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H.C.F AND L.C.M

SUBJECT : MATHEMATICS
CHAPTER NUMBER: 08
CHAPTER NAME : H.C.F AND L.C.M
SUBTOPIC :LCM ,Prime factor and Common Division Method
PERIOD NO: 3

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Learning outcomes

- Students will be able to find L.C.M. of given numbers .
- Students will develop application skill.
- Students will be able to solve problems based on LCM .

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Previous Knowledge Test

Question 1.

Show that 45 and 56 are co-prime numbers.

Solution:

The HCF of two co-prime numbers is always HCF of 45 and 56

$$
\begin{array}{l}
45\overline{)56}(1 \\
\quad 45 \\
\quad\overline{} \\
\quad 11\overline{)45}(4 \\
\quad\quad 44 \\
\quad\quad\overline{} \\
\quad\quad 1\overline{)11}(11 \\
\quad\quad\quad 11 \\
\quad\quad\quad\overline{} \\
\quad\quad\quad\ \times
\end{array}
$$

From above it is proved that HCF of 45 and 56 is 1

Hence 45 and 56 are co-prime numbers.

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Negative numbers and Integers

- Students will Learn L.C.M with the help of a video .
- https://www.youtube.com/watch?v=CIkDcENjzBA(4.50)

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Least Common Multiple of 5 and 7 :

Multiples of 5: 5 ; 10 ; 15 ; 20 ; 25 ; 30 ; 35....

Multiples of 7: 7 ; 14 ; 21 ; 28 ; 35.....

The least common mutiple of 2 and 3 is 35

$$LCM(5;7) = 35$$

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Program to find LCM of two numbers

LCM = Smallest Number that divides both

$15 = 5 \times 3$

$25 = 5 \times 5$

Union of all factors $= 5 \times 5 \times 3$

$= 75$

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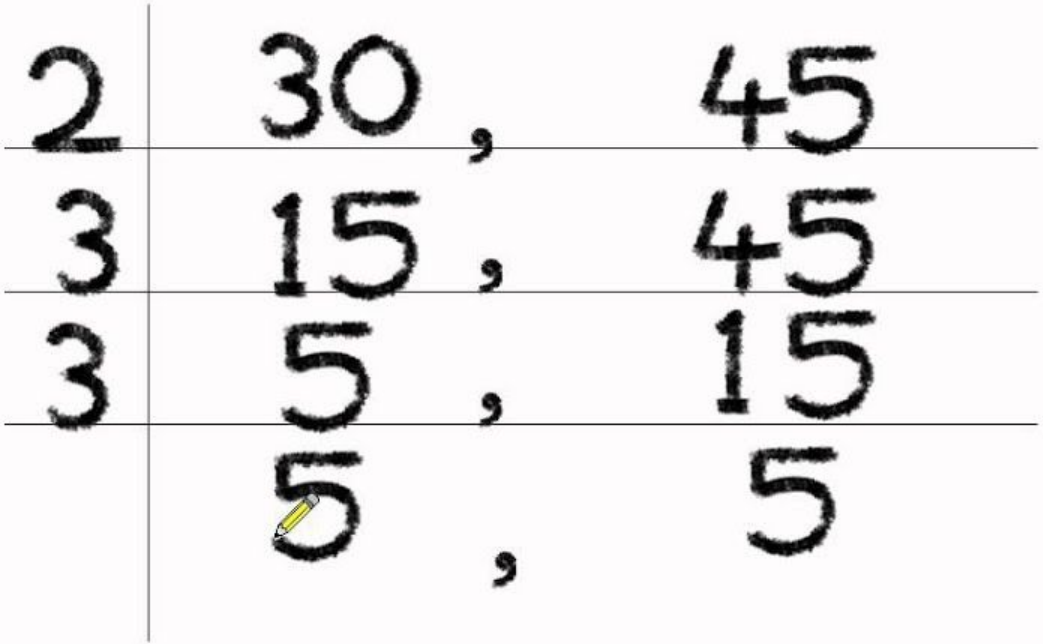
LCM by Common Division



Evaluation Question Exercise 8 C

1. Using the common multiple method, find the L.C.M. of the following:
(i) 8, 12 and 24
(ii) 10, 15 and 20
(iii) 3, 6, 9 and 12
Solution:

(i) 8, 12 and 24

4	8	12	24
3	2	3	6
2	2	1	2
	1	1	1

We get,
L.C.M = 4 × 3 × 2
= 24
Hence, L.C.M. of 8, 12 and 24 = 24

ii) 10, 15 and 20

2	10	15	20
2	5	15	10
3	5	15	5
5	5	5	5
	1	1	1

We get,
L.C.M = 2 × 2 × 3 × 5
= 60
Hence, L.C.M. of 10, 15 and 20 = 60

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Evaluation Question

2. Find the L.C.M. of each of the following groups of numbers, using (i) the prime factor method and (ii) the common division method:

(i) 18, 24 and 96 **(ii) 100, 150 and 200**

(iii) 14, 21 and 98 **(iv) 22, 121 and 33** **(v) 34, 85 and 51**

Solution:

(i) 18, 24 and 96

By using prime factor method, L.C.M. of 18, 24 and 96 are given below

Prime factors of 18 = 2 × 3 × 3

Prime factors of 24 = 2 × 2 × 2 × 3

Prime factors of 96 = 2 × 2 × 2 × 2 × 2 × 3

∴ L.C.M. = 2 × 2 × 2 × 2 × 2 × 3 × 3= 288

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Evaluation Question

By using common division method, L.C.M. of 18, 24 and 96 are given below

∴ L.C.M. = 2 × 2 × 2 × 2 × 2 × 3 × 3

= 288

2	18	24	96
2	9	12	48
2	9	6	24
2	9	3	12
2	9	3	6
3	9	3	3
3	3	1	1
	1	1	1

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Evaluation Question

3. The H.C.F. and the L.C.M. of two numbers are 50 and 300 respectively. If one of the numbers is 150, find the other one.

Solution: H.C.F. = 50 L.C.M. = 300

One number = 150

We know that, Product of H.C.F. and L.C.M. of two numbers is equal to product of those two numbers

50 × 300 = 150 × other number

15000 / 150 = other number

100 = other number

Hence, the other number is 100

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Evaluation Question

4. The product of two numbers is 432 and their L.C.M. is 72. Find their H.C.F.

Solution: Product of two numbers = 432 and L.C.M.= 72

We know that,

Product of H.C.F. and L.C.M. of two numbers is equal to product of those two numbers.

Now, to find H.C.F

H.C.F. × 72 = 432

H.C.F.= 432 / 72

H.C.F. = 6

Hence, H.C.F. = 6

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Evaluation Question

5. The product of two numbers is 19,200 and their H.C.F. is 40. Find their L.C.M.

Solution: Given

Product of two numbers = 19200 and H.C.F. = 40

We know that,

Product of H.C.F. and L.C.M. of two numbers is equal to product of those two numbers

Now, to find L.C.M.

40 × L.C.M. = 19200

L.C.M. = 19200 / 40

L.C.M. = 480

Hence, L.C.M. = 480

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Evaluation Question

6. Find the smallest number which, when divided by 12, 15, 18, 24 and 36 leaves no remainder.

Solution: The given numbers L.C.M. will be the least number which is exactly divisible 12, 15, 18, 24 and 36 and leaves no remainder

2	12	15	18	24	36
2	6	15	9	12	18
2	3	15	9	6	9
3	3	15	9	3	9
3	1	5	3	1	3
5	1	5	1	1	1
	1	1	1	1	1

L.C.M. = 2 × 2 × 2 × 3 × 3 × 5
= 360

Hence, smallest required number = 360

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Evaluation Question

7. Find the smallest number which, when increased by one is exactly divisible by 12, 18, 24, 32 and 40.

Solution:

First, let us find out the L.C.M. of 12, 18, 24, 32 and 40

2	12	18	24	32	40
2	6	9	12	16	20
2	3	9	6	8	10
2	3	9	3	4	5
2	3	9	3	2	5
3	3	9	3	1	5
3	1	3	1	1	5
5	1	1	1	1	5
	1	1	1	1	1

L.C.M. = 2 × 2 × 2 × 2 × 2 × 3 × 3 × 5

= 1440

This can be written as

= 1439 + 1

Hence, 1439 is the smallest number which, when increased by one is exactly divisible by the given numbers

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Evaluation Question

8. Find the smallest number which, on being decreased by 3, is completely divisible by 18, 36, 32 and 27.

Solution:

First, let us solve for L.C.M. of 18, 36, 32 and 27

L.C.M. = 2 × 2 × 2 × 2 × 2 × 3 × 3 × 3

= 864

2	18	36	32	27
2	9	18	16	27
2	9	9	8	27
2	9	9	4	27
2	9	9	2	27
3	9	9	1	27
3	3	3	1	9
3	1	1	1	3
	1	1	1	1

This can be written as

= 867 – 3

Hence, 867 is the smallest number which, when decreased by 3 is exactly divisible by the given numbers

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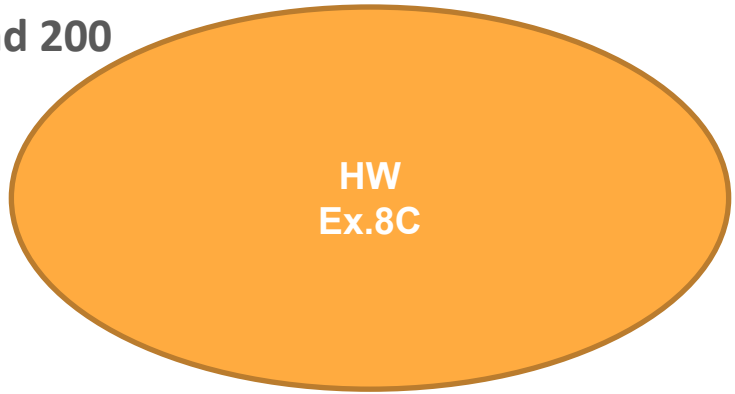
Additional Homework

1. Using any method, find the L.C.M. of the following:

(i) 18, 132 and 524

(ii) 120, 150 and 200



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