

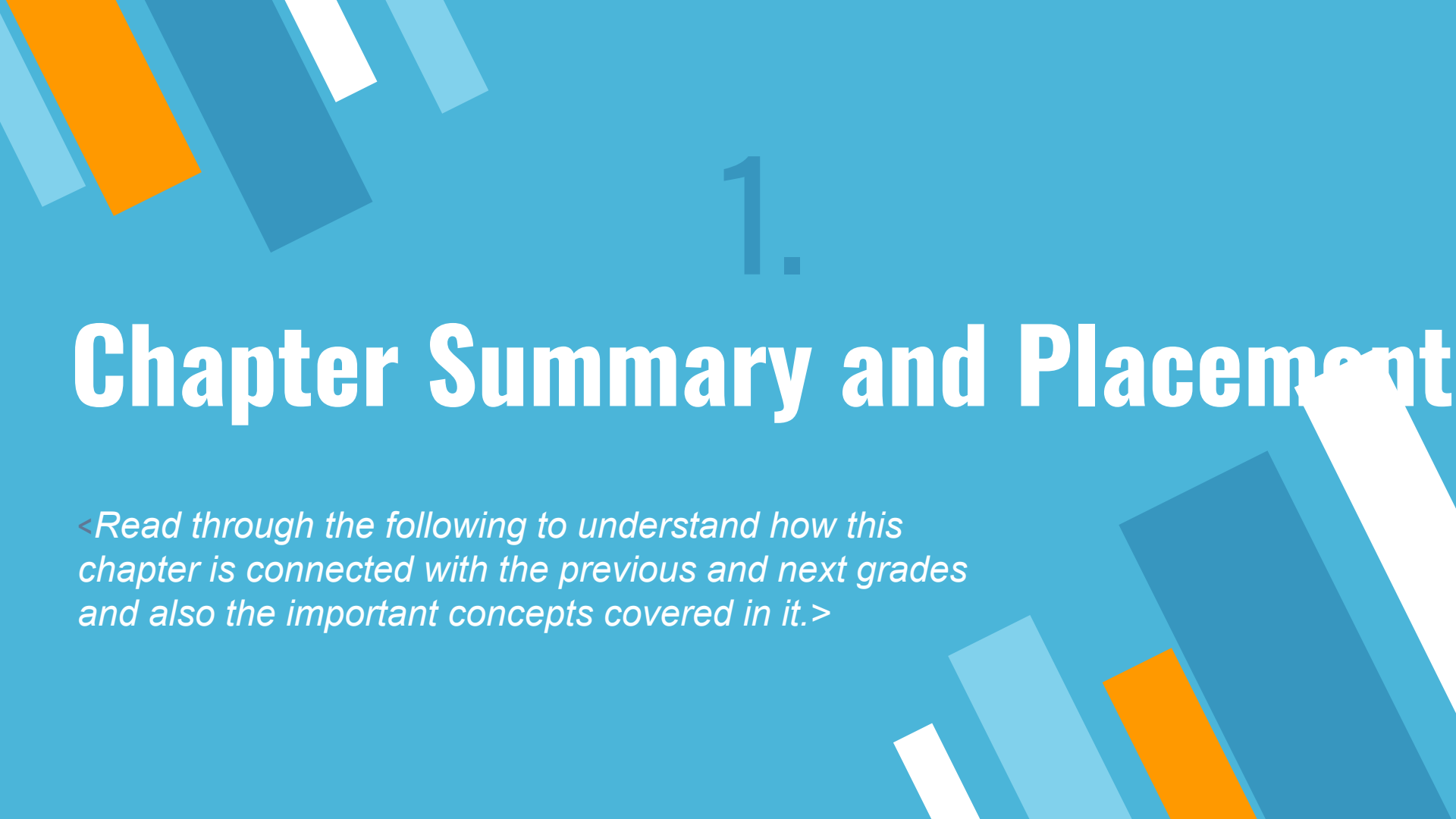


CHAPTER: Playing With Numbers

Grade: 9

Board: **CBSE**

Book: **NCERT**



1.

Chapter Summary and Placement

<Read through the following to understand how this chapter is connected with the previous and next grades and also the important concepts covered in it.>

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1. The concept of HCF and LCM has already been introduced to the students in Grade 5.
 2. Applications of LCM and HCF dealt at this level connect to future grades whenever and wherever LCM and HCF will be used for carrying out complex calculations and oper



2.

LEARNING OUTCOMES

<On completion of the chapter, students will be able to:>



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- 
1. Define Factors and multiples, Identify factors and multiples of the given number
 2. Define Prime and composite numbers, Co prime and twin primes
 3. Define divisibility test and restate divisibility tests for 2, 3, 4, 5, 6, 8, 9 and 10.
 4. Identify Common factors and common multiples of the given number.
 5. Extends rules of divisibility
 6. Prime factorise the given number
 7. Determine highest common factor (HCF) and least common multiple(LCM) of the given numbers
 8. Apply HCF and LCM to solve problems



3. Keywords

Definitions of some terms used in the chapter



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- 
1. Twin primes: Two consecutive primes whose difference is 2 are called twin primes. Eg.: 5 and 7, 11 and 13, 17 and 19.



4. TEACHING PLAN

Follow this section for getting ideas on teaching the content covered in the chapter. The subtopic given in the first column with the matching learning outcome can be explained using instructions and resources listed subsequently



Subtopic and Learning Objective #1

Subtopic: Factors and multiples

LO:

Define Factors and multiples, Identify factors and multiples of the given number

1. To make the student understand definition of factor and multiple of a number

2.To make the student to find factors and multiples of the number

Teacher Activity

1. Introduce the definition of factor and multiple of a number, conclusions about factor and multiple as given in NCERT text book

Worksheet 1 can be used as reinforcement to the topic

2. Introduce methods of finding factors and multiples of a number

Check for understanding:

- a) _____ is a factor of every number
- b) Number of factors of a number is _____
- c) Number of multiples of a number is _____
- d) Every number is factor and multiple of _____
- e) Multiples are greater than equal to the given number where as factor of a number is _____ the given number
- f) List out factors and multiples of the given number[Number can be teachers choice]

Resources Suggested

Blackboard, pen and paper

Subtopic and Learning Objective #2

Sub topic: Prime and composite

LO:

Define Prime and composite numbers, Co prime and twin primes

1. To make student to understand prime and composite numbers
2. To make the student understand co primes and twin primes

Teacher Activity

1. Introduce definitions of prime and composite numbers and method to identify whether the given number is prime or not.
2. Introduce the definitions of Co primes and twin primes.
[Explain with examples that co primes need not be always primes but twin primes must and should be primes]

Sieve of eratosthenes[Activity given in detail in NCERT text book] can be done in the class to find primes between 1 to 100

Check for understanding:

- a) How many primes are there between 30 and 40
- b) Factors of primes are _____ and _____
- c) _____ is neither prime nor composite
- d) Give two examples each for co primes and twin primes

Resources Suggested

Blackboard, pen and paper

Subtopic and Learning Objective #3

Sub topic: Divisibility test

LO:

Define divisibility test and restate divisibility tests for 2, 3, 4, 5, 6, 8, 9 and 10

1. To make student state divisibility tests

LO:

Extends rules of divisibility

2. To make the student understand the divisibility rules can be extended for other numbers

Teacher Activity

1. Introduce divisibility tests with enough number of examples. Need to give enough practice by making the students re read the rules again and again, since this topic has high importance in future classes
2. Introduce few more rules of divisibility of numbers as given in NCERT text book

Check for understanding:

- a) Check whether the given number is divisible by_____ or not[Numbers can be of teachers choice]
- b) If a number to be divisible by 6 if and only if it is divisible by _____ and _____
- c) If a number is divisible by 8 then it is definitely divisible by _____ and _____[ans: 2 and 4]
- d) State the divisibility test of 11.

Resources Suggested

Blackboard, pen and paper

Subtopic and Learning Objective #4

Sub topic: Common factor and common multiple

LO:

Identify Common factors and common multiples of the given number.

1. To make student identify common factors and common multiples

Teacher Activity

1. Introduce the method of finding common factors and common multiples

Perform Activity 1 to understand common factors and common multiples well

Check for understanding:

- a) Write the common factors of given numbers[Numbers can be of teachers choice]
- b) Write any three common multiples of given numbers[numbers can be of teachers choice]
- c) Are common multiples of two or more numbers finite?
- d) Are common factors of two or more numbers finite?

Resources Suggested

Blackboard, pen and paper

Activity 1

Name of the activity-Common factors and multiples

Type of activity – Group/Individual

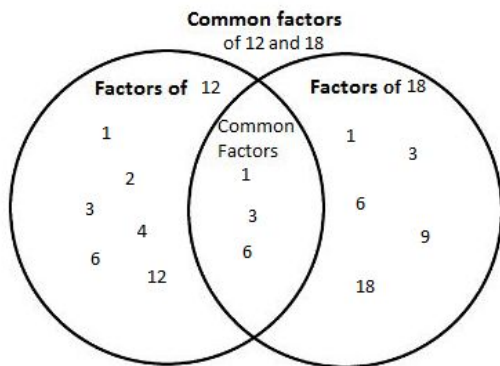
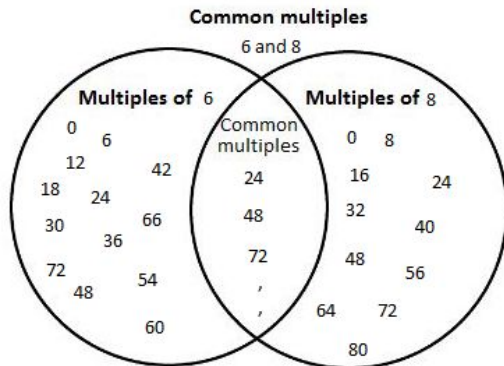
Use it for – practice/test

Materials – resource 2 and 3

Procedure –

Instructions to the teachers:

1. Give **resource sheet 2 and 3** either by printing or drawing on the blackboard.
 2. Give a set of numbers to each student to write common factors and multiples in the given format.
- See the Example below for numbers 12 and 18. *Not to be shared with students*



Subtopic and Learning Objective #5

Prime factorisation

LO:

Prime factorise the given number

1.To make the student to write prime factorisation of the number

Teacher Activity

1. Introduce the method of writing prime factorisation. First introduce with tree method and then short division method

Check for understanding:

- a) Write the prime factorisation of given number[Number can be of teachers choice]
- b) Write the factor tree of given number[Number can be of teachers choice]

Resources Suggested

Blackboard, pen and paper

Subtopic and Learning Objective #6

Sub topic: HCF and LCM

LO:

Determine highest common factor (HCF) and least common multiple(LCM) of the given numbers

1.To make the student to determine HCF and LCM of given numbers

Teacher Activity

1. Introduce the different methods of finding HCF and LCM[prime factorisation method, short division method, Long division method (HCF)]

Check for understanding:

- a) Find HCF of given numbers by using factorisation method and cross check with long division method/ short division method [Numbers can be of teachers choice]
- b) Find LCM of given numbers by factorisation method and cross check with short division method[Numbers can be of teachers choice]

Resources Suggested

Blackboard, pen and paper **Resource 1** can be used for better explanation of HCF

Subtopic and Learning Objective #7

Sub topic: Applications of HCF and LCM

LO:

Applies HCF and LCM to solve problems

1.To make student to solve problems basing on application of HCF and LCM

Teacher Activity

1. Introduce the key words that can help student to find out which concept to be apply

Like maximum, greatest, largest- HCF.

Least, smallest, minimum, next- LCM and

please make a note that these keywords can't work with the problems of model

a) Find greatest 6 digit number which is exactly divisible by 24, 15, 36. Hint: Though the key word is greatest the concept to be used is LCM

b) Determine the two numbers nearest to smallest 5 digit number which are exactly divisible by 2, 3, 4, 5, 6 and 7. Hint: Concept to be used is LCM

2. Introduce method to find solution of model involving HCF and LCM with remainder

Worksheet: 5 only questions can be used to assess what concept to be used for solving problem while actual solutions can be done later as home task

Check for understanding:

- a) Two tankers contain 850 liters and 680 liters of petrol respectively. Find the **maximum** capacity of the container which can measure the petrol of both the tankers in exact number of times
- b) Find the **greatest** number that divides 2053 and 967 and leaves the remainder of 5 and 7 respectively
- c) The students in a class can be divided into groups of 2, 3, 5 and 6. What is the **least** number of children that this class can have?
- d) Find the **least** number which when divided by 16, 28, 40, 77 leaving the remainder 8 in each case

Resources Suggested

Blackboard, pen and paper **Resource 1** can be used for better explanation of HCF

Resource 1

Step 1. Take any two numbers say 24 and 16.

Step 2. Cut out a strip of length 24 units using green colour grid paper

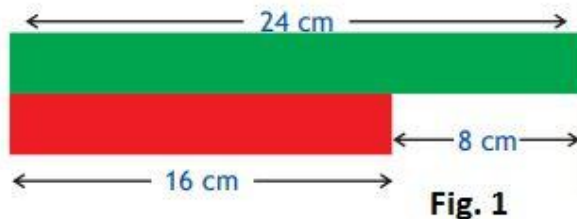
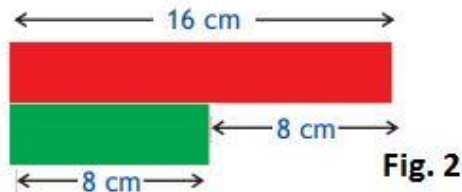
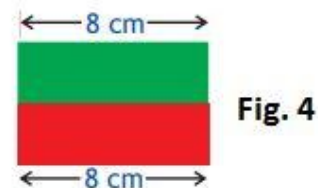
Step 3. Cut out another strip of length 16 units using red colour grid paper

Step 4. Place the red strip along the green strip as shown in the Fig. 1 and cut out the remaining part of the green strip.

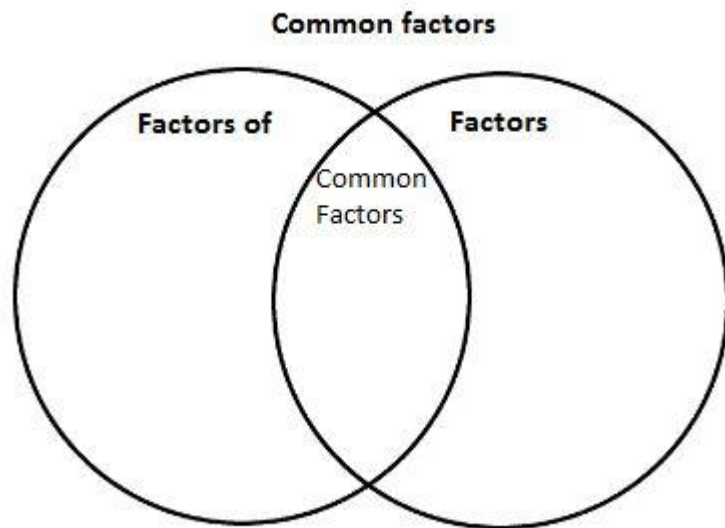
Step 5. Observe that the remaining part of green strip cut out is of length 8 units and is smaller than the red colour strip i.e. the strip of length 16 units.

Step 6. Now place the smaller cut out strip (green) along the larger cut out strip (red) and cut out the extra part (red strip) as shown in Fig. 2

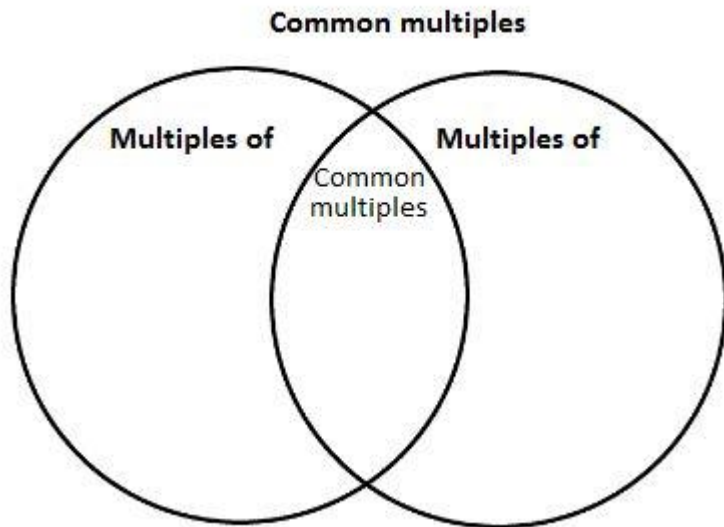
Step 7. Repeat the activity till both strips are equal.



Resource 2



Resource 3





5. WORKSHEETS

Print or copy the worksheet questions on the blackboard and ask the students to attempt them. They can be given as homework or a class test as well.

Worksheet 1

Use it like: test after the chapter is complete, homework

Answer the following:

1. A number which has more than 2 factors is called as _____
2. Every number is _____ and _____ to itself
3. _____ is factor to all numbers
4. _____ is multiple of all numbers
5. The product of two numbers is always _____
6. Every _____ of a given number is less than or equal to the given number
7. Every _____ of a given number is greater than or equal to the given number
8. Number of factors of a number is _____
9. Number of multiples of a number is _____

Worksheet 2

Use it like: test after the chapter is complete, homework

Answer the following:

1. Number of even primes is _____
2. A number that is neither prime nor composite is _____
3. Number of primes is _____
4. _____ is an example for even prime number
5. Smallest odd composite number is _____
6. All primes are odd [true / False]
7. Co primes must and should be primes[true/false]
8. Twin primes need not be primes always[true/false]

Worksheet 3

Use it like: test after the chapter is complete, homework

Answer the following:

1. A number is divisible by 4 if the number formed by the last _____ digits of the number is divisible by _____
2. A number is divisible by _____ if it is divisible by both 2 and 3
3. A number is divisible by _____ if its ones digit is 0 or 5
4. A number is divisible by 9 if the sum of the digits is divisible by _____
5. If a number is divisible by both 3 and 5 it is definitely divisible by _____
6. A number is divisible by _____ if the number formed by last 3 digits is divisible by _____
7. A number is divisible by 2 if the number has _____ in units place
8. A number is divisible by 3 if _____
9. A number is divisible by 11 if _____
10. Check whether 9020814 is divisible by 2,3,4,5,6,8,9,10, and 11

Worksheet 4

Use it like: test after the chapter is complete, homework

Answer the following:

1. Write the factors of 18
2. Write the multiples of 15
3. Prime factorise 234
4. Write common factors of 16 and 18
5. Write common multiples of 12 and 15

Worksheet 5

Answer the following:

1. The length, breadth and height of a room are 8m 25cm, 6m 75cm and 4m 50 cm respectively, determine the longest tape which can measure the three dimensions of the room exactly
2. In a school there are two sections of class VI. There are 32 students in one section and 36 in another section. Find the minimum number of books for their class library so that they can be distributed equally
3. Asha has three rolls of streamers to use in decorating school gym for a dance competition. The red roll is 42 m long, yellow roll is 49 m long and blue roll is 63 m long. She wants to cut the strips of equal length so that each material has no left over. What is the greatest length of the strip?
4. In a morning walk three persons step off together. Their steps measure 80 m, 85 cm, and 90 cm. What is the minimum distance each should walk so that they can cover equal distances in complete steps?
5. Sam and Reena are making sandwiches for the picnic party. If they have 63 tomato slices, 84 cheese slices, 126 cucumber slices. What is the greatest number of sandwiches they can make if each sandwich has the same filling?
6. Telegraph poles occur at equal distances of 220m along a road and heaps of stones are put at equal distances of 300m along the same road. The first heap is at the foot of the first pole. How far from it along the road the next heap which lies at the foot of the pole?
7. Three different tankers contain 496 litres, 403 liters and 713 litres of milk. Find the maximum capacity of the container that can measure the milk of any tanker exact number of times ?
8. Two bills of Rs 6075 and Rs 8505 are to be paid by cheques of same amount. What will be the largest possible amount of each cheque?



6. SOLUTIONS

This section gives you sample answers for activities and questions listed above.



Worksheet 1

Worksheet 1:

1. Composite
2. Factor, multiple
3. 1
4. 0
5. Composite
6. Factor
7. Multiple
8. Finite
9. infinite

Worksheet 2

1. One
2. 1
3. Infinite
4. 2
5. 9
6. False
7. False
8. false

Worksheet 3

1. 2, 4
2. 6
3. 5
4. 9
5. 15
6. 8,8
7. 0,2,4,6,8
8. Sum of the digits is divisible by 3
9. If the difference of sum of digits in odd places and sum of digits in even places is multiple of 11
10. 9020814
 - Divisible by 2 as units digit is 4
 - Divisible by 3 as sum of the digits is 24 which is divisible by 3
 - Not divisible by 4 as the number formed by last two digits 14 is not divisible by 4
 - Not divisible by 5 as units place is not 0 or 5

Worksheet 3

Divisible by 6 as it is divisible by both 2 and 3

Not divisible by 8 as the number formed by last three digits 814 is not divisible by 8

Not divisible by 3 as sum of the digits is 24 which is not divisible by 9

Not divisible by 10 as units place is not 0

Divisible by 11 as difference of sum of digits in odd places[23] and sum of digits in even places[1]

is 22 which is multiple of 11

Worksheet 4

1. 1,2,3,6,9,18
2. 0,15,30,45,60,75,90,105.....
3. $2 \times 3 \times 3 \times 13$
4. 1, 2
5. 60,120,180,240.....

Worksheet 5

1. 75 cm[HCF]
2. 288 books[LCM]
3. 7m[HCF]
4. 122 m 40 cm [LCM]
5. 21[HCF]
6. 3300m[LCM]
7. 31 litres[HCF]
8. Rs 1215[HCF]



7. EXTRA RESOURCES

Carry out the following suggested activities/ tasks if you have the time and resources to do them



Teacher can use these videos if time and facilities permit:

1. <https://www.youtube.com/watch?v=ZpAovCXN9l4-> shortcut to find hcf [can be used to cross checking]
2. <https://www.youtube.com/watch?v=uL6L74o-buw-> shortcut to find lcm [can be used to cross checking]