

LOGICAL REASONING
MODULE 1 – NUMBER SERIES

1. In the following question below, one term in the number series is wrong. Find out the wrong term.

10, 26, 74, 218, 654, 1946, 5834

- (a) **654** (b) 26 (c) 1946 (d) 218

Solution:

The relationship between the numbers is that there is a pattern to the additions between the consecutive terms of the series. Thus $10+16=26$; $26+48=74$; $74+144=218$; $218+432=650$; $650+1296=1946$ & $1946+3888=5834$. If you notice the numbers being added, you see that they form a GP: 16, 48, 144, 432, 1296 and 3888. Thus, clearly the number 654 doesn't fit in the given series. Hence the correct answer is option (a).

2. 18, 37, 76, 155, ____, 633, 1272

- (a) 322 (b) **314** (c) 341 (d) 250

Solution:

The sequence is as follows $18, 18 \times 2 + 1, 37 \times 2 + 2, 76 \times 2 + 3, 155 \times 2 + 4 = 314$. So option (b) is the correct answer.

3. -1, 0, 1, 0, 2, 4, 1, 6, 9, 2, 12, 16, ? ? ?

- (a) 11, 18, 27 (b) -1, 0, 3 (c) **3, 20, 25** (d) Cannot be ascertained

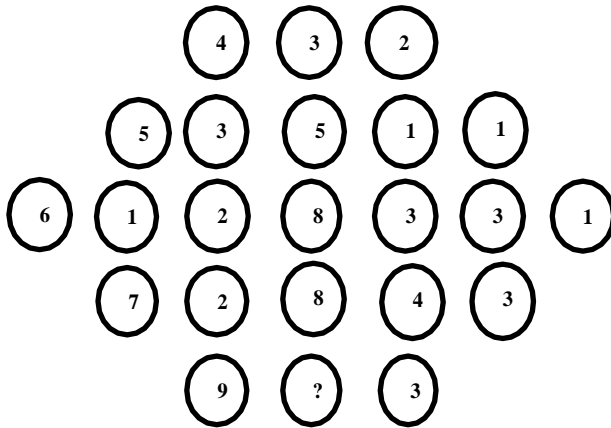
Solution:

There are three series alternating inside this series and the terms of the three series are at intervals of three places. Thus, the 1st, 4th, 7th and 10th terms form the sequence -1, 0, 1, 2 and hence the 13th term would be 3.

Similarly, the 2nd, 5th, 8th and 11th terms form the sequence 0, 2, 6, 12 and hence the 14th term would be 20 (as the series follows the logic +2, +4, +6 and hence would next need a +8).

The remaining sequence is 1, 4, 9, 16 and hence the 15th term would be 25. Option (c) is the correct answer.

4. What number should replace the question mark?



- (a) 1 (b) 4 (c) 12 (d) 6

Solution:

The value of the middle number in every row is equal to half the sum of the other numbers in the row. This can be viewed by looking at any of the first four rows. In the first row $(4+2)/2 = 3$; a similar logic exists for the other rows. The missing number is $(9+3)/2 = 6$.

5. Find the missing number in the following set:

2	4	6	8	10
2	14	34	?	98

- (a) 30 (b) 62 (c) 42 (d) 78

Solution:

The logic of the second row is, square of the number immediately above it $- 2$.

Thus, $2^2 - 2 = 2$; $4^2 - 2 = 14$; $6^2 - 2 = 34$; hence, $8^2 - 2 = 62$.

6. In this number grid insert the missing number at the sign of interrogation.

8	4	9	5
5	7	3	4
3	4	5	8
39	44	60	?

(a) 62

(b) **72**

(c) 60

(d) 70

Solution:

The logic for each column is fixed: So the first column has 39 at the bottom because $(8 + 5) \times 3 = 39$.

Similarly, in the second column we have: $(4 + 7) \times 4 = 44$.

In the third column we have: $(9 + 3) \times 5 = 60$

In the fourth column we would get: $(5 + 4) \times 8 = 72$. Option (b) is correct.

7. 4, 32, 288, ?, 31680

(a) 25600

(b) **2880**

(c) 7420

(d) 10000

Solution:

The logic of the series is 4, $4 \times 8 = 32$, $32 \times 9 = 288$, $288 \times 10 = 2880$, $2880 \times 11 = 31680$. Thus, the missing number is 2880. Option (b) is correct.

8. 300, 296, 287, 271, ?, 210

(a) **246**

(b) 250

(c) 244

(d) None of these

Solution:

The series follows the logic of -4 , -9 , -16 and hence the missing term must be $271 - 25 = 246$. So option (a) is correct.

9. 64, 125, 216, 343, 512, ?

(a) 8

(b) 729

(c) 27

(d) **999**

Solution:

All the numbers in the series are perfect cubes. 999 is not a cube of any natural number. Hence, option (d) is correct.

10. 2, 3, 18, 115, 854, ?

(a) 7776

(b) **7767**

(c) 6676

(d) 6667

Solution:

$$3 = 2 \times 1 + 1^2$$

$$18 = 3 \times 3 + 3^2$$

$$115 = 18 \times 5 + 5^2$$

$$854 = 115 \times 7 + 7^2$$

$$854 \times 9 + 9^2 = 7686 + 81 = 7767$$

11. **40, 24, 16, 12, 10, 9, ?**

- (a) **8.5** (b) 8 (c) 7.5 (d) 7

Solution:

The series follows logic of -16, -8, -4, -2, -1. Hence, the next term in the series would be $9 - 0.5 = 8.5$.
Correct answer is option (a).

12. **Find the odd man out: 1, 11, 26, 49, 80, 122, 169, 227, 290, 361**

- (a) 49 (b) 26 (c) **80** (d) 122

Solution:

The differences between the consecutive terms of the series are

5, 8, 11; 5, 8, 11;

$$\therefore \text{2nd term} = \text{1st term} + 10 = 1 + 10 = 11$$

$$\text{3rd term} = \text{2nd term} + 10 + 5 = 11 + 10 + 5 = 26$$

$$\text{4th term} = \text{3rd term} + 10 + 5 + 8 = 26 + 10 + 5 + 8 = 49$$

$$\text{5th term} = \text{4th term} + 10 + 5 + 8 + 11 = 49 + 10 + 5 + 8 + 11 = 83$$

Thus, fifth term should be 83 and not 80.

13. **Find the odd man out: 35, 19, 11, 7, 5, 4.5, 3.5**

- (a) 3.5 (b) **4.5** (c) 19 (d) 7

Solution:

$35 - 19 = 16$, $19 - 11 = 8$, $11 - 7 = 4$, $7 - 5 = 2$, $5 - 4 = 1$, $4 - 3.5 = .5$ The difference is halved every time. Thus the wrong number is 4.5, it should be 4.

14. **7, 56, 92, 117, 133, ?**

- (a) 148 (b) 138 (c) 135 (d) **142**

Solution:

The pattern of the number series is $+7^2$, $+6^2$, $+5^2$, $+4^2$, $+3^2$

15. **1, 4, 9, 1, 6, 2, 5, ?, ?**

- (a) 2, 6 (b) 3, 6 (c) 3, 9 (d) 2, 9

Solution: At a first glance it is very difficult to see any kind of pattern here. Any kind of pattern among increasing, decreasing, product, square, cube etc does not seem to be working here.

But we can observe that 1, 4, 9 are squares of 1, 2, 3 respectively. And after that should come 16 but instead of that we have 1, 6. After that instead of 25, we have 2, 5. So, we can come to the conclusion that when the squares start taking 2 digits, instead of writing them as a 2 digit number, we simply separate them into 2 different terms. So, our next term will be 3, 6.

16. **21, 77, 165, 285, ?**

(a) **437**

(b) 869

(c) 591

(d) 525

Solution:

$$21 = 5^2 - 4$$

$$77 = 9^2 - 4$$

$$165 = 13^2 - 4$$

$$285 = 17^2 - 4 \text{ Hence, } 437 = 21^2 - 4$$

17. **15625, 6250, 2500, 1000, ?, 160**

(a) 600

(b) **400**

(c) 500

(d) 650

Solution:

First term/2.5 = Second term

Second term/2.5 = Third term

And so on

So answer will be $1000/2.5 = 400$

18. **15, 51, 216, 1100, ?, 46452**

(a) 6530

(b) 6560

(c) **6630**

(d) 6650

Solution:

$$15 * 3 + 3 * 2 = 51$$

$$51 * 4 + 4 * 3 = 216$$

$$216 * 5 + 5 * 4 = 1100$$

$$1100 * 6 + 6 * 5 = 6630$$

$$6630 * 7 + 7 * 6 = 46452$$

19. **4, 18, 100, 294, _____**

(a) 1000

(b) 1100

(c) **1210**

(d) 1452

Solution:

$$2^3 - 2^2 = 3$$

$$3^3 - 3^2 = 18$$

$$5^3 - 5^2 = 100$$

$$7^3 - 7^2 = 294$$

$$\text{So, } 11^3 - 11^2 = 1210$$

20. **2, 30, 130, 350, _____**

(a) 512

(b) 520

(c) 729

(d) **738**

Solution:

$$2 = 1^3 + 1$$

$$30 = 3^3 + 3$$

$$130 = 5^3 + 5$$

$$350 = 7^3 + 7$$

$$\text{So next term will be } 9^3 + 9 = 738$$

21. **12, 54, 144, 300, 540, 882, ?**

(a) 1234

(b) 1314

(c) **1344**

(d) 1446

Solution:

$$(2^2) * 3 = 12$$

$$(3^2) * 6 = 54$$

$$(4^2) * 9 = 144$$

$$(5^2) * 12 = 300$$

$$(6^2) * 15 = 540$$

$$(7^2) * 18 = 882$$

$$(8^2) * 21 = 1344$$

22. 8, 7, 11, 12, 14, 17, 17, 22, ?

(a) 27

(b) 20

(c) 22

(d) 24

Solution:

There are two alternate series

8, 11, 14, 17, 20

7, 12, 17, 22

So the next term will be filled by 20

23. Find the odd man out: 253, 136, 352, 324, 631, 244

(a) 324

(b) 136

(c) 352

(d) 631

Solution:

The sum of all three digits comes to 10, except 324.

24. Find the odd man out: 15, 16, 34, 105, 424, 2124, 12756

(a) 34

(b) 2124

(c) 105

(d) 424

Solution:

$$15 * 1 + 1 = 16$$

$$16 * 2 + 2 = 34$$

$$34 * 3 + 3 = 105$$

$$105 * 4 + 4 = 424$$

$$424 * 5 + 5 = 2125$$

$$2125 * 6 + 6 = 12756$$

So, the wrong number is 2124

25. Find the next number in the following series: 2, 6, 12, 20, 30, 42, 56, ?

(a) 61

(b) 64

(c) 72

(d) 70

Solution:

$$2 + 4 = 6$$

$$6 + 6 = 12$$

$$12 + 8 = 20$$

$$20 + 10 = 30$$

$$30 + 12 = 42$$

$$42 + 14 = 56$$

$$56 + 16 = 72$$

26. Find the odd man out: 125, 106, 88, 76, 65, 58, 53

(a) 125

(b) 106

(c) 88

(d) 76

Solution:

Add series of prime numbers starting from 5 to get the next number

$$53 + 5 = 58$$

$$58 + 7 = 65$$

$$65 + 11 = 76$$

$$76 + 13 = 89$$

$$89 + 17 = 106$$

$$106 + 19 = 125$$

27. Find the odd man out: 1, 3, 10, 21, 64, 129, 356, 777

(a) 3

(b) 64

(c) 129

(d) 356

Solution:

$$1 = 1$$

$$3 = 3$$

$$10 = 1 + 0 = 1$$

$$21 = 2 + 1 = 3$$

$$64 = 6 + 4 = 10 = 1 + 0 = 1$$

$$129 = 1 + 2 + 9 = 12 = 1 + 2 = 3$$

$$356 = 3 + 5 + 6 = 14 = 1 + 4 = 5 \text{ (The sum should be one. Hence, it is wrong)}$$

$$777 = 7 + 7 + 7 = 21 = 2 + 1 = 3$$

28. Find the odd man out: 3, 7, 15, 39, 63, 127, 255, 511

- (a) 15 (b) 39 (c) 63 (d) 127

Solution:

$$3 * 2 + 1 = 7$$

$$7 * 2 + 1 = 15$$

$$15 * 2 + 1 = 31$$

$$31 * 2 + 1 = 63$$

29. Find out the wrong term: 2, 6, 24, 96, 285, 568, 567

- (a) 24 (b) 6 (c) 285 (d) 567

Solution:

The correct pattern is $x 6 - 6$, $x 5 - 5$, $x 4 - 4$,

So, 24 is wrong and must be replaced by $(6 x 5 - 5)$ i.e. 25

30. Find the next term in the following series: 8, 24, 12, 36, 18, 54, ?

- (a) 27 (b) 108 (c) 68 (d) 72

Solution:

$$8 * 3 = 24$$

$$24 / 2 = 12$$

$$12 * 3 = 36$$

$$36 / 2 = 18$$

$$18 * 3 = 54$$

$$54 / 2 = 27$$

HOME WORK

31. Find the odd man out: 16, 25, 36, 72, 144, 196, 225

- (a) 225 (b) 196 (c) 72 (d) 36

Solution:

All are square numbers except 72

32. Find the odd man out: 8, 27, 64, 100, 125, 216, 343

- (a) 27 (b) 125 (c) 343 (d) **100**

Solution:

All are perfect cubes except 100

33. 3, 4, 16, 75, 364, ?

- (a) 874 (b) 1238 (c) 1560 (d) **1945**

Solution:

$$\text{Step 1} \rightarrow 3 * 1 + 1^3 = 4$$

$$\text{Step 2} \rightarrow 4 * 2 + 2^3 = 16$$

$$\text{Step 3} \rightarrow 16 * 3 + 3^3 = 75$$

$$\text{Step 4} \rightarrow 75 * 4 + 4^3 = 364$$

$$\text{Step 5} \rightarrow 364 * 5 + 5^3 = 1945$$

34. $\frac{1}{3}$, $\frac{1}{5}$, $\frac{3}{25}$, $\frac{9}{125}$, ?

- (a) $\frac{125}{27}$ (b) $\frac{81}{125}$ (c) $\frac{12}{625}$ (d) **$\frac{27}{625}$**

Solution:

Every term multiply by $\frac{3}{5}$

$$\frac{1}{3} * \frac{3}{5} = \frac{1}{5}$$

$$\frac{1}{5} * \frac{3}{5} = \frac{3}{25}$$

$$\frac{3}{25} * \frac{3}{5} = \frac{9}{125}$$

$$\frac{9}{125} * \frac{3}{5} = \frac{27}{625}$$

35. 2, 12, 30, 56, 90, ?

- (a) 121 (b) 123 (c) **132** (d) 156

Solution:

$$1 * 2 = 2$$

$$3 * 4 = 12$$

$$5 * 6 = 30$$

$$7 * 8 = 56$$

$$9 * 10 = 90$$

$$11 * 12 = 132$$

36. **1, 3, 6, 10, 15, ?**

(a) 20

(b) 21

(c) 28

(d) 36

Solution:

$$1$$

$$1 + 2 = 3$$

$$1 + 2 + 3 = 6$$

$$1 + 2 + 3 + 4 = 10$$

$$1 + 2 + 3 + 4 + 5 = 15$$

$$1 + 2 + 3 + 4 + 5 + 6 = 21$$

37. **9, 3, 6, 21, 9, 12, 33, 15, ?**

(a) 17

(b) 18

(c) 27

(d) 30

Solution:

$$(9, 3, 6), (21, 9, 12), (33, 15, ?)$$

$$(9 - 3 = 6)$$

$$(21 - 9 = 12)$$

$$(33 - 15 = 18)$$

38. **17, 19, 23, 29, ?, 37**

(a) 31

(b) 33

(c) 35

(d) 37

Solution:

All are consecutive prime numbers

39. **165, 195, 255, 285, 345, ?**

(a) 375

(b) 385

(c) 425

(d) 435

Solution:

$$165, 195, 255, 285, 345, x$$

See the pattern,

$$255 - 165 = 90$$

$$285 - 195 = 90$$

$$345 - 255 = 90$$

$$x - 285 = 90$$

$$x = 375$$

40. **986, 7248, 14832, 432246, 1264824, ?**

(a) 2123458625 (b) 2122232468 (c) 2122241284 (d) **2122432168**

Solution:

$$986 \rightarrow 9 * 8 = 72, 8 * 6 = 48 \rightarrow 7248$$

$$7248 \rightarrow 7 * 2 = 14, 2 * 4 = 8, 4 * 8 = 32 \rightarrow 14832$$

$$14832 \rightarrow 1 * 4 = 4, 4 * 8 = 32, 8 * 3 = 24, 3 * 2 = 6 \rightarrow 432246$$

Similarly,

$$1264824 \rightarrow 1 * 2 = 2, 2 * 6 = 12, 6 * 4 = 24, 4 * 8 = 32, 8 * 2 = 16, 2 * 4 = 8 \rightarrow 2122432168$$