

# (Olympiad Champs Notes)

## Number System

### Multiple Choice Questions

- (a) Time value
- (b) Place value
- (c) Difference value
- (d) Product value

#### CHALLENGE A

**Directions (Qs. 7 to 10): In the given questions, identify the place value of 5.**

1. Which is the correct word form of 9.04?  
(a) Nine and four tenths  
(b) Ninety and four hundredths  
(c) Nine and four hundredths  
(d) Nine and four thousandths
2. What is the value of the 5 in the following numbers? 132, 070, 689, 050  
(a) ten (b) ten thousand  
(c) ten million (d) ten billion
3. Pick the odd one out keeping in mind the divisibility rules of 3.  
(a) 252 (b) 367  
(c) 183 (d) 492
4. 12 : Even number :: \_\_\_ : Odd number.  
(a) 14 (b) 17  
(c) 16 (d) 10
5. 11 : Prime Number :: \_\_\_ : Composite number.  
(a) 12 (b) 13  
(c) 17 (d) 7

7. 17,526,010  
(a) five ten thousands  
(b) five thousands  
(c) five hundred thousands  
(d) five hundreds
8. 2,110,735,000  
(a) five thousands  
(b) five hundreds  
(c) five millions  
(d) five ten thousands
9. 780,756  
(a) five ones (b) five tens  
(c) five hundreds (d) 5 tenth
10. 50,697  
(a) five hundreds  
(b) five millions  
(c) five hundred thousands  
(d) five ten thousands

#### CHALLENGE B

6. This is the value of where the digit is in the number, such as units, tens, hundreds, etc.
11. Match the following numbers in list I with the corresponding place value of number 1.

	List I		List II
A.	761,364	1.	One hundred thousand
B.	13,486.3	2.	One thousand
C.	1,234,567	3.	One ten thousand
D.	1,234,567	4.	One million

	A	B	C	D
(a)	2	3	4	1
(b)	3	2	1	4
(c)	4	2	3	1
(d)	1	3	2	4

- 12.** Complete the number sentence.

$$327,421 = 300,000 + 20,000 + ? + 400 + 20 + 1$$

- (a) 70,000                      (b) 700,000  
(c) 7,000                      (d) 700

- 13.** Which shows five hundred six million, seventy-three thousand, and eight in standard form?

- (a) 516,073,008              (b) 506,073,008  
(c) 506,111.0008            (d) 506,068,908

- 14.** How do you write 10.067 in expanded notation?

- (a)  $10 + 6/100 + 7/1,000$   
(b)  $1 + 6/10 + 7/100$   
(c)  $100 + 60 + 7$   
(d)  $1 + 6/100 + 7/1,000$

- 15.** The expanded form of 6.153.122 is:

- (a)  
 $6,000,000 + 100,000 + 50,000 + 3000 + 100 + 20 + 2$   
(b)  $60,000,000 + 100,000 + 50,000 + 3000 + 100 + 20 + 2$   
(c)  $600,000.000 + 100,000 + 50,000 + 3000 + 100 + 20 + 2$   
(d)  
 $6.000,000,000 + 100,000 + 50,000 + 3000 + 100 + 20 + 2$

- 16.** How many multiples does 10 have?

- (a) 4                              (b) 9  
(c) 100                          (d) An infinity

- 17.** Which number is a multiple of 6?

- (a) 2                              (b) 3  
(c) 42                            (d) 1

- 18.** 40 is a multiple of which of the following number?

- (a) 8                              (b) 80  
(c) 120                          (d) 200

**Directions (Qs. 19 to 27): Find the lowest common multiple in the following questions.**

- 19.** [6 and 20]

- (a) 80                              (b) 75  
(c) 25                              (d) 60

- 20.** [15 and 18]

- (a) 120                            (b) 90  
(c) 100                            (d) 110

- 21.** [18 and 27]  
(a) 54 (b) 78  
(c) 75 (d) 120

- 22.** [9 and 15]  
(a) 60 (b) 45  
(c) 70 (d) 75

- 23.** [12, 15 and 24]  
(a) 115 (b) 160  
(c) 120 (d) 125

- 24.** [12 and 18]  
(a) 21 (b) 28  
(c) 36 (d) 40

- 25.** [8, 12 and 20]  
(a) 120 (b) 140  
(c) 150 (d) 175

- 26.** [12, 16 and 25]  
(a) 100 (b) 147  
(c) 1200 (d) 1085

- 27.** [32, 48 and 80]  
(a) 480 (b) 750  
(c) 460 (d) 780

- 28.** Martin is pasting pieces of square coloured paper of equal size onto a board measuring 72 cm by 90 cm. If only whole square pieces are used, and the board is to be completely covered, find the largest possible length of the side of each square coloured paper.

- (a) 72 (b) 18  
(c) 17 (d) 90

- 29.** Tim has a bag of 36 orange-flavoured sweets and Peter has a bag of 44 grape-flavoured sweets. They have to divide up the sweets into small trays with equal number of sweets; each tray containing either orange-flavoured or grape-flavoured sweets only. If there is no remainder, find the largest possible number of sweets in each tray.

- (a) 8 (b) 11  
(c) 4 (d) 6

**Directions (Qs 30 to 36): Find the greatest common factor (GCF) of the numbers given below.**

- 30.** (4 and 6)  
(a) 2 (b) 3  
(c) 4 (d) 6

- 31.** (10 and 6)  
(a) 5 (b) 6  
(c) 2 (d) 4

- 32.** (6 and 9)  
(a) 2 (b) 6  
(c) 9 (d) 3

- 33.** (10 and 25)  
(a) 5 (b) 10  
(c) 25 (d) 15

- 34.** (24 and 16 )  
 (a) 4 (b) 16  
 (c) 8 (d) 12
- 35.** (7 and 14)  
 (a) 1 (b) 7  
 (c) 2 (d) 14
- 36.** (24 and 18)  
 (a) 2 (b) 8  
 (c) 4 (d) 6
- 37.** Janice and Jasmine were each given a piece of ribbon of equal length. Janice cuts her ribbons into equal lengths of 2m, while Jasmine cuts her ribbons into equal lengths of 5m. If there was no remainder in both cases, find the shortest possible length of ribbon given to them.  
 (a) 10 (b) 2  
 (c) 5 (d) 100
- 38.** Read the statement and choose the correct option.  
**Statement A:** As per the place value system, multiplication is performed from left to right i.e. Highest place value to lowest place value).  
**Statement B:** As per the place value system, division is performed from left to right i.e. Highest place value to lowest place value).
- (a) Only A is true.  
 (b) Only B is true.  
 (c) Both A and B are true.  
 (d) Both A and B are false.
- 39.** 17422.16 in word form is  
 (a) seventeen thousand, four hundred, two, two and one tenths and six hundredths  
 (b) seventeen, four hundreds, twenty-two and sixteen hundredths  
 (c) seventeen thousand, four hundred, twenty-two and sixteen hundredths  
 (d) seventeen thousand, four hundred, twenty-two and sixteen tenths
- 40.** Sara's user ID is a 5-digit number. The 9 is in the ten thousands place. The 0 is in the ones place. An 8 is in the thousands place. A 4 is in the tens place. A 2 is in the hundreds place. What is Sara's user ID number?  
 (a) 90,842 (b) 89,204  
 (c) 98,420 (d) 98,240
- 41.** Which of the following expressions does not describe the value of the digit 5 in the number 21.3572?  
 (a) 500+en-thousand+hs  
 (b) 50 tenths  
 (c) 50 thousandths  
 (d) 5 hundredths
- 42.** John spends 2.63 hours studying for Math, 6.37 hours studying for English and 0.4

hours studying for Reading. How much total time does John spend studying?

- (a) nine and four thousandth hours
- (b) nine and four tenths hours
- (c) nine and forty hundredth hours
- (d) nine hours

**43.** How do you write 240,004,395 in expanded notation?

- (a)  $200.000,000 + 40.000,000 + 4,000.000 + 300 + 90 + 5$
- (b)  $200,000,000 + 40,000,000 + 4,000 + 300 + 90 + 5$
- (c)  $200,000,000 + 40,000,000 + 4,000,000 + 300.000 + 90.000 + 5.000$
- (d)  $200.000,000 + 40,000.000 + 300 + 90 + 5$

**44.** What is the value of 2 in the following number: 529,307,604,000

- (a) Hundred billion
- (b) Ten billion
- (c) Ten million
- (d) One million

**45.** Choose an answer that has a digit in the hundreds place that has a greater value than the digit in the thousands place.

- (a) 101,100                      (b) 428,304
- (c) 580,340                      (d) 873,212

**46.**  $p + 6 = 10$

- (a) 6                                      (b) 10
- (c) p                                      (d) Can't say

**47.**  $(a + b) + 19 = 49$

- (a) 19                                      (b) 17
- (c)  $a + b$                               (d) -411 of these

**48.**  $x + y + z = 10$

- (a) x                                      (b) y
- (c) z                                      (d) All of these

**49.**  $x + 10 = 14$

- (a) 14                                      (b) 10
- (c) x                                      (d) Can't say

**50.**  $(v + w) + a + 17 = 40$

- (a)  $(v + w)$
- (b) a
- (c) Both (a) and (b)
- (d) 17

**51.** How many four digit numbers are there between 999 and 3000?

- (a) 2001                                      (b) 2000
- (c) 1999                                      (d) 1998

**52.** Estimate to the nearest hundred 496 plus 318.

- (a) 814                                      (b) 800
- (c) 178                                      (d) 700

**Directions (Qs.46 to 50): Identify the variable(s) in the given equations.**

**53.** Write the following four numbers in descending order :

- |                    |                    |
|--------------------|--------------------|
| I. 4203567         | II. 4203657        |
| III 4203756        | IV. 4203675        |
| (a) I, II. III. IV | (b) III. IV, II, I |
| (c) I. II. IV,III  | (d) III, II, IV. I |

**54.** The number 5 crores 9 lacs 4 thousands 9 hundred eighty-eight in numerals can be written as

- |               |               |
|---------------|---------------|
| (a) 59004988  | (b) 590400988 |
| (c) 509049088 | (d) 50904988  |

**55.** Which of the following statements is true?

- (a) 1 is not a prime number
- (b) 1 is a prime number
- (c) 1 is a composite number
- (d) 2 is not a prime number.

**56.** What is the highest common factor (HCF) of the numbers 425 and 476?

- |        |        |
|--------|--------|
| (a) 4  | (b) 5  |
| (c) 17 | (d) 51 |

**57.** What is the least common multiple (LCM) of the numbers 90, 60, 75 and 35?

- |          |          |
|----------|----------|
| (a) 2700 | (b) 6300 |
| (c) 4250 | (d) 2750 |

**58.** Sum of a number of two digits and the number obtained by reversing the digits of the first number is 110. If the difference of the digits is 4, then the number is

- |        |        |
|--------|--------|
| (a) 62 | (b) 73 |
| (c) 84 | (d) 51 |

**59.** Which of the following is correct?

- (a) Successor of predecessor of 1000 is 1001
- (b) Successor of predecessor of 1000 is 1002
- (c) Predecessor of successor of 1000 is 1000
- (d) Predecessor of predecessor of 1000 is 999

**60.** Sum of place values of 6 in 63606 is

- |           |          |
|-----------|----------|
| (a) 6066  | (b) 18   |
| (c) 60606 | (d) 6606 |

**61.** The difference of 5671 and the number obtained on reversing its digits is

- |          |          |
|----------|----------|
| (a) 7436 | (b) 3906 |
| (c) 4906 | (d) 3916 |

**62.** The HCF of two numbers is 11 and their LCM is 693. If one of the numbers is 77, then the other number is

- |        |                   |
|--------|-------------------|
| (a) 88 | (b) 33            |
| (c) 99 | (d) None of these |

**63.** In the number 3.4625, the place value of the digit 2 is

- |            |           |
|------------|-----------|
| (a) 1000   | (b) 100   |
| (c) 1/1000 | (d) 1/100 |

**64.** 407928 is read as

- (a) Forty thousand nine hundred twenty eight
- (b) Four lakh seven thousand nine hundred twenty eight
- (c) Four lakh seventy nine thousand twenty eight

(d) Forty seven thousand nine hundred twenty eight

(a) 1800

(b) 1080

(c) 1008

(d) 1000

**65.** The sum of all the factors of 100 is

(a) 223

(b) 115

(c) 216

(d) 217

**66.** Number of common factors of 12 and 16 is

(a) 2

(b) 3

(c) 4

(d) 5

**67.** Ten thousands + ten ones + ten tens equals :

(a) 10110

(b) 11010

(c) 10011

(d) 101010

**68.** In the given number 890436 /if you write 0 in place of 4, by how much the resulting number be less than this given number?

(a) 40

(b) 400

(c) 436

(d) 36

**69.** Which one of the following statements is true?

(a) All the even numbers are composite numbers.

(b) All the odd numbers are prime numbers.

(c) These are infinitely prime numbers.

(d) A prime number can be written as the product of more than two natural number.

**70.** In number 97580, when the digits 7 and 5 as interchanged its place, then the difference between the original and the new number is

## Solutions with Explanation

### CHALLENGE A

- 1.** (c)  $9.04 =$  Nine and four hundredths.
- 2.** (a) The place value of 5 in 132,070,689,050 is tens.
- 3.** (b) 367 is the odd one out. According to the divisibility rules of 3, a number is divisible by 3 if its sum is divisible by 3. Here  $3 + 6 + 7 = 16$ , this is not divisible by 3.
- 4.** (b) 12: Even number::17: Odd number.
- 5.** (a) 11; Prime Number::12:Composite number,
- 6.** (b) - Place Value is the value of where the digit is in the number, such as units, tens, hundreds, etc.
- 7.** (c) In 17,526,010 the place value of 5 is five hundred thousand.
- 8.** (a) In 2,110,735.000 the place value of 5 is five thousand.
- 9.** (b) In 780.756 the place value of 5 is five tens.
- 10.** (d) In 50.697 the place value of 5 is five ten thousand.

### CHALLENGE B

- 11.** (a)
- 12.** (c)  $327,421 = 300,000 + 20,000 + 7000 + 400 + 20 + 1$
- 13.** (b)  $506,073,008 =$  five hundred six million, seventy-three thousand, eight.

- 14.** (a)  $10 + 6/100 + 7/1,000 = 10.067$
- 15.** (a)  $6153122 = 6,000,000 + 100,000 + 50,000 + 3000 + 100 + 20 + 2$
- 16.** (d) All the numbers have infinite number of multiples. To obtain the multiple of any number, we multiply it with 1,2,3..... etc.
- 17.** (c) The Multiples of a number are formed by multiplying it with other numbers like 1,2,3 .etc. Thus 42 is a multiple of 6 when multiplied 7.
- 18.** (a) The Multiples of a number are formed by multiplying it with other numbers like 1,2,3 .etc. Thus 40 is a multiple of 8 when it is multiplied by 5.
- 19.** (d) Prime factors of  $6 = 2 \times 3$   
 Prime factors of  $20 = 2 \times 2 \times 5$   
 LCM of 6 and  $20 = 2 \times 2 \times 3 \times 5 = 60$
- 20.** (b) Prime factors of  $15 = 3 \times 5$   
 Prime factors of  $18 = 2 \times 3 \times 3$   
 LCM of 15 and  $18 = 2 \times 3 \times 3 \times 5 = 90$
- 21.** (a) Prime factors of  $18 = 2 \times 3 \times 3$   
 Prime factors of  $27 = 3 \times 3 \times 3$   
 LCM of 18 and  $27 = 2 \times 3 \times 3 \times 3 = 54$
- 22.** (b) Prime factors of  $9 = 3 \times 3$   
 Prime factors of  $15 = 3 \times 5$   
 LCM of 9 and  $15 = 3 \times 3 \times 5 = 45$
- 23.** (c) Prime factors of  $12 = 2 \times 2 \times 3$   
 Prime factors of  $15 = 3 \times 5$   
 Prime factors of  $24 = 2 \times 2 \times 2 \times 3 \times 5 = 120$   
 LCM of 12, 15 and  $24 = 2 \times 2 \times 2 \times 3 \times 5 = 120$
- 24.** (c) Prime factors of  $12 = 2 \times 2 \times 3$   
 Prime factors of  $18 = 2 \times 3 \times 3$
- LCM of 12 and  $18 = 2 \times 2 \times 3 \times 3 = 36$
- 25.** (a) Prime factors of  $8 = 2 \times 2 \times 2$   
 Prime factors of  $12 = 2 \times 2 \times 3$   
 Prime factors of  $20 = 2 \times 2 \times 5$   
 LCM of 8, 12 and  $20 = 2 \times 2 \times 2 \times 3 \times 5 = 120$
- 26.** (c) Prime factors of  $12 = 2 \times 2 \times 3$   
 Prime factors of  $16 = 2 \times 2 \times 2 \times 2$   
 Prime factors of  $25 = 5 \times 5$   
 LCM of 12, 16 and  
 $25 = 2 \times 2 \times 2 \times 2 \times 3 \times 5 \times 5 = 1200$
- 27.** (a) 32, 48 and 80  
 Prime factors of  $32 = 2 \times 2 \times 2 \times 2 \times 2$   
 Prime factors of  $48 = 2 \times 2 \times 2 \times 2 \times 3$   
 Prime factors of  $80 = 2 \times 2 \times 2 \times 2 \times 5$   
 LCM OF 32, 48 and  
 $80 = 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 5 = 480$
- 28.** (b) The largest possible length of the side of each square coloured paper = GCF of 72 and 90.  
 Factors of  $72 = 2 \times 2 \times 2 \times 3 \times 3$   
 Factors of  $90 = 3 \times 3 \times 2 \times 5$   
 GCF =  $2 \times 3 \times 3 = 18$
- 29.** (c) GCF, is the greatest factor that divides two numbers, thus in the question, we will be calculating the GCF.  
 Tim has a bag of 36 orange-flavoured sweets and Peter has a bag of 44 grape-flavoured sweets.  
 For calculating, we need to calculate the factors of 36 and 44.  
 Factors of  $36 = 2 \times 2 \times 3 \times 3$ ;  
 Factors of  $44 = 2 \times 2 \times 11$



Thus  $GCF = 2 \times 2 = 4$ , , Therefore the largest possible number of sweets in each tray is 4.

- 30.** (a) The greatest common factor is the greatest whole number that is a factor of each of two or more numbers.

List the factor of each number:-

4:4,2,1

6:6,3,2,1

Thus the GCF of 4 and 6 is 2.

- 31.** (c) Factors of 10:10., 5,2,1

Factors of 6: 6, 3, 2, 1

Thus the GCF of 10 and 6 is 2.

- 32.** (d) Factors of 6 = 2, 3

Factors of 9= 3,3

Thus the GCF of 6 and 9 is 3.

- 33.** (a) Factors of 10=2,5

Factors of 25 = 5, 5

Thus the GCF of 10 and 25 is 5.

- 34.** (c) Factors of 24=2,2,2,3

Factors of 16= 2,2,2,2

Thus the GCF of 24 and 16 is  $2 \times 2 \times 2 = 8$

- 35.** (b) Factors of 7 = 1,7

Factors of 14 =  $2 \times 7$

Thus the GCF of 7 and 14 is 7.

- 36.** (d) Factors of 24=2,2,2,3

Factors of 18= 2,3,3

Thus the GCF of 24 and 18 =  $2 \times 3 = 6$ .

- 37.** (a) The shortest possible length of ribbon can be calculated by measuring the lowest common multiple (LCM) of the lengths of ribbon cut by Janice and Jasmine. Since 2 and 5 are both prime numbers, so to find their LCM, we will multiply them to get the

shortest length of ribbon =  $2 \times 5 = 10$   $2 \times 5 = 10$ .

- 38.** (b) As per the place value system, division is performed from left to right i.e. Highest place value to lowest place value). Whereas multiplication is performed from right to left.

- 39.** (c) 17422.16 in word form is seventeen thousand, four hundred, twenty-two and sixteen hundredths.

- 40.** (d) Sara's user ID number is 98,240.

- 41.** (b) Since 5 is present on the right side of the decimal, therefore 50 tenths does not tell the place value of 5 in 21.3572.

- 42.** (c) Time spent by John studying =  $2.63 + 6.37 + 0.4 = 9.4 =$  nine and four tenths hours.

- 43.** (b)  $200,000,000 + 40,000,000 + 4,000 + 300 + 90 + 5 = 240,004,395$

- 44.** (b) The value of the 2 in 529,307,604,000 is ten billion.

- 45.** (c) a digit in the hundreds place that has a greater value than the digit in the thousands place can be seen only in the third option wherein number at hundreds place (3) is greater than number at thousands place (0).

- 46.** (c) p, A variable is a number whose value can vary. Here two numbers are given whereas one number is not disclosed, thus p is the variable.

- 47.** (c) (a + b), A variable is a number whose value can vary. Here two numbers are given whereas one number is not disclosed, thus (a + b) is the variable.

48. (d)  $x, y, z$  are the three variables given in the equation.

49. (c)  $x$  is the variable in this equation as its value can vary.

50. (c) The variables in the given equation are  $(v + w)$  and  $a$ , since their values are variable and not given.

51. (c) Required number =  $2999 - 1000 = 1999$ .

52. (b)  $496 + 318 = 814$   
Nearest hundred = 800.

53. (b)  $4203756 > 4203675 > 4203657 > 4203567$

54. (d)  $50000000 + 900000 + 4000 = 988$   
 $= 50904988$

55. (a)

56. (c) H.C.F. of 425 and 476

$$\begin{array}{r} 425 \overline{)476} \quad (1 \\ \underline{425} \phantom{00} \\ 51 \overline{)425} \quad (8 \\ \underline{408} \phantom{00} \\ 17 \overline{)51} \quad (3 \\ \underline{51} \\ \hline \end{array}$$

17 is the HCF of given numbers.

57. (b)

5	90, 60, 75, 35
3	18, 12, 5, 7
2	6, 4, 5, 7
3	3, 2, 5, 7
2	1, 2, 5, 7
5	1, 1, 5, 7
7	1, 1, 1, 7
	1, 1, 1, 7

LCM =  $5 \times 3 \times 2 \times 3 \times 2 \times 5 \times 7 = 6300$ .

58. (b) Let the two digit number be  $10x + y$   
Reversing the digit, number become  
 $10y + x$ .

sum =  $10x + y + 10y + x$

$$\Rightarrow 11x + 11y = 110$$

$$\Rightarrow x + y = 10 \quad \dots(1)$$

$$x - y = 4 \text{ (Given)} \quad \dots(2)$$

From equ. (1) & (2)

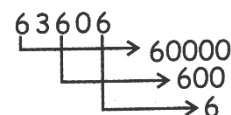
$$2x = 14 \Rightarrow x = 7$$

$$\therefore y = 3$$

Hence the number is 73.

59. (c) successor of 1000 = 1000. 1 = 1001 then predecessor of 1001 - 1001

60. (c) Place values of all 6 in



$$\text{Sum} = 60000 + 600 + 6 = 60606.$$

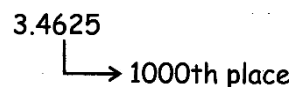
61. (b) Given number = 5671  
After reversing its digits = 1765.

$$\text{Difference} = 5671 - 1765 = 3906.$$

62. (c) Product of two numbers  
= H.C.F.  $\times$  L.C.M. of numbers  
 $77 \times \text{other number} = 11 \times 693$

$$\text{other number} = \frac{11 \times 693}{77} = 99.$$

63. (c)



$$\therefore \text{Place value of 2 in 3.4625 is } \frac{1}{1000}.$$

64. (b)

65. (d) Factors of 100 = 1, 2, 4, 5, 10, 20, 25, 50, 100

Sum of all the factors of 100

$$= 1 + 2 + 4 + 5 + 10 + 20 + 25 + 50 + 100$$

$$= 217$$

66. (a) Factors of 12 are =  $2 \times 2 \times 3$

Factors of 16 are  $= 2 \times 2 \times 2 \times 2$

Common factors of 12 and 16 are  $2 \times 2$

Number of common factors of 12 and 16 are  
2.

**67.** (a) Ten thousands + ten ones + ten tens

$$= 10 \times 1000 + 10 \times 1 + 10 \times 10$$

$$= 10000 + 10 + 100 = 10110$$

**68.** (b) Original number = 890436

$$\text{New number} = 890036$$

Then the resulting number is 400 less than by  
given number.

**69.** (c)

**70.** (a) Original number = 97580

$$\text{New number} = 95780$$

$$\text{Reqd. difference} = 97580 - 95780 = 1800$$

LCM of 12, 16 and

$$25 = 2 \times 2 \times 2 \times 2 \times 3 \times 5 \times 5 = 1200.$$