

CHAPTER – 2

NUMBER AND LETTER ANALOGIES

Analogy means "similarity" or "similar relation ship". In questions on number or letter analogies, a pair, that has a certain relationship between them, is given. This number/letter pair is followed by a third number/letter. The student is expected to identify the relationship between the pair given and find out a FOURTH number such that the relationship between the third and the fourth is similar to the relationship that exists between the first and the second. (In some cases, it may not be the fourth one that has to be found out. The fourth one will be given and the student has to find out one of the other three, whichever is not given).

Number Analogies:

Typical relationships between the numbers in a given pair can be any of the following:

- One number is a multiple of the other.
- One number is the square or square root of the other.
- One number is the cube or cube root of the other.
- The two numbers are squares of two other numbers which themselves are related. For example, the two numbers are squares of two consecutive integers or squares of two consecutive even integers or squares of two consecutive odd integers.
- The two numbers are such that they are obtained by subtracting a certain number from the squares or cubes of the two related numbers.
- The two numbers are such that they are obtained by adding a certain number to the squares or cubes of the two related numbers.
- The two numbers can be consecutive, even, odd or prime numbers.

There can be many more combinations that one can think of but the student has to note an important point in solving questions on Number Analogies. In Number Series related questions, since a series of numbers (more than two numbers) will be given, the relationship or pattern can be identified uniquely. In Number Analogies, since only two numbers are given, it may be possible to think of more than one relationship existing between the two numbers in the given pair. But, it should be kept in mind that generally, simple addition of one number or subtraction of one number is not what is given in Number Analogies. The questions try to test the insight that the student has got into the relationship between the numbers.

Let us take a few examples and understand the questions on Number Analogies.

Worked out examples:

1. Find the missing number.
 $25 : 36 :: 49 : \underline{\hspace{1cm}}$
 (A) 61 (B) 63 (C) 65 (D) 60 (E) 98

Sol. When the numbers in the question are considered the students tend to consider 25 and 36 as squares

of two consecutive natural numbers. But the answer choices does not consist of an answer suitable to the above logic. Hence, it is important that, the student keeps the answer choices in view in arriving at the logic.

$$25 + 11 = 36$$

$$\text{Similarly, } 49 + 11 = 60 \quad \text{Choice (D)}$$

2. Find the missing number.
 $27 : 51 :: 83 : \underline{\hspace{1cm}}$
 (A) 102 (B) 117 (C) 123
 (D) 138 (E) 171

Sol. The given analogy can be written as
 $5^2 + 2 : 7^2 + 2 :: 9^2 + 2 : \underline{\hspace{1cm}}$
 5 and 7 are successive odd numbers.
 Similarly, next odd number to 9 is 11 and
 $11^2 + 2 = 121 + 2 = 123.$ Choice (C)

3. Find the missing number.
 $11 : 25 :: 17 : \underline{\hspace{1cm}}$
 (A) 33 (B) 28 (C) 41 (D) 37 (E) 34

Sol. $11 \times 2 + 3 = 22 + 3 = 25$
 Similarly, $17 \times 2 + 3 = 34 + 3 = 37.$ Choice (D)

Letter Analogies:

The questions in this area are similar to Verbal Analogies. Here, the questions are based on the relationship between **two groups of letters** (instead of **two words** as in Verbal Analogies). Typically, three sets of letters are given followed by a question mark (where a fourth set of letters is supposed to be inserted). The student has to find the relation or order in which the letters have been grouped together in the first two sets of letters on the left hand side of the symbol :: and then find a set of letters to fit in place of the question mark so that the third and the fourth set of letters will also have the same relationship as the first and the second. The sequence or order in which the letters are grouped can be illustrated by the following examples.

1. BDEG : DFGI :: HKMO :
 (A) ILNP (B) JMOP (C) JMOQ
 (D) JNOQ (E) IMPO

Sol. Two letters are added to each letter to get the next letters in the analogy.
 B D E G; Similarly, H K M O
 $+2 +2 +2 +2$ $+2 +2 +2 +2$
 D F G I J M O Q
 Choice (C)

2. ACDF : CGJN :: BEHI :
 (A) DJNQ (B) DINQ (C) DINR
 (D) DHNQ (E) DKMR

Sol. A C D F; Similarly, B E H I
 $+2 +4 +6 +8$ $+2 +4 +6 +8$
 C G J N D I N Q
 Choice (B)

3. SUWY : LPTX :: PRTV : _____.
 (A) INRU (B) INQU (C) IMRU
 (D) IMQU (E) JNRS

Sol. S U W Y; Similarly, P R T V
 $-7 -5 -3 -1$ $-7 -5 -3 -1$
 L P T X I M Q U
 Choice (D)

4. BCDE : DFHH :: FGHI : _____.
 (A) LJPL (B) LKPL (C) JKPJ
 (D) IKPL (E) JKPM

Sol. B C D E; Similarly, F G H I
 $x2 +3$ $x2 +3$ $x2 +3$ $x2 +3$
 D F H H L J P L
 Choice (A)

Verbal Analogies:

Here, the questions are based on relationship between the two words. In these kind of questions three words are followed by a blank space, which the student has to fill up in such a way that the third and the fourth words

have the same relationship between them as the first and the second words have. The following examples help in understanding the concepts.

1. Gum : Stick :: Needle : _____.
 (A) Cloth (B) Prick (C) Taylor
 (D) Stitch (E) Thread

Sol: Gum is used to stick and needle is used to stitch.
 Choice (D)

2. Socks : Feet :: _____ : Hands
 (A) Arms (B) Snow (C) Gloves
 (D) Fingers (E) Nails

Sol: Socks are worn on feet, similarly gloves are worn on hands.
 Choice (C)

3. Soft : Hard :: Cold : _____.
 (A) Hot (B) Snow (C) winter
 (D) Ice (E) Night

Sol: Soft and hard are antonyms similarly the antonym of cold is hot.
 Choice (A)

Exercise – 2(a)

Directions for questions 1 to 50: In each question below two pairs of numbers are given but one number in the second pair is missing. Identify the relationship between the two numbers in the first pair and find the missing number in the second pair such that the numbers in the second pair also follow the same relationship.

1. $196 : 256 :: 324 : \underline{\hspace{1cm}}$
(A) 361 (B) 400 (C) 411
(D) 484 (E) 529
2. $441 : 361 :: 729 : \underline{\hspace{1cm}}$
(A) 841 (B) 676 (C) 625
(D) 684 (E) 960
3. $121 : 169 :: 361 : \underline{\hspace{1cm}}$
(A) 529 (B) 400 (C) 484
(D) 576 (E) 256
4. $225 : 400 :: 625 : \underline{\hspace{1cm}}$
(A) 767 (B) 729 (C) 961
(D) 900 (E) 1024
5. $324 : 400 :: 576 : \underline{\hspace{1cm}}$
(A) 625 (B) 729 (C) 784
(D) 900 (E) 841
6. $125 : 216 :: 1331 : \underline{\hspace{1cm}}$
(A) 144 (B) 729 (C) 1728
(D) 2744 (E) 1000
7. $343 : 729 :: 125 : \underline{\hspace{1cm}}$
(A) 27 (B) 343 (C) 216
(D) 512 (E) 25
8. $125 : 343 :: 343 : \underline{\hspace{1cm}}$
(A) 512 (B) 1331 (C) 1728
(D) 81 (E) 27
9. $27 : 216 :: 64 : \underline{\hspace{1cm}}$
(A) 216 (B) 1331 (C) 512
(D) 729 (E) 1000
10. $97 : 89 :: 43 : \underline{\hspace{1cm}}$
(A) 37 (B) 31 (C) 39 (D) 40 (E) 41
11. $36 : 343 :: \underline{\hspace{1cm}} : 1331$
(A) 81 (B) 121 (C) 100
(D) 144 (E) 169
12. $24 : 576 :: 32 : \underline{\hspace{1cm}}$
(A) 1024 (B) 992 (C) 1228
(D) 865 (E) 1728
13. $13 : 2197 :: 16 : \underline{\hspace{1cm}}$
(A) 256 (B) 2744 (C) 4096
(D) 3378 (E) 3375
14. $81 : 729 :: 144 : \underline{\hspace{1cm}}$
(A) 1728 (B) 1331 (C) 169
(D) 2197 (E) 121
15. $22 : 506 :: 27 : \underline{\hspace{1cm}}$
(A) 675 (B) 756 (C) 702
(D) 783 (E) 800
16. $6 : 222 :: 9 : \underline{\hspace{1cm}}$
(A) 738 (B) 767 (C) 729
(D) 744 (E) 776
17. $5 : 120 :: 8 : \underline{\hspace{1cm}}$
(A) 520 (B) 504 (C) 448
(D) 512 (E) 542
18. $5 : 150 :: 8 : \underline{\hspace{1cm}}$
(A) 520 (B) 516 (C) 512
(D) 584 (E) 576
19. $6 : 180 :: 9 : \underline{\hspace{1cm}}$
(A) 729 (B) 738 (C) 632
(D) 648 (E) 623
20. $105 : 150 :: 39 : \underline{\hspace{1cm}}$
(A) 68 (B) 64 (C) 60 (D) 72 (E) 74
21. $390 : 315 :: \underline{\hspace{1cm}} : 564$
(A) 663 (B) 689 (C) 653
(D) 674 (E) 523
22. $3864 : 5098 :: 4994 : \underline{\hspace{1cm}}$
(A) 6228 (B) 6246 (C) 6194
(D) 6286 (E) 6144
23. $1936 : 1360 :: \underline{\hspace{1cm}} : 2142$
(A) 2746 (B) 2718 (C) 2672
(D) 2466 (E) 2933
24. $11 : 24 :: 37 : \underline{\hspace{1cm}}$
(A) 68 (B) 92 (C) 74 (D) 84 (E) 78
25. $97 : 8 :: 43 : \underline{\hspace{1cm}}$
(A) 4 (B) 2 (C) 3 (D) 7 (E) 9
26. $784 : 812 :: 1024 : \underline{\hspace{1cm}}$
(A) 1040 (B) 1056 (C) 1132
(D) 1098 (E) 1236
27. $256 : 240 :: \underline{\hspace{1cm}} : 90$
(A) 110 (B) 132 (C) 100
(D) 81 (E) 218
28. $16 : 68 :: 36 : \underline{\hspace{1cm}}$
(A) 216 (B) 210 (C) 222
(D) 226 (E) 183
29. $512 : 504 :: 1728 : \underline{\hspace{1cm}}$
(A) 1728 (B) 1716 (C) 1718
(D) 1724 (E) 1824
30. $4 : 256 :: 5 : \underline{\hspace{1cm}}$
(A) 625 (B) 1025 (C) 525
(D) 875 (E) 946
31. $4 : 256 :: 5 : \underline{\hspace{1cm}}$
(A) 1225 (B) 125 (C) 2525
(D) 3125 (E) 81
32. $4 : 0.25 :: 5 : \underline{\hspace{1cm}}$
(A) 0.4 (B) 0.6 (C) 0.2
(D) 0.8 (E) 1.2

33. 2 : 0.25 :: 5 : _____
 (A) 0.06 (B) 0.04 (C) 0.08
 (D) 0.02 (E) 0.4
34. 132 : 660 :: 726 : _____
 (A) 2890 (B) 3260 (C) 3630
 (D) 3840 (E) 1938
35. 7 : 18 :: 12 : _____
 (A) 26 (B) 28 (C) 32
 (D) 37 (E) 49
36. 23 : 66 :: 72 : _____
 (A) 207 (B) 237 (C) 219
 (D) 213 (E) 343
37. 143 : 221 :: 437 : _____
 (A) 629 (B) 667 (C) 713
 (D) 693 (E) 824
38. 1234 : 18964 :: 4213 : _____
 (A) 64723 (B) 16419 (C) 168127
 (D) 163829 (E) 18246
39. 101 : 2002 :: 30003 : _____
 (A) 4004 (B) 40004 (C) 404
 (D) 440 (E) 400004
40. 127 : 100 :: 187 : _____
 (A) 256 (B) 324 (C) 361
 (D) 441 (E) 529
41. 64 : 100 :: 256 : _____
 (A) 289 (B) 144 (C) 484
 (D) 169 (E) 121
42. 25 : 343 :: 121 : _____
 (A) 125 (B) 216 (C) 64
 (D) 512 (E) 343
43. 3829 : 3851 :: 2987 : _____
 (A) 3013 (B) 3007 (C) 3017
 (D) 3023 (E) 2983
44. 121 : 484 :: 235 : _____
 (A) 1350 (B) 2750 (C) 2150
 (D) 2350 (E) 3140
45. 47 : 121 :: 89 : _____
 (A) 183 (B) 191 (C) 193
 (D) 195 (E) 187
46. 5 : 30 :: 7 : _____
 (A) 46 (B) 48 (C) 56 (D) 68 (E) 57
47. 11 : 1331 :: _____ : 2744
 (A) 12 (B) 16 (C) 14 (D) 17 (E) 13
48. 343 : 512 :: 1331 : _____
 (A) 1436 (B) 1598 (C) 1648
 (D) 1728 (E) 1649
49. 10 : 30 :: 68 : _____
 (A) 176 (B) 164 (C) 130 (D) 112 (E) 165
50. 25 : 343 :: 81 : _____
 (A) 986 (B) 729 (C) 1331
 (D) 1276 (E) 987

Exercise – 2(b)

Directions for questions 1 to 50: In each question below two pairs of letter(s)/word are given but one letter(s)/word in the second pair is missing. Identify the relationship between the two letter(s)/word in the first pair and find the missing letter(s)/word in the second pair such that the letter(s)/word in the second pair also follow the same relationship.

1. C : G :: K : _____
 (A) N (B) Q (C) O (D) P (E) R
2. K : P :: S : _____
 (A) F (B) H (C) G (D) I (E) V
3. F : S :: L : _____
 (A) V (B) W (C) X (D) T (E) Y
4. H : P :: S : _____
 (A) L (B) N (C) J (D) I (E) M
5. DK : GG :: LS : _____
 (A) OR (B) PP (C) OO
 (D) NN (E) RR
6. PS : KH :: MT : _____
 (A) NH (B) NG (C) LG
 (D) LH (E) MG
7. EOU : IUA :: AIU : _____
 (A) EIO (B) IOE (C) EOA
 (D) EAO (E) AEI
8. HRD : JSF :: XMP : _____
 (A) ZNQ (B) ZOR (C) YNR
 (D) MKR (E) YNQ
9. DATE : ECWI :: CHAIN : _____
 (A) DJDMS (B) DJELR (C) DIFMS
 (D) DIELS (E) DKFRM
10. MONTH : NMQPM :: PAPER : _____
 (A) QYTBV (B) QXSBX (C) QYTAV
 (D) QYSAW (E) QWPKV
11. TALENT : VDQLYG :: MODERN : _____
 (A) ORJMCB (B) OQIMCA (C) ORILCA
 (D) OQIKCZ (E) OPRSTV
12. PAPER : QZRCU :: _____ : NUMBER
 (A) OTOZHO (B) MVKDHU
 (C) OTKDBU (D) MVKDBU
 (E) MTKDBC
13. NATURE : PEVASI :: ISOMERS : _____
 (A) OTUNJTV (B) OTUNIST
 (C) PUVNJST (D) OVTNJST
 (E) OUTVJRV

14. RISHLE : IVHSOR :: PUBLIC : _____
 (A) KHPWY (B) KHYOVX (C) KIXPWZ
 (D) KIXNWX (E) KHXNVY
15. AHK : FRZ :: HRB : _____
 (A) MDR (B) NDQ (C) LCD
 (D) NBP (E) MBQ
16. BRPL : AOKE :: APPLE : _____
 (A) ZMLHZ (B) YNLDX (C) YMNFX
 (D) ZMKEV (E) ZNLDV
17. BADF : CEMV :: HRID : _____
 (A) IVRT (B) IXSV (C) IVQU
 (D) IXST (E) IVSV
18. BAD : BBL :: JDFE : _____
 (A) JHRI (B) JHPX (C) JFTV
 (D) JHRT (E) JFPT
19. FAMOUS : HBODWL :: PECKL : _____
 (A) RJHTP (B) RJEVN (C) RLETP
 (D) RJXT (E) RKIXN
20. BDEJ : FLOD :: FIAC : _____
 (A) HRFR (B) RACI (C) RBDA
 (D) KBLI (E) None of these
21. TAP : SUZBOQ :: RED : _____
 (A) QTDGDE (B) PSDEDF (C) QSDFCE
 (D) QRDGBE (E) QRDGCE
22. PSB : NRQUZD :: SET : _____
 (A) RTDFSU (B) QUCGRV (C) QUDFRU
 (D) QUCGSV (E) QTDERS
23. MARINE : AIENRM :: DISGUISE : _____
 (A) IGIEDSUS (B) IDGSIUES
 (C) IGESRNPQ (D) IGEIUSSD
 (E) IGIESUSD
24. DEPR : LRPED :: POCKET : _____
 (A) TECHOP (B) TEKOCF (C) TEKOCF
 (D) TELNOQ (E) None of these
25. BCE : DIY :: ADFG : _____
 (A) APLV (B) APIW (C) AIPW
 (D) APJW (E) AQJW
26. 6P1 : 5Y2 :: 6J3 : _____
 (A) 6L4 (B) 9K4 (C) 9W4
 (D) 4L6 (E) 8I1
27. 3P2 : 2J0 :: 3R6 : _____
 (A) 2M6 (B) 2N8 (C) 1H6
 (D) 2L4 (E) 2V2
28. 2E3 : 4I5 :: 7O8 : _____
 (A) 8Q9 (B) 11W12 (C) 13A14
 (D) 9U12 (E) 10U11
29. A26 : E22 :: I18 : _____
 (A) 15L (B) 12O (C) O12
 (D) U6 (E) R9
30. 4X2 : 6Z2 :: 6P1 : _____
 (A) 8R1 (B) 9S1 (C) 7R1
 (D) 8S1 (E) 5Q1
31. Train : Track :: Bus : _____
 (A) Driver (B) Conductor (C) Petrol
 (D) Passengers (E) Road
32. Earth : Planet :: Carrot : _____
 (A) Vegetable (B) Plant (C) Cooking
 (D) Root (E) Fruit
33. Wood : Carpenter :: Iron : _____
 (A) Goldsmith (B) Instrument (C) Melting
 (D) Blacksmith (E) Metal
34. Pen : Write :: Knife : _____
 (A) Vegetable (B) Cut (C) Sharp
 (D) Shoot (E) Blood
35. Pig : Piglet :: Dog : _____
 (A) Cat (B) Tail (C) Pug
 (D) Canine (E) Puppy
36. Nut : Shell :: Seed : _____
 (A) Plant (B) Tree (C) Fruit
 (D) Sapling (E) Shade
37. Day : Night :: Spendthrift : _____
 (A) Rich (B) Miser (C) Poor
 (D) Pauper (E) Money
38. Hand : Fingers :: Leg : _____
 (A) Knuckles (B) Knee (C) Toes
 (D) Heel (E) Walk
39. Kangaroo : Hopping :: Snake : _____
 (A) Crawling (B) Mongoose (C) Poisonous
 (D) Bite (E) Frog
40. USA : President :: Germany : _____
 (A) Berlin (B) Chancellor (C) Director
 (D) Arms (E) Pope
41. Poem : Stanza :: _____ : _____
 (A) Essay : Paragraph (B) Word : Sentence
 (C) Song : Lyric (D) Book : story
 (E) Sentence : Letters
42. Japan : Sumo :: _____ : _____
 (A) India : Kabaddi
 (B) America : Rugby
 (C) Jamaica : Base ball
 (D) Bhutan : Archery
 (E) England : Foot ball
43. Australia : Kangaroo :: _____ : _____
 (A) Bangladesh : Hilsa
 (B) Finland : Brown Bear
 (C) India : Peacock
 (D) Mongolia : Saker Falcon
 (E) USA : Bald Eagle
44. Algeria : Dinar :: _____ : _____
 (A) Albania : Lek (B) Japan : Euro
 (C) Italy : Taka (D) Bangladesh : Rupee
 (E) Australia : Peso
45. Sharp : Blunt :: _____ : _____
 (A) Shelter : Guard (B) Show : Present
 (C) Sight : Blindness (D) Sign : Mark
 (E) Parity : Equality

46. Presume : Assume :: — : —
 (A) Simple : Fused (B) Sin : Purity
 (C) Singular : Rare (D) Sink : Rise
 (E) Diligent : Inactive
47. Clown : Circus :: — : —
 (A) Nurse : Doctor
 (B) Architect : Engineer
 (C) Lyricist : Writer
 (D) Club : Singer
 (E) Lawyer : Court
48. Crow : Murder :: — : —
 (A) Dolphin : Pup (B) Deer : Herd
 (C) Donkey : Jack (D) Dove : Cock
 (E) Sheep : Troop
49. Graham Bell : Telephone :: Galileo Galilei : —
 (A) Telescope (B) Television
 (C) Jet engine (D) Sewing Machine
 (E) Mother Board
50. Afghanistan : Kabul :: — : —
 (A) China : Tokyo
 (B) Canada : Toronto
 (C) Cuba : Bayamo
 (D) Ghana : Tema
 (E) Bulgaria : Sofia

Key

Exercise – 2(a)

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|-------|-------|-------|-------|-------|
| 1. B | 11. C | 21. A | 31. D | 41. D |
| 2. C | 12. A | 22. A | 32. C | 42. C |
| 3. A | 13. C | 23. B | 33. B | 43. A |
| 4. D | 14. A | 24. E | 34. C | 44. D |
| 5. A | 15. B | 25. B | 35. B | 45. E |
| 6. C | 16. A | 26. B | 36. D | 46. C |
| 7. B | 17. B | 27. C | 37. B | 47. C |
| 8. B | 18. E | 28. C | 38. C | 48. D |
| 9. C | 19. D | 29. B | 39. E | 49. C |
| 10. E | 20. A | 30. A | 40. A | 50. C |

Exercise – 2(b)

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|-------|-------|-------|-------|-------|
| 1. C | 11. C | 21. C | 31. E | 41. A |
| 2. B | 12. D | 22. B | 32. A | 42. D |
| 3. E | 13. B | 23. E | 33. D | 43. B |
| 4. A | 14. B | 24. C | 34. B | 44. A |
| 5. C | 15. E | 25. D | 35. E | 45. C |
| 6. B | 16. D | 26. C | 36. C | 46. C |
| 7. C | 17. A | 27. D | 37. B | 47. E |
| 8. E | 18. D | 28. E | 38. C | 48. B |
| 9. A | 19. B | 29. C | 39. A | 49. A |
| 10. D | 20. B | 30. A | 40. B | 50. E |