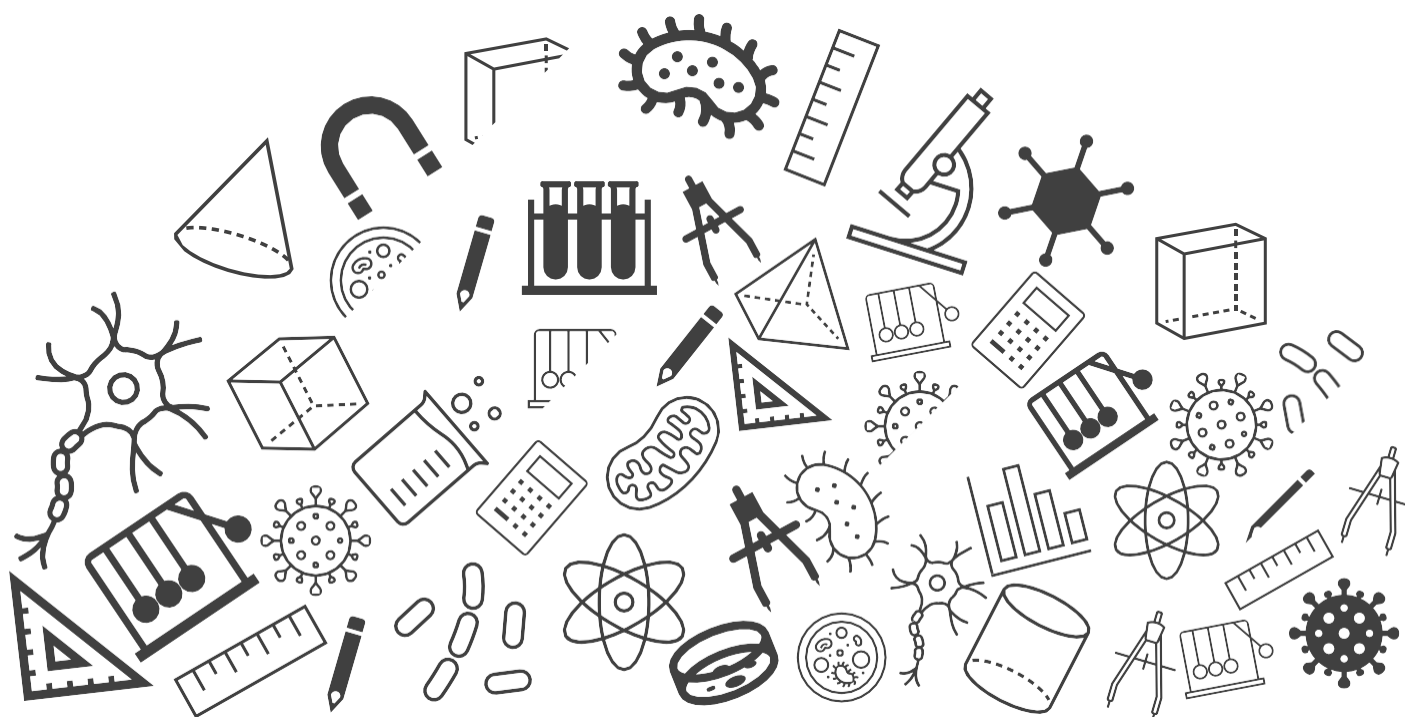




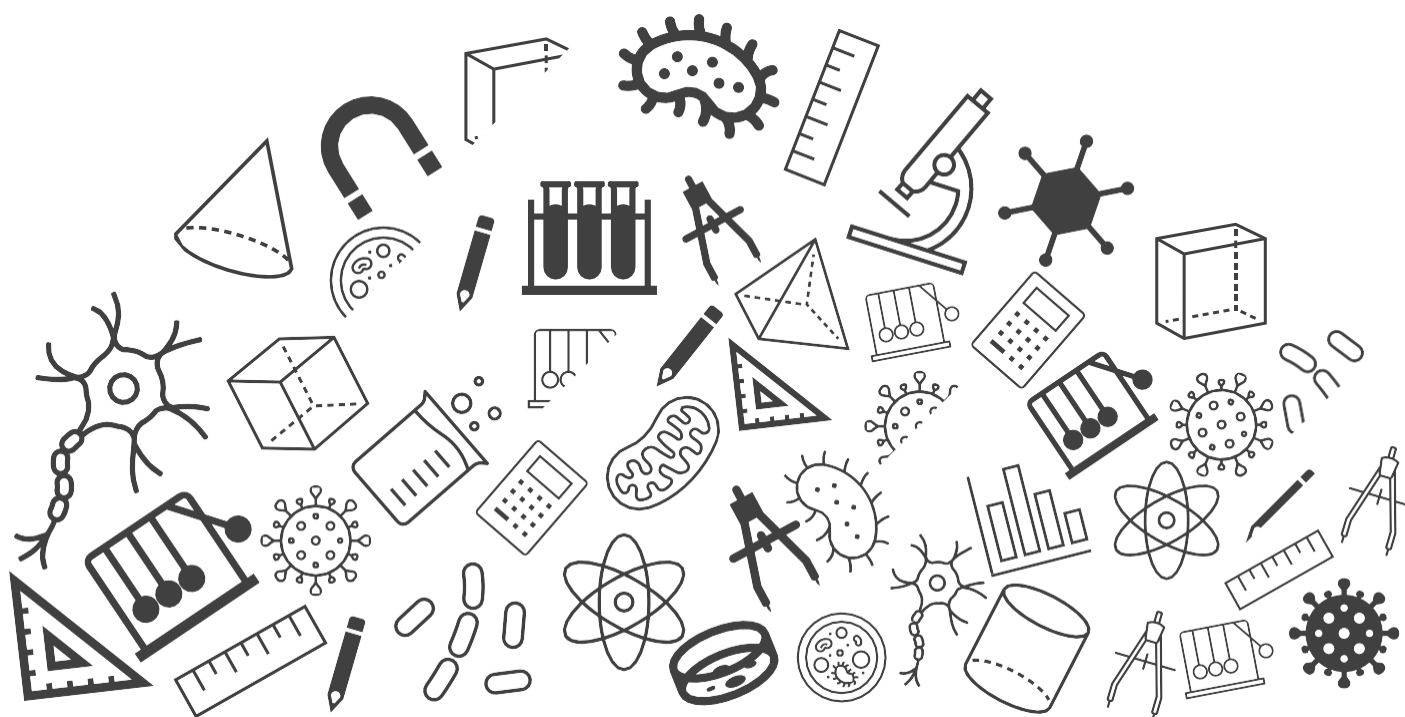
Grade 06: Maths

Exam Important Questions





Playing With Numbers



Playing with Numbers

1. 37 students are standing in a row. Every 4th student is wearing a cap. Every 5th student is wearing a coat. Which students in the row will be wearing both a cap and a coat? [3 marks]

Every 4th student is wearing cap i.e. it is divisible by 4. [0.5 marks]

And every 5th is wearing a coat. i.e. it is divisible by 5. [0.5 marks]

So, if we want to find out which student is wearing both cap and coat, we need to find the LCM of 4 and 5. [0.5 marks]

LCM of 4 and 5 = $4 \times 5 = 20$. Since they are co-prime numbers, their LCM will be the product of these numbers. [1 marks]

So, 20th student in a row will be wearing both a cap and a coat. [0.5 marks]

2. Find the greatest three digit number and the smallest four-digit which is exactly divisible by the numbers 84 and 112. [4 marks]

We know, $84 = 2 \times 2 \times 3 \times 7$

and, $112 = 2 \times 2 \times 2 \times 2 \times 7$

$\text{LCM}(84, 112) = 2 \times 2 \times 2 \times 2 \times 3 \times 7 = 336$

[1 mark]

Every integral multiple of the LCM of two given numbers is divisible by the given numbers.

Let the greatest three digit number be $336 \times \#$.

For the greatest 3-digits number,

$336 \times \# < 1000$

$\Rightarrow \# < 3$

$\Rightarrow \# = 2$

[1.5 marks]

The greatest three digit number be:

$336 \times \# = 336 \times 2 = 672$

[0.5 mark]

If $\# = 3$, the multiple would have become 1008, which in that case would have been the smallest 4 digit number divisible by 84 and 112.

[1 mark]

Playing with Numbers

3. 105 goats, 140 donkeys and 175 cows have to be taken across a river. There is only one boat which will have to make many trips in order to do so. The lazy boatman has his own conditions for transporting them. He insists that he will take the same number of animals in every trip and they have to be of the same kind. He will naturally like to take the largest possible number each time. Can you tell how many animals went in each trip?

[2 marks]

In order to find the largest possible number of animals
= HCF of 105, 140 and 175

So prime factorization is

$$105 = 3 \times 5 \times 7$$

$$140 = 2 \times 2 \times 5 \times 7$$

$$175 = 5 \times 5 \times 7$$

We get HCF of 105, 140 and 175 = $5 \times 7 = 35$

Therefore, 35 animals went in each trip.

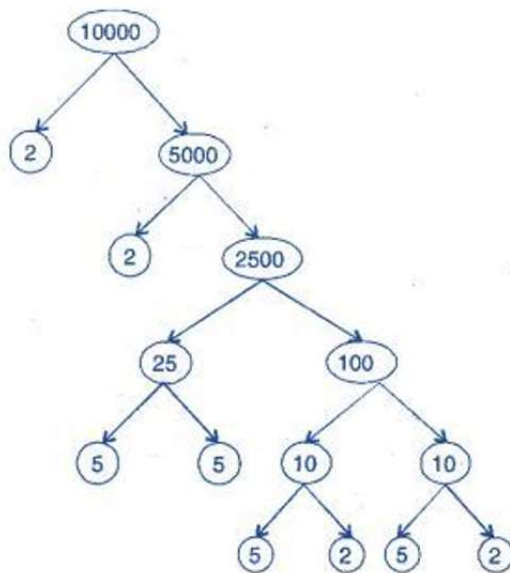
[2 marks]

Playing with Numbers

4. Write the smallest 5-digit number and express it in terms of its prime factors.
[4 marks]

The smallest five digit number is 10000.
[0.5 mark]

The factor tree of 10000:



[2.5 marks]

The prime factors of 10000 are $2 \times 2 \times 2 \times 2 \times 5 \times 5 \times 5 \times 5$.
[1 mark]

5. Express the given number as the sum of three odd primes: 53
[3 marks]

To obtain an odd number like 21, the possible combinations are : odd + odd + odd = odd
even + even + odd = odd
[1 mark]

Our second case fails because we only have 2 as an even prime number.
So, the only case is : odd + odd + odd = odd

Clearly, $13 + 17 + 23 = 53$
Here 13, 17, and 23 are odd prime numbers.
[2 marks]

Playing with Numbers

6. A 3-digit number $4a3$ is added to another 3-digit number 984 to give a 4-digit number $13b7$, which is divisible by 11 . Find $(a+b)$.

[5 marks]

Consider $13b7$. It is divisible by 11 .

To make a number divisible by 11 , the difference between the sum of digits at odd places and even places should be 0 or multiple of 11 .

[1 mark]

Considering the difference 0 : The sum of digits at odd places is equal to the sum of digits at even places.

\Rightarrow Sum of digits at even places = Sum of digits at odd place

$$\Rightarrow 3 + 7 = 1 + b$$

$$\Rightarrow b = 9$$

Therefore, the number is 1397 .

[2 marks]

$$\text{Now, } 4a3 + 984 = 1397$$

$$\Rightarrow 4a3 = 1397 - 984$$

$$\Rightarrow 4a3 = 413$$

Comparing the place values, $a = 1$

$$\text{So, } a + b = 9 + 1 = 10$$

[2 marks]

Playing with Numbers

7. What is the largest number that divides 626, 3127 and 15628 and leaves remainders of 1, 2 and 3 respectively?
[3 marks]

In order to find the largest number which divides 626, 3127 and 15628 leaving remainders 1, 2 and 3, We get

$$626 - 1 = 625$$

$$3127 - 2 = 3125$$

$$15628 - 3 = 15625$$

[1 mark]

So, the required number = HCF of 625, 3125 and 15625

By resolving the required number into prime factors we get

$$625 = 5 \times 5 \times 5 \times 5$$

$$3125 = 5 \times 5 \times 5 \times 5 \times 5$$

$$15625 = 5 \times 5 \times 5 \times 5 \times 5 \times 5$$

[1 mark]

So, the HCF of 625, 3125 and 15625 = $5 \times 5 \times 5 \times 5 = 625$

Therefore, the largest number that divides 626, 3127 and 15628 and leaves remainders 1, 2 and 3 is 625.

[1 mark]

Playing with Numbers

8. Find the LCM of the following numbers:

a) 12, 48

b) 9, 45

[4 marks]

The least common multiple (LCM) of 2 or more numbers is the smallest number that they all divide evenly.

a) 12, 48

2	12, 48
2	6, 24
2	3, 12
2	3, 6
3	3, 3
	1, 1

[1.5 marks]

L.C.M of 12 and 48

$$= 2 \times 2 \times 2 \times 2 \times 3$$

$$= 48$$

[0.5 mark]

b) 9, 45

3	9, 45
3	3, 15
5	1, 5
	1, 1

[1.5 marks]

L.C.M. of 9 and 45

$$= 3 \times 3 \times 5$$

$$= 45$$

[0.5 mark]

Note: We can conclude that if the smallest number is the factor of the largest number, then the LCM of two numbers is equal to that of the larger number.