Computation Operations

2.1 ADDITION

The result of numbers added together in addition operation is called sum. The numbers to be added in an addition are called addends.

For example :

$$
\begin{array}{r}
5\ 4\ 3\ 2\ 1\ 8\ 6 \quad \rightarrow \quad \text{Addend} \\
+\ 2\ 3\ 0\ 1\ 2\ 1\ 3 \quad \rightarrow \quad \text{Addend} \\
\hline
7\ 7\ 3\ 3\ 3\ 9\ 9 \quad \rightarrow \quad \text{Sum}
\end{array}
$$

Properties of Addition

1. Numbers (addends) can be added in any order, the sum does not change.
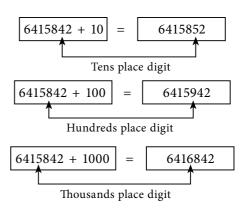
   | 2143287 + 3215894 | = | 5359181 | = | 3215894 + 2143287 |

2. When three or more numbers are added, the sum remains same, even if the order of addends is changed.

   (32141623 + 1038714) + 7124803 = 40305140
   32141623 + (1038714 + 7124803) = 40305140   Same

3. When zero is added to a number, the sum is the number itself.

   4216854 + 0 = 4216854   Same

4. Addition of 1 to a number gives the successor of the number.

   2516835 + 1 = 2516836
   Successor of 2516835

5. Addition of 10, 100 and 1000 to a number increases the value of digit at tens, hundreds and thousands place by 1 respectively.

6415842 + 10 = 6415852
Tens place digit

6415842 + 100 = 6415942
Hundreds place digit

6415842 + 1000 = 6416842
Thousands place digit

2.2 SUBTRACTION

The number from which another number is subtracted is called minuend. The number that is to be subtracted is called subtrahend. The result obtained from subtraction is called difference.
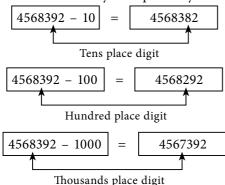
For example :

$$
\begin{array}{r}
7\ 2\ 5\ 6\ 8\ 5\ 4 \quad \rightarrow \quad \text{Minuend} \\
-\ 5\ 2\ 4\ 3\ 5\ 3\ 2 \quad \rightarrow \quad \text{Subtrahend} \\
\hline
2\ 0\ 1\ 3\ 3\ 2\ 2 \quad \rightarrow \quad \text{Difference}
\end{array}
$$

Properties of Subtraction

1. When 0 is subtracted from a number, the difference is the number itself.

   7256892 − 0 = 7256892   Same

2. When minuend is equal to the subtrahend, the difference is zero.

   8253451 − 8253451 = 0

3. When 1 is subtracted from a number, the difference is the predecessor of the number.

$$\boxed{5498765 - 1} = \boxed{5498764}$$

Predecessor of 5498765

4. When 10, 100 and 1000 are subtracted from a number, then digit at tens, hundreds and thousands place are decreased by 1 respectively.

$$\boxed{4568392 - 10} = \boxed{4568382}$$

Tens place digit

$$\boxed{4568392 - 100} = \boxed{4568292}$$

Hundred place digit

$$\boxed{4568392 - 1000} = \boxed{4567392}$$

Thousands place digit

2.3 ESTIMATING THE SUM AND DIFFERENCE

Estimation is the process of finding an approximate value. We use the concept of rounding off to estimate numbers.

For example : If the population of village *A* is 75396 and that of village *B* is 45256, then

Total population when rounded off to nearest 100 gives = 75400 + 45300 = 120700.

Difference of population when rounded off to nearest 1000 gives = 75000 – 45000 = 30000.

2.4 MULTIPLICATION

We have already studied multiplication in earlier classes. In the same way, we multiply the large numbers by 1, 2, 3 or 4-digit numbers.

Properties of Multiplication

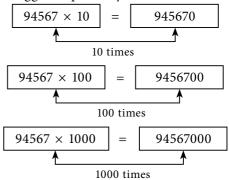1. The product of any number with 1 results the number itself.

$$\boxed{4235698 \times 1} = \boxed{4235698}$$

Same

2. The product of any number with 0 is 0.

$$\boxed{5269841 \times 0} = \boxed{0}$$

3. If the order of numbers is changed, the product will remains same.

$$\boxed{145 \times 46812} = \boxed{6787740} = \boxed{46812 \times 145}$$

4. If two or more numbers are multiplied together, then the product will remains same even if numbers are grouped in any order.

$$\boxed{(1205 \times 15) \times 112} = \boxed{2024400}$$

$$\boxed{1205 \times (15 \times 112)} = \boxed{2024400}$$

Same

5. Multiplication of a number by 10, 100 and 1000 makes the product 10 times, 100 times and 1000 times bigger respectively.

$$\boxed{94567 \times 10} = \boxed{945670}$$

10 times

$$\boxed{94567 \times 100} = \boxed{9456700}$$

100 times

$$\boxed{94567 \times 1000} = \boxed{94567000}$$

1000 times

2.5 DIVISION

We have already studied division in earlier classes. In the same way, we divide the large numbers by 1, 2 or 3-digit numbers.

Properties of Division

1. When a number is divided by 1, the quotient is the number (dividend) itself.

$$\boxed{652416 \div 1} = \boxed{652416}$$

Same

💡 *Olympiad Bite*

Division by zero is not defined.

2. When zero is divided by any number, the quotient is zero.

$$\boxed{0 \div 521689} = \boxed{0}$$

3. When a number is divided by itself, the quotient is 1.

$$\boxed{750423 \div 750423} = \boxed{1}$$

2.6 ESTIMATING THE MULTIPLICATION AND DIVISION

Let us learn estimating the multiplication and division with the help of an example.

For example :

➤ Mansi bought 102 boxes of shirts. Each box contains 85 shirts. Find the total estimated number of shirts she had.

Estimated number of shirts

= 100 × 90 = 9000

➤ Rohan bought 503 cricket bats and pays ₹ 43450. Find the estimated cost of each bat. (Estimate to nearest thousands).

Estimated cost of one bat

= ₹(40000 ÷ 500) = ₹ 80

2.7 FACTORS AND MULTIPLES

Factors

The numbers that are multiplied to find a product are called its factors.

Factors of 6 are 1, 2, 3 and 6.

Factors of 15 are 1, 3, 5 and 15.

Properties of Factor

1. 1 is the factor of every number and is also the smallest factor of every number.

2. Greatest factor of a number is the number itself.

3. Every factor of a number is less than or equal to the number.

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Every number has atleast two factors : 1 and the number itself.

Prime Numbers and Composite Numbers

➤ The numbers have only two factors, 1 and the number itself are called prime numbers.

2, 3, 5, 7, 11, 13, ... are prime numbers.

➤ The numbers having more than two factors are called composite numbers.

4, 6, 8, 9, ... are composite numbers.

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• 1 is neither a prime number nor a composite number.

• 2 is the smallest and only even prime number.

Highest Common Factor (H.C.F.)

The greatest number that divides both the numbers without leaving any remainder is the H.C.F. of the numbers.

For example :

Factors of 12 are 1, 2, 3, 4, 6 and 12.

Factors of 18 are 1, 2, 3, 6, 9 and 18.

The common factors of 12 and 18 are 1, 2, 3 and 6. The highest common factor of 12 and 18 is 6.

So, H.C.F. (12, 18) = 6.

Using Prime Factorisation Method

2	12
2	6
3	3
	1

2	18
3	9
3	3
	1

Here, common prime factors of above two numbers are 2 and 3.

So, H.C.F. (12, 18) = 2 × 3 = 6

💡 *Olympiad Bite*

The H.C.F. of given numbers cannot be greater than any of the given numbers.

Multiples

A multiple is any number which is the product of the number and any counting number.

For example : Multiples of 5 are 5 × 1, 5 × 2, 5 × 3, ...

i.e., 5, 10, 15, ...

Properties of Multiples

1. Every number is a multiple of itself.
2. Smallest multiple of a number is the number itself.
3. There is no largest multiple of a number.
4. Every number is a multiple of 1.

💡 *Olympiad Bite*

We can find infinitely many multiples for any given number.

Least Common Multiple (L.C.M.)

The L.C.M. of two or more numbers is the smallest number that can be divided by those numbers without leaving a remainder.

For example :

Multiples of 5 are 5, 10, 15, 20, 25, 30, ...

Multiples of 6 are 6, 12, 18, 24, 30, ...

Here, smallest (least) common multiple of 5 and 6 is 30.

So, L.C.M. (5, 6) = 30

Using Prime Factorisation Method L.C.M. of 14 and 12

2	14		2	12
7	7		2	6
	1		3	3
				1

So, L.C.M. (12, 14) = 2 × 2 × 7 × 3 = 84

💡 *Olympiad Bite*

- L.C.M of two numbers is always greater than or equal to one of the numbers.
- H.C.F. × L.C.M. = Product of two numbers.

SELF TEST - 2

1. Find the common factors of 75 and 90.

(A) 1, 3 and 5   (B) 1, 5 and 15

(C) 1, 3, 5 and 15   (D) 5, 3 and 15

2. _____ is the smallest prime number.

(A) 1   (B) 2

(C) 3   (D) 4

3. Numbers which have more than two factors are called _____ numbers.

(A) Composite   (B) Prime

(C) Ordinal   (D) None of these

4. H.C.F. of 140 and 200 is _____.

(A) 5   (B) 10

(C) 7   (D) 20

5. L.C.M. of 45 and 105 is _____.

(A) 45   (B) 105

(C) 315   (D) 405

EXERCISE

1. Find the H.C.F. of 145 and 245.

(A) 8   (B) 6

(C) 5   (D) 49

2. Sum of greatest and smallest factor of 1728 is

(A) 1728   (B) 1729

(C) 1800   (D) 4230

3. Find the greatest number which divides 30 and 45 leaving no remainder in each case.

(A) 15   (B) 18

(C) 10   (D) 5

4. Find the sum of the smallest 7-digit number and the greatest 6-digit number formed by using digits 5, 6, 3, 4 and 1 (each digit must be used atleast once).

(A) 2356   (B) 1245689

(C) 1778879   (D) 1778887

5. The quotient when 260820 is divided by 36 is _____.

(A) 7354   (B) 6245

(C) 7245   (D) 7562

6. Subtract 3rd multiple of 40 from the 5th multiple of 46 gives _____.

(A) 80   (B) 110

(C) 150   (D) 75

7. Find the number of prime factors of 240.

(A) 3   (B) 4

(C) 2   (D) 5

8. What will you get, if you divide smallest 8-digit number by 125?

(A) 80000   (B) 8000

(C) 10000   (D) 1000

9. Which of the following is prime?

(A) 41   (B) 85

(C) 74   (D) 95

10. The population of a city is 1045693. Out of these 532564 are males. How many females are there?

(A) 612710   (B) 412568

(C) 513129   (D) None of these

11. There are _____ prime numbers between 20 and 85.

(A) 10   (B) 15

(C) 12   (D) 18

12. Find the estimated sum of 200534 and 345126 by rounding off each to the nearest hundreds.

(A) 640600   (B) 545600

(C) 545700   (D) 540700

13. Subtract the sum of 2456837 and 2568398 from 6897252.

(A) 1792054   (B) 1652092

(C) 2384071   (D) 1872017

14. Nikita had ₹ 105689 in her account. She withdraws ₹ 5689 on one day and deposit ₹ 8569 on other day. How much money in her account now?

(A) ₹ 156870   (B) ₹ 120682

(C) ₹ 108569   (D) ₹ 96280

15. An NGO involves distributing of 925920 books for poor children in 45 cities equally. How many books will be distributed in each city?

(A) 30526   (B) 14059

(C) 20224   (D) 20576

16. What must be added to 3412058 to get 10 millions?

(A) 6587942   (B) 6578592

(C) 5678924   (D) 6587402

17. Which of the following are the multiples of 4 and 9?

(A) 80   (B) 99

(C) 108   (D) 84

18. The number of factors of any prime number is _____.

(A) 2   (B) 1

(C) 3   (D) 4

19. Find the difference of greatest and smallest 5-digit number formed from the digits 3, 5, 2 and 9 (using each digits atleast once).

(A) 77252   (B) 65216

(C) 77173   (D) 70125

20. Find the value of MMMCCXCVI + MCCXLVI.

(A) 5460   (B) 5462

(C) 4550   (D) 4542

21. Which of the following is greatest?

(A) 3rd multiple of 18   (B) 2nd multiple of 12

(C) 4th multiple of 17   (D) 5th multiple of 14

22. Sohan sold 825 refrigerators at ₹ 20590 each. Find the total money earned by him.

(A) ₹ 15287025   (B) ₹ 16986750

(C) ₹ 25695760   (D) None of these

23. In a garden, there are 2995 plants in 1 row. If each row has the same number of plants, then how many plants are there in 128 rows?

(A) 383360   (B) 286590

(C) 372560   (D) 296570

24. Compare and fill the box.

MMCCLII + CCXXXVI ☐ MCCCXIV + MCCXVI

(A) >   (B) <

(C) =   (D) Can't be determined

25. What should be added to 3rd multiple of 16 to get 5th multiple of 18?

(A) 38   (B) 40

(C) 42   (D) 32

26. Two ropes 12 m and 18 m long are to be cut into small pieces of equal lengths. What will be the maximum length of each piece?

(A) 5 m   (B) 6 m

(C) 7 m   (D) 8 m

27. There are 2168 boxes of biscuits. Each box contains 120 packet of biscuits. How many packets of biscuits are there?

(A) 260160   (B) 260100

(C) 260600   (D) 250840

28. Estimate the difference between 42163456 and 51620132, if the numbers are rounded off to the nearest thousands.

(A) 9890400   (B) 9321000

(C) 8590000   (D) 9457000

29. Add three million three hundred two thousand thirty with six million two hundred one thousand twenty.

(A) 8050030   (B) 9503050

(C) 9500350   (D) 6305010

30. Three bells ring of intervals of 12, 15 and 20 minutes. If they all ring at 6 a.m. together, then at what time will they next ring together?

(A) 6 : 30 a.m.   (B) 7 : 05 a.m.

(C) 6 : 45 a.m.   (D) 7 : 00 a.m.

31. The sum of (product of 2nd multiple of 10 and 5th multiple of 7) and 19 is _____.

(A) 719   (B) 700

(C) 619   (D) 721

32. A company earned ₹ 46,72,000 in a year. If the expenses were ₹ 7,56,824, then how much money was saved?

(A) ₹ 16,84,591   (B) ₹ 28,10,219

(C) ₹ 38,14,198   (D) ₹ 39,15,176

33. Which two numbers gives the product 675924?

(A) 7268×93 (B) 6428×84

(C) 7520×82 (D) 6419×97

34. Salary of a person is ₹ 42570 per month. How much total salary did he earn in a year?

(A) ₹ 620540   (B) ₹ 512750

(C) ₹ 510840   (D) ₹ 410760

35. A library has 30 racks. Each rack is fitted with 25 shelves and there are 50 books in each shelf. Find the total number of books in the library.

(A) 28150   (B) 42500

(C) 36150   (D) 37500

36. Which of the following is true?

(A) $82599 \div 0 = 0$ (B) $0 \div 82683 = 0$

(C) $72598 \times 1 = 1$ (D) None of these

37. Akshit collected 90528 stickers. He distributes the stickers equally among his 12 friends. How many stickers did each friend get?

(A) 6420   (B) 7544

(C) 7210   (D) 6894

38. The product of 214 and a number is X. Taking 49 away from X gives 1449. Find the number.

(A) 7   (B) 9

(C) 1498   (D) 1640

39. Least common multiple of 15, 20 and 40 is _____.

(A) 80   (B) 110

(C) 120   (D) 140

40. A fruit seller has 69875 apples. He has to pack them in boxes, with each box containing 325 apples. Find the number of boxes required to pack all the apples.

(A) 225   (B) 315

(C) 215   (D) 205

41. 7th multiple of 18 is _____ more than the 5th multiple of 13.

(A) 51   (B) 120

(C) 61   (D) 59

42. How many composite numbers are there between 35 and 50?

(A) 10   (B) 8

(C) 12   (D) 11

43. Compare and fill the box.

$$9549 \times 38 \; \boxed{} \; 7256 + 8590$$

(A) >   (B) <

(C) =   (D) Can't be determined

44. Evaluate :

CDLXVII + MCCXV – CMXXIX

(A) 820   (B) 753

(C) 615   (D) 710

45. Find the sum of greatest and smallest 6-digit numbers that can be formed by using the digits 2, 1, 0 and 8 (using each digit atleast once).

(A) 998138   (B) 988238

(C) 978168   (D) None of these

Achievers Section (HOTS)

46. If $\triangle$ + $\bigcirc$ = 3710;

$\triangle$ + $\bigcirc$ + $\bigcirc$ + $\bigcirc$ = 10214 and

$\square$ + $\triangle$ + $\bigcirc$ = 4620,

Then, $\triangle$ + $\square$ + $\square$ + $\bigcirc$ = ____?____

(A) 4280   (B) 4690

(C) 5530   (D) 5215

47. Find the value of $\dfrac{P + R - S}{Q}$.

(A) $\dfrac{3}{5}$

(B) $\dfrac{4}{5}$

(C) $\dfrac{2}{5}$

(D) $\dfrac{1}{5}$

```
            [P] 2 [R] 5
    258 ) 8 3 7 2 1 0
        - 7 7 4 ↓
          6 3 2
        - [Q] 1 6 ↓
          1 1 6 1
        - 1 0 [S] 2 ↓
          1 2 9 0
        - 1 2 9 0
          0
```

48. Which of the following options is correct?

Statement p : The HCF of two given numbers cannot be greater than the LCM of these numbers.
Statement q : The LCM of two numbers is the least number that divides both the numbers without leaving any remainder.

(A) Both Statement p and Statement q are true.

(B) Both Statement p and Statement q are false.

(C) Statement p is true but Statement q is false.

(D) Statement p is false but Statement q is true.

49. If $\square$ × $\square$ = 36; $\bigcirc$ ÷ $\square$ = 8

and ☆ + $\bigcirc$ = 50, then find the value of $\square$

+ $\bigcirc$ + ☆.

(A) 50   (B) 56

(C) 48   (D) 52

50. In a town, there are two public libraries. The number of books in first library is 4,52,568 and the number of books in second library is 3,46,802.

(i) Find the total number of books in both the libraries.

(ii) How many more books does the first library have than second library?

	(i)	(ii)
(A)	5,46,894	1,05,766
(B)	6,43,508	2,04,689
(C)	7,99,370	1,05,766
(D)	7,99,370	2,52,708

SOF IMO 2019 QUESTIONS

1. Find the sum of the common prime factors of 168 and 315.
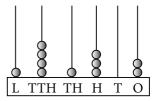
(A) 10   (B) 7

(C) 3   (D) 9   *(Level-1)*

2. If $\bigotimes$ ÷ $\boxtimes$ = 13 and $\boxtimes$ + $\boxtimes$

+ $\boxtimes$ + $\boxtimes$ = 28, then what is the value of $\bigotimes$

+ $\boxtimes$?

(A) 3   (B) 49

(C) 52   (D) 98   *(Level-1)*

3. Find the number which is 2529 more than the number shown on the abacus.

| L | TTH | TH | H | T | O |

(A) 143831   (B) 141302

(C) 16661   (D) None of these *(Level-1)*

4. Which of the following has the greatest value?

(A) 30 tens more than 50 hundreds

(B) 70 ones more than 300 tens

(C) 20 ones less than 30 tens

(D) 60 hundreds less than 8 thousands *(Level-1)*

5. If a number M is multiplied by 16 and 989 is added, then the answer obtained is 2749. Find twice of the number M.

(A) 110 (B) 220

(C) 400 (D) 560 *(Level-1)*

6. Divya reads 225 pages every day except on Sunday and Thursday. How many pages does she read in 9 weeks?

(A) 10,320 (B) 10,125

(C) 11,245 (D) 12,040 *(Level-1)*

7. Karan has 52920 balls. He has to pack them in boxes, with each box containing 420 balls. Find the number of boxes required to pack all the balls.

(A) 120 (B) 215

(C) 126 (D) 150 *(Level-1)*

8. A gardener plants 312250, 234278 and 143581 trees on three successive months. How many trees did he plant in all three months?

(A) 690109 (B) 990109

(C) 900999 (D) 890109 *(Level-1)*

9. Fill in the blanks.

(i) There are __**P**__ prime numbers between 73 and 94.

(ii) Least common multiple of 32, 36 and 72 is __**Q**__.

(iii) The smallest number that can be divided by the given numbers without leaving any remainder is __**R**__.

(iv) If 443272 is divided by 268, then __**S**__ is the remainder.

	P	**Q**	**R**	**S**
(A)	5	108	HCF	1654
(B)	3	288	LCM	0
(C)	4	162	LCM	1252
(D)	5	254	LCM	987

(Level-1)

10. In an examination, marks obtained by three boys are as follows :

Tarun : Second multiple of 32

Manish : Fifth multiple of 17

Vishal : Greatest factor of 45

Which of the following shows the correct descending order of boys according to their marks?

(A) Tarun, Manish, Vishal

(B) Manish, Tarun, Vishal

(C) Vishal, Tarun, Manish

(D) Tarun, Vishal, Manish *(Level-1)*

11. Add the 4th multiple of 52 and the 8th multiple of 37. The value obtained is 700 less than ♣. Find the value of ♣.

(A) 1400 (B) 504

(C) 968 (D) 1204 *(Level-1)*

12. If + + = 1275 and − = 75, then what is the value of ?

(A) 400 (B) 475

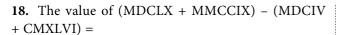(C) 465 (D) 480 *(Level-1)*

13. Find the sum of all factors of 243.

(A) 364 (B) 121

(C) 120 (D) 363 *(Level-1)*

14. A factory manufactures 2530900 pens in a month. The factory got a order to fill 17608 cartons with 144 pens each. How many more pens should it manufacture to complete the order?

(A) 4260 (B) 4652

(C) 3421 (D) 5625 *(Level-1)*

15. An NGO earned ₹ 50480 in a month. If the total expenses were ₹ 36500 per month, then how much money was saved in one year?

(A) ₹ 234060 (B) ₹ 613700

(C) ₹ 167760 (D) ₹ 117340 *(Level-1)*

16. In a garden, there are 403354 plants in 329 rows. If each row has the same number of plants, then how many plants are there in 115 rows?

(A) 104099 (B) 149900

(C) 149090 (D) 140990 *(Level-1)*

17. Find the value of $\dfrac{(Q+R)\div(P-S)}{S}$.

```
              1 P 4 9 R
      132) 2 3 0 9 S 4 2 (
           − 1 3 2
             9 8 9
           − 9 2 Q
             6 S 5
           − 5 2 8
             1 2 P 4
           − 1 1 8 8
               8 R 2
             − 7 9 2
                 7 0
```

(A) 5 (B) 1

(C) 10 (D) 2 *(Level-1)*

18. The value of (MDCLX + MMCCIX) – (MDCIV + CMXLVI) =
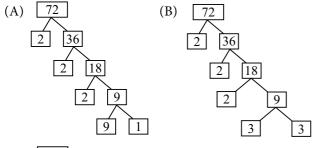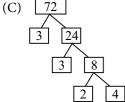
(A) MCCIX   (B) MCCCIX

(C) MCCCXIX   (D) MCCXIX   *(Level-2)*

19. Which of the following options shows the correct prime factorisation of 72 ?

(A)
```
        72
       /  \
      2    36
          /  \
         2    18
             /  \
            2    9
                / \
               9   1
```

(B)
```
        72
       /  \
      2    36
          /  \
         2    18
             /  \
            2    9
                / \
               3   3
```

(C)
```
        72
       /  \
      3    24
          /  \
         3    8
             /  \
            2    4
```

(D) Both (A) and (B)

(Level-2)

20. A certain number when divided by 3 gives a remainder of 1. The same number when divided by 4 gives a remainder of 3. Which of the following can be the number?

(A) 109   (B) 71

(C) 82   (D) 79   *(Level-2)*

21. How much greater is the smallest 5-digit number with all different digits than the largest 4-digit number with all different digits?

(A) 2469   (B) 88889

(C) 358   (D) 2464   *(Level-2)*

22. ★ is twice the difference between the 6th and the 10th multiple of 7. Find ★.

(A) 38   (B) 56

(C) 60   (D) 28   *(Level-2)*

23. Find the HCF and LCM respectively of 42, 63 and 105.

(A) 7,630   (B) 21,1260

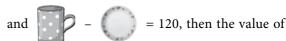(C) 21,630   (D) 7,1260   *(Level-2)*

24. Rashi think of a 6-digit number. Find the number using the given clues.

➤ The digit at thousands place is more than the digit at tens place by 5.

➤ The digit at lakhs place is HCF of 3 and 7.

➤ The digit at tens place is the smallest odd prime number.

➤ The digit at ten thousands place is 3rd multiple of 2.

➤ The digit at ones place is 4 less than the digit at ten thousands place.

➤ The digit at hundreds place is product of digit at lakhs place and ones place.

(A) 166212   (B) 158232

(C) 168232   (D) 756212   *(Level-2)*

25. If ⬤ + ⬤ + ☕ + ☕ = 1160;

🍨 + ⬤ + ☕ = 740

and ☕ – ⬤ = 120, then the value of

⬤ + 🍨 + 🍨 + ⬤ = _____.

(A) 780   (B) 1020

(C) 1180   (D) 880   *(Level-2)*

HINTS & EXPLANATIONS

SELF TEST-1

1. (B) : 568972 + 248694 = 817666
742861 + 156890 = 899751
And, 81766 $\bigcirc\!\!\!<$ 899751

2. (B) : 15000 × 852 = 15000 × (<u>800</u> + 50 + 2)

3. (C) : Cost of 1 AC = ₹ 75865
Estimated cost of 1 AC = ₹ 76000
So, estimated cost of 410 AC's = ₹ (76000 × 410)
= ₹ 31160000

4. (B) : Let the other number be x.
According to question, we have
520 × x = 3133000
⇒ x = 3133000 ÷ 520
⇒ x = 6025

5. (D): Seven million three hundred five thousand twenty = 7,305,020
Three million one hundred one thousand fifty
= 3,101,050
∴ Required difference = 7,305,020 – 3,101,050
= 4,203,970

SELF TEST-2

1. (C) : Factors of 75 = 1, 3, 5, 15, 25 and 75
Factors of 90 = 1, 2, 3, 5, 6, 9, 10, 15, 18, 30, 45 and 90
∴ Common factors of 75 and 90 = 1, 3, 5, 15.

2. (B)

3. (A)

4. (D): Prime factorisation of 140 and 200 is

2	140
2	70
5	35
7	7
	1

2	200
2	100
2	50
5	25
5	5
	1

So, 140 = 2 × 2 × 5 × 7
200 = 2 × 2 × 2 × 5 × 5
∴ H.C.F. (140, 200) = 2 × 2 × 5 = 20

5. (C) : Prime factorisation of 45 and 105 is,

3	45
3	15
5	5
	1

3	105
5	35
7	7
	1

So, L.C.M. (45, 105) = 3 × 3 × 5 × 7 = 315

EXERCISE

1. (C) :

5	145
29	29
	1

5	245
7	49
7	7
	1

∴ H.C.F. = 5

2. (B) : Greatest factor of 1728 = 1728
Smallest factor of 1728 = 1
∴ Their sum = 1728 + 1 = 1729.

3. (A) : Required number is the H.C.F. of 30 and 45.

2	30
3	15
5	5
	1

3	45
3	15
5	5
	1

So, H.C.F. (30, 45) = 3 × 5 = 15

4. (D): Smallest 7-digit number formed from the given digits = 1113456
Greatest 6-digit number formed from the given digits = 665431
∴ Required sum = 1113456 + 665431
= 1778887

5. (C) :
$$
\begin{array}{r}
7\,245 \\
36\,)\overline{260820} \\
-252 \\
\hline
88 \\
-72 \\
\hline
162 \\
-144 \\
\hline
180 \\
-180 \\
\hline
0
\end{array}
$$

6. (B) : 3rd multiple of 40 = 40 × 3 = 120
5th multiple of 46 = 46 × 5 = 230
∴ Required difference = 230 – 120 = 110

7. (A) : Prime factorisation of 240 is,

2	240
2	120
2	60
2	30
3	15
5	5
	1

∴ Prime factors of 240 are 2, 3 and 5.

8. (A): Smallest 8-digit number = 10000000
So, 10000000 ÷ 125 = 80000.

9. (A)

10. (C): Population of the city = 1045693
Number of males = 532564
∴ Number of females = 1045693 – 532564
= 513129

11. (B): Prime numbers between 20 and 85 are 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79 and 83 *i.e.*, 15 in number.

12. (B): 200534 when rounding off to nearest hundreds gives 200500 and 345126 when rounding off to nearest hundreds gives 345100.
Required sum = 200500 + 345100 = 545600.

13. (D): Sum of 2456837 and 2568398
= 2456837 + 2568398 = 5025235
∴ Required difference = 6897252 – 5025235
= 1872017

14. (C): Amount of money in her account now
= ₹ (105689 – 5689 + 8569) = ₹ 108569

15. (D): Number of books distributed in 45 cities
= 925920
∴ Number of books distributed in 1 city
= 925920 ÷ 45 = 20576

16. (A): Required number
= 10000000 – 3412058 = 6587942

17. (C)

18. (A): Factors of any prime number is either 1 or the number itself.

19. (C): Greatest 5-digit number formed from the given digits = 99532
Smallest 5-digit number formed from the given digits = 22359
∴ Required difference = 99532 – 22359 = 77173.

20. (D): MMMCCXCVI + MCCXLVI
= 3296 + 1246 = 4542

21. (D): (A) 3rd multiple of 18 = 54
(B) 2nd multiple of 12 = 24
(C) 4th multiple of 17 = 68
(D) 5th multiple of 14 = 70

22. (B): Total money earned = ₹ (20590 × 825)
= ₹ 16986750

23. (A): Total number of plants = 2995 × 128 = 383360.

24. (B): MMCCLII + CCXXXVI = 2252 + 236 = 2488
MCCCXIV + MCCXVI = 1314 + 1216 = 2530
As, 2488 $\boxed{<}$ 2530

25. (C): 3rd multiple of 16 = 16 × 3 = 48
5th multiple of 18 = 18 × 5 = 90
So, required number = 90 – 48 = 42.

26. (B): Maximum length of each piece is the H.C.F. of 12 and 18.

2	12		2	18
2	6		3	9
3	3		3	3
	1			1

∴ H.C.F. (12, 18) = 2 × 3 = 6
∴ Maximum length of each piece = 6 m

27. (A): Number of boxes = 2168
Number of packets of biscuits in each box = 120
So, total number of packets of biscuits = 2168 × 120
= 260160

28. (D): 42163456 when rounding off to the nearest thousands becomes 42163000.
51620132 when rounding off to the nearest thousands becomes 51620000.
∴ Required difference = 51620000 – 42163000
= 9457000

29. (B): Required sum = 3302030 + 6201020 = 9503050

30. (D):

2	12, 15, 20
2	6, 15, 10
3	3, 15, 5
5	1, 5, 5
	1, 1, 1

L.C.M. (12, 15, 20) = 2 × 2 × 3 × 5 = 60
So, the bells will ring together 60 minutes after 6 a.m. *i.e.*, at 7 a.m.

31. (A): Product = 2nd multiple of 10 × 5th multiple of 7
= 20 × 35 = 700
∴ Required sum = 700 + 19 = 719

32. (D): Amount earned in a year = ₹ 46,72,000
Expenses = ₹ 7, 56, 824
∴ Amount of money saved = ₹(46,72,000 – 7,56,824)
= ₹ 39,15,176

33. (A): 7268 × 93 = 675924

34. (C): Per month salary of a person = ₹ 42570
∴ Amount of money earned in a year
= ₹ (42570 × 12) = ₹ 510840

35. (D): Total number of books in the library
= 30 × 25 × 50 = 37500

36. (B)

37. (B): Number of stickers collected = 90528
∴ Number of stickers each friend get
= 90528 ÷ 12 = 7544

38. (A): According to question, we have
X – 49 = 1449 ⇒ X = 1449 + 49 = 1498
Now, required number = 1498 ÷ 214 = 7

39. (C):

2	15, 20, 40
2	15, 10, 20
2	15, 5, 10
3	15, 5, 5
5	5, 5, 5
	1, 1, 1

∴ L.C.M. = 2 × 2 × 2 × 3 × 5 = 120

40. (C): Total number of apples = 69875
Number of apples in 1 box = 325
∴ Number of boxes required = 69875 ÷ 325 = 215

41. (C): 7th multiple of 18 = 7 × 18 = 126
5th multiple of 13 = 5 × 13 = 65
∴ Required difference = 126 – 65 = 61

42. (A): Composite numbers are : 36, 38, 39, 40, 42, 44, 45, 46, 48 and 49 *i.e.*, 10 in number.

43. (A): 9549 × 38 = 362862
7256 + 8590 = 15846
And, 362862 > 15846

44. (B): CDLXVII + MCCXV – CMXXIX
= 467 + 1215 – 929 = 753

45. (B): Greatest 6-digit number formed from the given digits = 888210
Smallest 6-digit number formed from the given digits = 100028
∴ Required sum = 888210 + 100028
= 988238

46. (C): We have,
△ + ◯ = 3710 ...(i)
and △ + ◯ + ◯ + ◯ = 10214
⇒ 3710 + 2◯ = 10214 (Using (i))
⇒ 2◯ = 10214 – 3710
⇒ 2◯ = 6504
⇒ ◯ = 6504 ÷ 2 = 3252
Now, △ + 3252 = 3710
⇒ △ = 3710 – 3252 = 458
Also, we have
▯ + △ + ◯ = 4620
⇒ ▯ + 3710 = 4620 (Using (i))

⇒ ▯ = 4620 – 3710 = 910
So, △ + ▯ + ▯ + ◯ = 458 + 910 + 910 + 3252
= 5530

47. (B): 258) 837210

```
      ③ 2 ④ 5
258 ) 8 3 7 2 1 0
     -7 7 4
      6 3 2
     -⑤1 6
      1 1 6 1
    - 1 0 ③ 2
        1 2 9 0
      - 1 2 9 0
              0
```

So, P = 3, Q = 5, R = 4 and S = 3
∴ $\dfrac{P + R - S}{Q} = \dfrac{3 + 4 - 3}{5} = \dfrac{4}{5}$

48. (A)

49. (B): We have, ▯ × ▯ = 36
As, 6 × 6 = 36
So, ▯ = 6
Also, ◯ ÷ ▯ = 8
or 48 ÷ 6 = 8
So, ◯ = 48
And ☆ + ◯ = 50
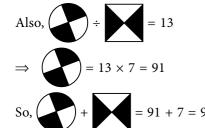⇒ ☆ = 50 – 48
⇒ ☆ = 2
Hence, ▯ + ◯ + ☆ = 6 + 48 + 2 = 56

50. (C): (i) Total number of books
= 4,52,568 + 3,46,802 = 7,99,370
(ii) Required difference
= 4,52,568 – 3,46,802 = 1,05,766

SOF IMO 2019 QUESTIONS

1. (A): Prime factorisation of 168 = 2 × 2 × 2 × 3 × 7
Prime factorisation of 315 = 3 × 3 × 5 × 7
∴ Common prime factors of 168 and 315 are 3 and 7.
So, sum = 3 + 7 = 10

2. (D): We have, 4 × ◪ = 28
⇒ ◪ = 28 ÷ 4 = 7

Also, ÷ = 13

⇒ = 13 × 7 = 91

So, + = 91 + 7 = 98

3. (A) : Number shown on abacus = 141302

So, required number = 141302 + 2529 = 143831

4. (A) : (A) 30 × 10 + 50 × 100 = 300 + 5000 = 5300

(B) 70 × 1 + 300 × 10 = 70 + 3000 = 3070

(C) 30 × 10 – 20 × 1 = 300 – 20 = 280

(D) 8 × 1000 – 60 × 100 = 8000 – 6000 = 2000

5. (B) : We have, $(M \times 16) + 989 = 2749$

⇒ $16M = 2749 - 989$ ⇒ $16M = 1760$

⇒ $M = 1760 \div 16 = 110$

So, twice of $M = 2 \times 110 = 220$

6. (B) : Number of days on which Divya reads pages in a week = 5

Number of pages she reads in 1 day = 225

So, total pages she reads in 9 weeks

= 9 × 5 × 225

= 45 × 225 = 10125

7. (C) : Total number of balls = 52920

Number of balls in 1 box = 420

So, number of boxes required = 52920 ÷ 420 = 126

8. (A) : Total number of trees planted

= 312250 + 234278 + 143581 = 690109

9. (B) : (i) Prime numbers between 73 and 94 are 79, 83, 89 *i.e.*, 3 in number.

(ii) L.C.M. of 32, 36 and 72 is 288.

(iii) L.C.M. is the smallest number that on dividing by the given numbers leaves 0 remainder.

(iv) 443272 ÷ 268 = 1654

So, remainder is 0.

10. (B) : Marks obtained by Tarun = Second multiple of 32 = 64

Marks obtained by Manish = Fifth multiple of 17 = 85

Marks obtained by Vishal = Greatest factor of 45 = 45

The correct descending order of boys according to their marks is : Manish, Tarun, Vishal

11. (D) : 4th multiple of 52 = 208

8th multiple of 37 = 296

So, sum = 208 + 296 = 504

Now, 504 = ♣ – 700

⇒ ♣ = 700 + 504 = 1204

12. (B) : We have,

 + + = 1275   (i)

and – = 75

⇒ = 75 +

From (i), + + 75 + = 1275

⇒ 3 = 1275 – 75 = 1200

⇒ = 1200 ÷ 3 = 400

So, = 400 + 75 = 475

13. (A) : Factors of 243 are 1, 3, 9, 27, 81, 243

So, required sum = 1 + 3 + 9 + 27 + 81 + 243 = 364

14. (B) : Number of pens manufactures in a month
= 2530900

Number of pens ordered = 17608 × 144 = 2535552

So, number of more pens should manufacture to complete the order = 2535552 – 2530900 = 4652

15. (C) : Amount of money earned in a month = ₹ 50480

Total expenses in a month = ₹ 36500

So, total amount of money saved in one month

= ₹(50480 – 36500) = ₹ 13980

∴ Total amount of money saved in one year

= ₹ (13980 × 12) = ₹ 167760

16. (D) : Number of plants in 329 rows = 403354

∴ Number of plants in 115 rows = $\dfrac{403354}{329} \times 115$

= 140990

17. (B) :

```
            1 7 4 9 6
      132) 2 3 0 9 5 4 2 (
          – 1 3 2
            9 8 9
          – 9 2 4
            6 5 5
          – 5 2 8
            1 2 7 4
          – 1 1 8 8
              8 6 2
            – 7 9 2
                7 0
```

So, $P = 7$, $Q = 4$, $R = 6$ and $S = 5$

Hence, $\dfrac{(Q + R) \div (P - S)}{S} = \dfrac{(4 + 6) \div (7 - 5)}{5}$

$= \dfrac{10 \div 2}{5} = \dfrac{5}{5} = 1$

18. (C) : (MDCLX + MMCCIX) – (MDCIV + CMXLVI)

= (1660 + 2209) – (1604 + 946)

= 3869 – 2550 = 1319 = MCCCXIX

19. (B)

20. (D)

21. (C) : Smallest 5-digit number = 10234

Largest 4-digit number = 9876

∴ Required difference = 10234 – 9876 = 358

22. (B) : 6th multiple of 7 = 42

10th multiple of 7 = 70

∴ Difference = 70 – 42 = 28

So, ★ = 2 × 28 = 56

23. (C) :

2	42
3	21
7	7
	1

3	63
3	21
7	7
	1

3	105
5	35
7	7
	1

∴ H.C.F. = 3 × 7 = 21

L.C.M. = 2 × 3 × 3 × 5 × 7 = 630

24. (C) : Digit at lakhs place = H.C.F. (3, 7) = 1

Digit at tens place = Smallest odd prime number = 3

Digit at ten thousands place = 3rd multiple of 2 = 6

Digit at ones place = 6 – 4 = 2

Digit at thousands place = 3 + 5 = 8

Digit at hundreds place = 1 × 2 = 2

So, required number = 168232

25. (A) : Since, [mug] – [plate] = 120

⇒ [mug] = 120 + [plate]

Now, [plate] + [plate] + [mug] + [mug] = 1160

⇒ [plate] + [plate] + 120 + [plate] + 120 + [plate] = 1160

⇒ 4 [plate] + 240 = 1160

⇒ 4 [plate] = 1160 – 240 = 920

⇒ [plate] = 920 ÷ 4 = 230

So, [mug] = 120 + 230 = 350

Now, [sundae] + [plate] + [mug] = 740

⇒ [sundae] + 230 + 350 = 740

⇒ [sundae] = 740 – 580 = 160

So, [plate] + [sundae] + [sundae] + [plate]

= 230 + 160 + 160 + 230 = 780