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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 : Introduction, Factors, Prime Numbers , Introduction to H.C.F
PERIOD NO: 1

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Learning outcomes

- Students will be able to find prime factors of a given number.
- Students will be able to find H.C.F of given pair of numbers .

H.C.F and L.C.M

- Students will Learn prime factorization and H.C.F with the help of a video.
- https://www.youtube.com/watch?v=7n5Qak9hnEU

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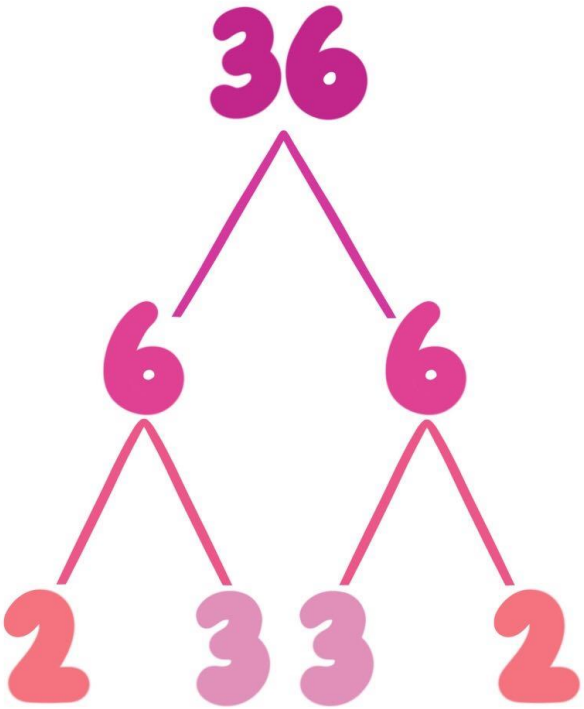
Factor Trees:

a way to find prime factorization



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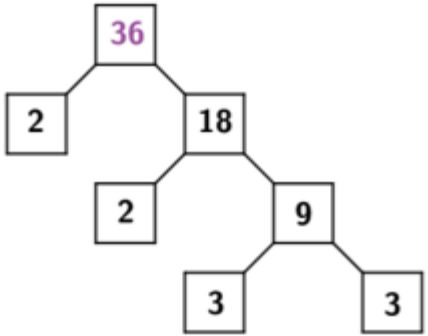
Prime Factorization

Using Factor Trees

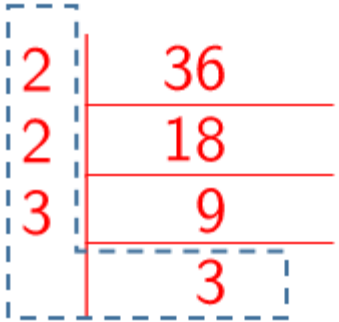
Find the prime factors of 36



36 = 2 x 2 x 3 x 3

Using Repeated Division

Find the prime factors of 36



36 = 2 x 2 x 3 x 3

Evaluation Question

1. Write all the factors of:

(i) 15 (ii) 55 (iii) 48 (iv) 36 (v) 84

2. Write all prime numbers:

(i) less than 25 (ii) between 15 and 35 (iii) between 8 and 76

3. Write the prime numbers from:

(i) 5 to 45 (ii) 2 to 32

(iii) 8 to 48 (iv) 9 to 59

Evaluation Question

1.Solution: (i) The factors of 15 are 1, 3, 5 and 15

∴ F(15) = 1, 3, 5 and 15

(ii) The factors of 55 are 1, 5, 11 and 55

∴F(55) = 1, 5, 11 and 55

(iii) The factors of 48 are 1, 2, 3, 4, 6, 8, 12, 16, 24 and 48

∴F (48) = 1, 2, 3, 4, 6, 8, 12, 16, 24 and 48

(iv) The factors of 36 are 1, 2, 3, 4, 6, 9, 12, 18 and 36

∴F (36) = 1, 2, 3, 4, 6, 9, 12, 18 and 36

(v) The factors of 84 are 1, 2, 3, 4, 6, 7, 12, 14, 21, 28, 42 and 84

∴ F (84) = 1, 2, 3, 4, 6, 7, 12, 14, 21, 28, 42 and 84

Evaluation Question

2.Solutions:

(i) 2, 3, 5, 7, 11, 13, 17, 19 and 23 are the prime numbers less than 25

(ii) 17, 19, 23, 29 and 31 are the prime numbers between 15 and 35

(iii) 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71 and 73 are the prime numbers between 8 and 76.

Evaluation Question

3.Solution:(i) The prime numbers from 5 to 45 are 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41 and 43

(ii) The prime numbers from 2 to 32 are 2, 3, 5, 7, 11, 13, 17, 19, 23, 29 and 31

(iii) The prime numbers from 8 to 48 are 11, 13, 17, 19, 23, 29, 31, 37, 41, 43 and 47

(iv) The prime numbers from 9 to 59 are 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53 and 59

4. Write the prime factors of:

(i) 16 (ii) 27 (iii) 35 (iv) 49

Evaluation Question

Solution:

i)Prime factors of 16 is 2

ii) Prime factorsof 27 is 3

2	16
2	8
2	4
2	2
	1

3	27
3	9
3	3
	1

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Evaluation Question

5. If P_n means prime factors of n, find:

(i) P_6 (ii) P_{24} (iii) P_{50} (iv) P_{42}

Solution:

(i) Prime factors of 6 are 2 and 3

(ii) Prime factors of 24 are 2 and3

(iii) Prime factors of 50 are 2 and 5

2	6
3	3
	1

2	24
2	12
2	6
3	3
	1

2	50
5	25
5	5
	1

Evaluation Question EXERCISE 8B

1. Using the common factor method, find the H.C.F. of:

(i) 16 and 35 **(ii) 25 and 20**

(iii) 27 and 75 **(iv) 8, 12 and 18** **(v) 24, 36, 45 and 60**

2. Using the prime factor method, find the H.C.F. of:

(i) 5 and 8 **(ii) 24 and 49**

Evaluation Question

1.(i) Common factors of 16 and 35 are as follows:

F (16) = 1, 2, 4, 8, 16

F (35) = 1, 5, 7, 35

The common factors between 16 and 35 = 1

∴The H.C.F. of 16 and 35 = 1

(ii) Common factors of 25 and 20 are as follows:

F (25) = 1, 5, 25

F (20) = 1, 2, 4, 5, 10, 20

The common factors between 25 and 20 = 1, 5

∴The H.C.F. of 25 and 20 = 5

Evaluation Question

(iii) Common factors between 27 and 75 are as follows:

F (27) = 1, 3, 9, 27

F (75) = 1, 3, 5, 15, 25, 75

The common factors between 27 and 75 = 1, 3

∴The H.C.F. of 27 and 75 = 3

(iv) Common factors between 8, 12 and 18 are as follows:

F (8) = 1, 2, 4, 8

F (12) = 1, 2, 3, 4, 6, 12

F (18) = 1, 2, 3, 6, 9, 18

Common factors between 8, 12 and 18 = 1, 2

- ∴The H.C.F. of 8, 12 and 18 = 2

Evaluation Question

(v) Common factors between 24, 36, 45 and 60 are as follows:

F (24) = 1, 2, 3, 4, 6, 8, 12, 24

F (36) = 1, 2, 3, 4, 6, 12, 18, 36

F (45) = 1, 3, 5, 9, 15, 45

F (60) = 1, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60

Common factors between 24, 36, 45, and 60 = 1, 3

∴The H.C.F. of 24, 36, 45 and 60 = 3

Evaluation Question

2.(i) The prime factors of 5 and 8 are as follows:

$P_5 = 5$

$P_8 = 2 \times 2 \times 2$

No common prime factors between 5 and 8

Hence, H.C.F. of 5 and 8 = 1

(ii) The prime factors of 24 and 49 are as follows:

$P_{24} = 2 \times 2 \times 2 \times 3$

$P_{49} = 7 \times 7$

No common prime factors between 24 and 49

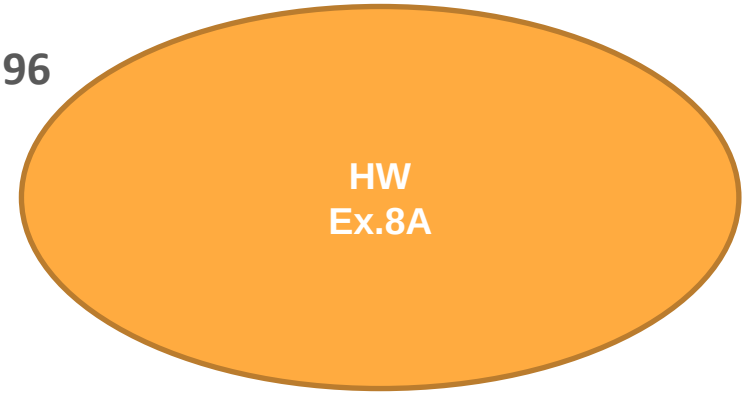
Hence, H.C.F. of 24 and 49 = 1

Additional Homework

1. Use a method of your own choice to find the H.C.F. of:

(i) 45, 75 and 135

(ii) 48, 36 and 96



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