 7 and the sum their squares is 23, their product is equal to:

- **A.** 10
- **B.** 11
- **C.** 12
- **D.** 13

Answer: D

Explanation:

Let the numbers be x and y

It is given that x2+y2=23 ————(i)

Also, x+y=7 Squaring both sides, we get:

=> x2+y2+2xy=49

=> 23+2xy=49

=> 2xy=49−23=26

=> xy=262=13

∴ Product of the numbers = 13

23. The difference between two numbers is 1146. When we divide the larger number by smaller we get 4 as

- **A.** 1526
- **B.** 1431
- **C.** 1485
- **D.** 1234

Answer: A

Explanation:

Let the smaller number be x and the larger number = (x+1146) According to ques, on dividing the the larger term by smaller one,

=> (x + 1146) = 4x + 6

=> 4 x − x = 1146 − 6

=> 3x = 1140

=> x = 11403 = 380

∴ Larger number = 380 + 1146 = 1526

24. The number between 4000 and 5000 that is divisible by each of 12, 18, 21 and 32 is

- **A.** 4302
- **B.** 4032
- **C.** 4023
- **D.** 4203

Answer: B

Explanation:

LCM of 12,18,21,32 is

252 Multiples of 252 between 4000

And 5000 are 4032, 4284, 4536, 4788. 4032, 4284, 4536, 4788.

4032 is present in the options

25. A number between 1000 and 2000 which when divided by 30, 36 & 80 gives a remainder 11 in each case is

- **A.** 1451
- **B.** 1641
- **C.** 1712
- **D.** 1523

Answer: A

Explanation:

LCM of given 3 numbers (30, 36, 80) = 720

Multiple of 720 between 1000 and 2000 is 1440

∴ Number which gives a remainder 11 in each case (1440 + 11) = 1451

26. Find the greatest number that will divide 43, 91 and 183 so as to leave the same remainder in each case.

- **A.** 4
- **B.** 7
- **C.** 9
- **D.** 13

Answer: A

Explanation:

Required number = H.C.F. of (91 - 43), (183 - 91) and (183 - 43)

= H.C.F. of 48, 92 and 140 = 4.

27. The H.C.F. of two numbers is 23 and the other two factors of their L.C.M. are 13 and 14. The larger of the two numbers is:

- **A.** 276
- **B.** 299
- **C.** 322
- **D.** 345

Answer: C

Explanation:

Clearly, the numbers are (23 x 13) and (23 x 14).

Larger number = (23 x 14) = 322.

28. Six bells commence tolling together and toll at intervals of 2, 4, 6, 8 10 and 12 seconds respectively. In 30 minutes, how many times do they toll together?

- **A.** 4
- **B.** 10
- **C.** 15
- **D.** 16

Answer: D

Explanation:

L.C.M. of 2, 4, 6, 8, 10, 12 is 120.

So, the bells will toll together after every 120 seconds (2 minutes).

In 30 minutes, they will toll together $\frac{30}{2}$ + 1 = 16 times.

29. Let N be the greatest number that will divide 1305, 4665 and 6905, leaving the same remainder in each case. Then sum of the digits in N is:

- **A.** 4
- **B.** 5
- **C.** 6
- **D.** 8

Answer: A

Explanation:

N = H.C.F. of (4665 - 1305), (6905 - 4665) and (6905 - 1305)

= H.C.F. of 3360, 2240 and 5600 = 1120.

Sum of digits in N = (1 + 1 + 2 + 0) = 4

30. The greatest number of four digits which is divisible by 15, 25, 40 and 75 is:

- **A.** 9000

B. 9400
C. 9600
D. 9800

Answer: C

Explanation:

Greatest number of 4-digits is 9999.

L.C.M. of 15, 25, 40 and 75 is 600.

On dividing 9999 by 600, the remainder is 399.

Required number (9999 - 399) = 9600.

31. The product of two numbers is 4107. If the H.C.F. of these numbers is 37, then the greater number is:

A. 101
B. 107
C. 111
D. 185

Answer: C

Explanation:

Let the numbers be 37a and 37b.

Then, 37a x 37b = 4107

ab = 3.

Now, co-primes with product 3 are (1, 3).

So, the required numbers are (37 x 1, 37 x 3) i.e., (37, 111).

Greater number = 111.

32. Three number are in the ratio of 3: 4: 5 and their L.C.M. is 2400. Their H.C.F. is:

A. 40
B. 80
C. 120
D. 200

Answer: A

Explanation:

Let the numbers be 3x, 4x and 5x.

Then, their L.C.M. = 60x.

So, 60x = 2400 or x = 40.

The numbers are (3 x 40), (4 x 40) and (5 x 40).

Hence, required H.C.F. = 40.

33. The G.C.D. of 1.08, 0.36 and 0.9 is:

- **A.** 0.03
- **B.** 0.9
- **C.** 0.18
- **D.** 0.108

Answer: C

Explanation:

Given numbers are 1.08, 0.36 and 0.90. H.C.F. of 108, 36 and 90 is 18,

H.C.F. of given numbers = 0.18.

34. The product of two numbers is 2028 and their H.C.F. is 13. The number of such pairs is:

- **A.** 1
- **B.** 2
- **C.** 3
- **D.** 4

Answer: B

Explanation:

Let the numbers 13a and 13b.

Then, 13a x 13b = 2028

a b = 12.

Now, the co-primes with product 12 are (1, 12) and (3, 4).

[Note: Two integers a and b are said to be cop rime or relatively prime if they have no common positive factor other than 1 or, equivalently, if their greatest common divisor is 1]

So, the required numbers are (13 x 1, 13 x 12) and (13 x 3, 13 x 4).

Clearly, there are 2 such pairs.

35. The least multiple of 7, which leaves a remainder of 4, when divided by 6, 9, 15 and 18 is:

- **A.** 74
- **B.** 94
- **C.** 184
- **D.** 364

Answer: D

Explanation:

L.C.M. of 6, 9, 15 and 18 is 90.

Let required number be 90k + 4, which is multiple of 7.

Least value of k for which (90k + 4) is divisible by 7 is k = 4.

Required number = (90 x 4) + 4 = 364.

36. Find the lowest common multiple of 24, 36 and 40.

- **A.** 120
- **B.** 240
- **C.** 360
- **D.** 480

Answer: C

Explanation:

2 | 24 - 36 - 40

---

2 | 12 - 18 - 20

---

2 | 6 - 9 - 10

---

3 | 3 - 9 - 5

| 1 - 3 - 5

L.C.M. = 2 x 2 x 2 x 3 x 3 x 5 = 360.

37. The least number which should be added to 2497 so that the sum is exactly divisible by 5, 6, 4 and 3 is:

A. 3
B. 13
C. 23
D. 33

Answer: C

Explanation:

L.C.M. of 5, 6, 4 and 3 = 60.

On dividing 2497 by 60, the remainder is 37.

Number to be added = (60 - 37) = 23.

38. Reduce $\frac{128352}{238368}$ to its lowest terms.

A. $\frac{3}{4}$
B. $\frac{5}{13}$
C. $\frac{7}{13}$
D. $\frac{9}{13}$

Answer: C

Explanation:

128352) 238368 (1

128352

110016) 128352 (1

110016

18336) 110016 (6

110016

X

So, H.C.F. of 128352 and 238368 = 18336.

Therefore, $\frac{128352}{238368} = \frac{128352 \div 18336}{238368 \div 18336} = \frac{7}{13}$

39. The least number which when divided by 5, 6, 7 and 8 leaves a remainder 3, but when divided by 9 leaves no remainder, is:

- **A.** 1677
- **B.** 1683
- **C.** 2523
- **D.** 3363

Answer: B

Explanation:

L.C.M. of 5, 6, 7, 8 = 840.

∴ required number is of the form 840k + 3

Least value of k for which (840k + 3) is divisible by 9 is k = 2.

∴ Required number = (840 x 2 + 3) = 1683.

40. A, B and C start at the same time in the same direction to run around a circular stadium. A completes a round in 252 seconds, B in 308 seconds and c in 198 seconds, all starting at the same point. After what time will they again at the starting point?

- **A.** 26 minutes and 18 seconds
- **B.** 42 minutes and 36 seconds
- **C.** 45 minutes
- **D.** 46 minutes and 12 seconds

Answer: D

Explanation:

L.C.M. of 252, 308 and 198 = 2772.

So, A, B and C will again meet at the starting point in 2772 sec. i.e., 46 min. 12 sec.

41. The H.C.F. of two numbers is 11 and their L.C.M. is 7700. If one of the numbers is 275, then the other is:

- **A.** 279
- **B.** 283
- **C.** 308
- **D.** 318

Answer: C

Explanation:

Other number = $[\frac{11 \times 7700}{275}]$ = 308.

42. The ratio of two numbers is 3: 4 and their H.C.F. is 4. Their L.C.M. is:

- **A.** 12
- **B.** 16
- **C.** 24
- **D.** 48

Answer: D

Explanation:

Let the numbers be 3x and 4x. Then, their H.C.F. = x. So, x = 4.

So, the numbers 12 and 16.

L.C.M. of 12 and 16 = 48.

43. The smallest number which when diminished by 7, is divisible 12, 16, 18, 21 and 28 is:

- **A.** 1008
- **B.** 1015
- **C.** 1022
- **D.** 1032

Answer: B

Explanation:

Required number = (L.C.M. of 12, 16, 18, 21, 28) + 7

= 1008 + 7

= 1015

44. 252 can be expressed as a product of primes as:

- **A.** 2 x 2 x 3 x 3 x 7
- **B.** 2 x 2 x 2 x 3 x 7
- **C.** 3 x 3 x 3 x 3 x 7
- **D.** 2 x 3 x 3 x 3 x 7

Answer: A

Explanation:

Clearly, 252 = 2 x 2 x 3 x 3 x 7.

45. Three numbers which are co-prime to each other are such that the product of the first two is 551 and that of the last two is 1073. The sum of the three numbers is:

- **A.** 75
- **B.** 81
- **C.** 85
- **D.** 89

Answer: C

Explanation:

Since the numbers are co-prime, they contain only 1 as the common factor.

Also, the given two products have the middle number in common.

So, middle number = H.C.F. of 551 and 1073 = 29;

First number = $[\frac{551}{29}]$ = 19; Third number = $\left[\frac{1073}{29}\right]$ = 37.

∴ Required sum = (19 + 29 + 37) = 85.

46. Find the highest common factor of 36 and 84.

- **A.** 4
- **B.** 6
- **C.** 12
- **D.** 18

Answer: C

Explanation:

$36 = 2^2 \times 3^2$

$84 \quad 2^2 \times 3 \times 7$

$\therefore$ H.C.F. $= 2^2 \times 3 = 12$.

47. Which of the following fraction is the largest?

A. $\frac{7}{8}$
B. $\frac{13}{16}$
C. $\frac{31}{31}$
D. $\frac{63}{80}$

Answer: A

Explanation:

L.C.M. of 8, 16, 40 and 80 = 80.

$\frac{7}{8} = \frac{70}{80}$; $\frac{13}{16} = \frac{65}{80}$; $\frac{31}{40} = \frac{62}{80}$

Since, $\frac{70}{80} > \frac{62}{80} > \frac{63}{80} > \frac{62}{80}$, so $\frac{7}{8} > \frac{13}{16} > \frac{63}{80} > \frac{31}{40}$

So, $\frac{7}{8}$ is the largest?

48. The least number, which when divided by 12, 15, 20 and 54 leaves in each case a remainder of 8 is:

A. 504
B. 536
C. 544
D. 548

Answer: D

Explanation:

Required number = (L.C.M. of 12, 15, 20, 54) + 8

= 540 + 8

= 548.

49. Which of the following has the most number of divisors?

A. 99
B. 101

C. 176
D. 182

Answer: C

Explanation:

99 = 1 x 3 x 3 x 11

101 = 1 x 101

176 = 1 x 2 x 2 x 2 x 2 x 11

182 = 1 x 2 x 7 x 13

So, divisors of 99 are 1, 3, 9, 11, 33, .99

Divisors of 101 are 1 and 101

Divisors of 176 are 1, 2, 4, 8, 11, 16, 22, 44, 88 and 176

Divisors of 182 are 1, 2, 7, 13, 14, 26, 91 and 182.

Hence, 176 have the most number of divisors.

50. The L.C.M. of two numbers is 48. The numbers are in the ratio 2 : 3. Then sum of the number is:

A. 28
B. 32
C. 40
D. 64

Answer: C

Explanation:

Let the numbers be 2x and 3x.

Then, their L.C.M. = 6x.

So, 6x = 48 or x = 8.

The numbers are 16 and 24.

Hence, required sum = (16 + 24) = 40.

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