

ANSWER KEY: INDUCTIVE REASONING



section 1. Figure Series.

1. *Ans. A.*

Increasing number of sides in even numbers, i.e., 4-6-8-10.



2. *Ans. B.*

The figure gets cut, first into quarters, and then into eighths. The right side of each new cut is the black and white negative of its predecessor.



3. *Ans. C.*

The succeeding figure is almost the mirror image of the previous one. However, the white spirals are deleting their outer curves successively in "semi-circles". The black spirals are deleting their inner curves successively in "semi-circles".



4. *Ans. D.*

The black outer donut is deleting a quarter of itself

counterclockwise, starting from the lower right quarter. The inner black circle is also deleting a quarter of itself counterclockwise, but this time starting from the upper left quarter. There is an alternation of the "X" and the "cross" at the center of the figure.



5. *Ans. E.*

The figure is rotating 90° clockwise. The black shading is also slowly being deleted, starting from the innermost circle.



6. *Ans. B.*

The figure is rotating counterclockwise. The line in the square is moving, making the triangle grow wider. The circle is growing smaller, but it stays "attached" to the same point on the line and moves along with it.



7. *Ans. A.*

The number of sides of the figure is increasing by one, starting from 5 sides (i.e., 5-6-7-8). The number of compartments within each figure is increasing by two, starting from 3 compartments (i.e., 3-5-7-9).



8. *Ans. C.*

The arrow is curving successively. The white cross is moving from corner to corner clockwise, starting from the upper right corner. The star (alternating between black and white) within the cross is moving with the cross, but it is always found in the corner of the cross closer to the corner of the square.



9. *Ans. E.*

To the small cube, a similar prism - elongated along the smiley face - is added. A small cube is added to this prism. An elongated prism is then added. The addition of prisms/cubes is in a clockwise, "compact" fashion.



10. *Ans. D.*

The leftmost oblong splits along a horizontal axis; the resulting lower oblong becomes black while the upper one splits along a vertical axis. The resulting right oblong becomes black, while the left one splits along another horizontal axis; the new lower resulting oblong blackens.

Meanwhile, the sideways pyramid of circles is successively losing a base; the color of each remaining layer alternates between black and white. The lower right triangle splits

horizontally into a proportional upper triangle and a lower trapezoid. The lower trapezoid "produces" a similar small triangle, which then again splits horizontally to produce an upper triangle and a lower trapezoid.



11. *Ans. A.*

The outer "hollow" black octagon is successively losing every other side, starting from the base and going clockwise. The upper white triangle in the inner diamond is "mimicked" by a similar triangle below it; thus, the left white triangle is "mimicked" by a similar triangle to its right.



12. *Ans. E.*

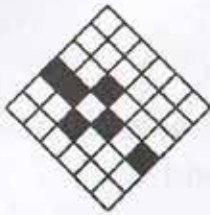
The original black square with the white-lined diamond is successively growing smaller and, at the same time, moving around the corners of the large square in a clockwise fashion. Alternating black and white "L's" appear one at a time (successively growing smaller also) at the same time the black square grows smaller. These "L's" have lines radiating from them; the number of these lines successively grows.



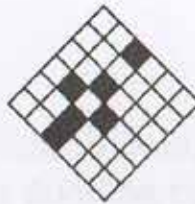
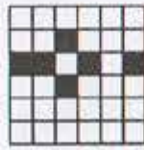
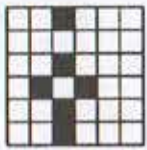
Section 2. Figure Grouping.



13. Ans. B.



All the others are exactly the same figure but in different positions.



14. Ans. D.



All the others are exactly the same spiral but in different positions.




15. Ans. C.




Each set has only one type of polygon based on the number of sides. The number of figures per set is the same number of sides of that set's characteristic polygon. That is, 5 pentagons, 3 triangles, 4 quadrilaterals, and 7 heptagons. The odd man out has only 5 hexagons, not 6.



16. *Ans. D.* 

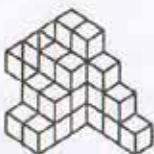
Figures A and B are exactly the same, only in different positions. The same goes for figures C and E.



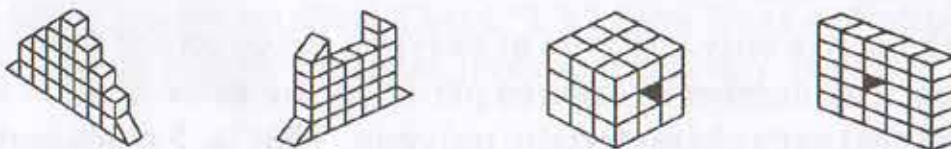
17. *Ans. E.* 

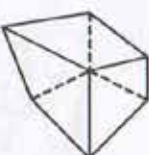
All the other figures have inner figures with lighter shading than the outer ones that contain them.



18. *Ans. C.* 

All the figures have a volume of 24 cubes, while the odd man out has 32.



19. *Ans. A.* 

All the others have an odd number of faces.



20. *Ans. B.*



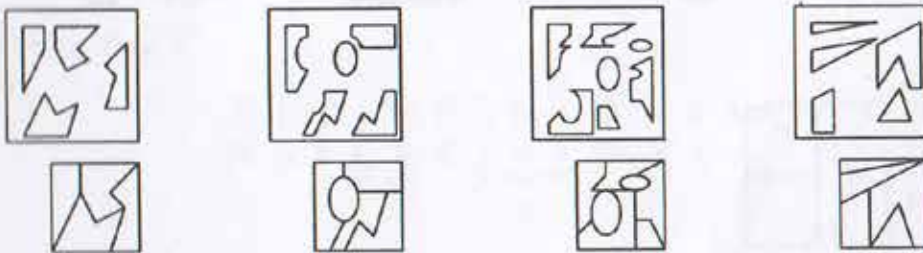
All the other figures have either a complete or incomplete "tunnel" going through them, thus dividing each solid into distinct inside and outside spaces. The odd man out is a Klein's bottle, a surface that has no inside when analyzed.



21. *Ans. E.*



All the others have pieces that interlock to form a square.



22. *Ans. D.*

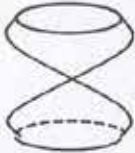


The others have at least one curve present in one of the

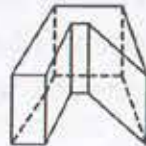
letters. All the others also have one vowel present.



23. *Ans. C.*



All the other solids can somehow be perceived as containing one continuous space despite complex structures. The odd man out has two definitely separate, distinct spaces.



24. *Ans. B.*



All the other figures exhibit some form of symmetry.



25. *Ans. A.*



All the other figures are divided into an even number of compartments by the arrows.



Section 3. Number and Letter Series.

26. Ans. A. S.

This is one of the older brain-teasers that exist. The series consists of the first letters of the Hindu-Arabic numerals ("One, Two, Three, Four, Five, Six..."). Thus, the next letter that comes in the series is S, which is the first letter of "Seven".

27. Ans. B. 99.

$$3_{+5} 8_{\times 2} 16_{+5} 21_{\times 2} 42_{+5} 47_{\times 2} 94_{+5} 99$$

28. Ans. C. 108.

$$2_{\times 1} 2_{+1} 3_{\times 2} 6_{+2} 8_{\times 3} 24_{+3} 27_{\times 4} 108$$

29. Ans. D. M.

* letter corresponds with its numerical placement in the alphabet, i.e., A=1, B=2, C=3, etc.

$$\begin{matrix} A & B & D & C & F & G & N & M \\ 1 & +1 & 2 & \times 2 & 4 & -1 & 3 & \times 2 & 6 & +1 & 7 & \times 2 & 14 & -1 & 13 \end{matrix}$$

30. Ans. E. IR.

$$\begin{matrix} A & B & C & D & E & F & G & H & I & J & K & L & M \\ Z & Y & X & W & V & U & T & S & R & Q & P & O & N \end{matrix}$$

31. Ans. A. JW.

$$\begin{matrix} A & B & C & D & E & F & G & H & I & J & K & L & M \\ N & O & P & Q & R & S & T & U & V & W & X & Y & Z \\ & & 1 & & 2 & & 3 \end{matrix}$$

32. Ans. D. T.

$$\begin{matrix} \Delta & B & C & D & E & F & G & H & I & J & K & L & M & N & O & P & Q & R & S & T & U & V & W & X & Y & Z \\ & & 1 & & 2 & & 3 & & 4 & & 5 \end{matrix}$$

* for those in the final series, uppercase and lowercase letters alternate, that is: B e I n T.



33. *Ans. E. f.*

Z Y X W V U T S R Q P O N M L K J I H G F
 2 1 2 1 2 1 2 1

* then, from

Z W U R P M K H F

lower/uppercase letters alternate as follows:

z W u r P m K h f
 1 2 1 2

34. *Ans. C. 742.*

The digits of each number follow independent patterns.

The first digits of the numbers follow this pattern:

1 1 2 3 4 5 6 7 ...
 1 1+0 1+1 1+2 1+3 1+4 1+5 1+6

The second digits follow this pattern:

2, 4, 8, 2, 4, 8, 2, 4...

The third digits follow this pattern:

3, 2, 1, 1, 2, 3, 3, 2...

Hence, the next number is 742.

35. *Ans. B. C.*

F A E B D C

* every other letter is in sequence, with the sequence beginning with F going backwards (F, E, D) and the sequence beginning with A going forward (A, B, C)

36. *Ans. E. DC.*

AB CD EFGH IJ KL MNOP QR ST UVWX YZ

Reverse every other pair, then reverse the entire sequence.

YZ TS QR LK IJ DC AB

37. *Ans. B. Ts.*

AB CD EF GH IJ KL MN OP QR T UV WX YZ

Reverse every other pair, then follow this pattern of lower/uppercase for the entire sequence: both lowercase, then upper/lowercase, then lower/uppercase, then both uppercase, then reverse this pattern.

ab Dc eF HG IJ lK Mn po qr Ts uV XW YZ

38. *Ans. A. 1429.*

$$40 +_{52} 92 +_{25} 117 +_{104} 221 +_{401} 622 +_{156} 778 +_{651} 1429$$

* ! * ! * ! * ! F SAT - UNP

* multiples of 52

! reverse of previous multiple of 52, i.e.,

$$52 \leftrightarrow 25, 104 \leftrightarrow 401, 156 \leftrightarrow 651$$

39. *Ans. D. 54.*

$$18 +_{12} 30 -_{21} 9 +_{24} 33 -_{42} -9 +_{36} 27 -_{63} -36 +_{48} 12 -_{84} -72 +_{60} -12 -_6 -18 +_{72} 54$$

* ! * ! * ! * ! * ! * ! *

* (add) multiples of 12

! (subtract) reverse of previous multiple of 12, i.e.,

$$12 \leftrightarrow 21, 24 \leftrightarrow 42... 60 \leftrightarrow 06 = 6$$

40. *Ans. C. L11j.*

From the sequence

ABC DEF GHI JKL...

reverse each trio to get

CBA FED IHG LKJ...

Replace each middle letter with its corresponding numerical placement (A=1, B=2, C=3, etc.) and replace the last letter with its lowercase counterpart.

C2a F5d I8g L11j...



41. *Ans. C. 63556c.*

Every other term starting from 2 is the square of the previous term that has no letter paired with it.

$$2 \ 2a \ 4 \ 4z \ 16 \ 61b \ 256 \ 652y \ 65536...$$

↓ ↓ ↓ ↓

$$2^2 \quad 4^2 \quad 16^2 \quad 256^2$$

The term following each "squared term" as shown above is a combination of a number and a letter. The number is simply the "mirror image" of the preceding "squared term", i.e.

$$2 \leftrightarrow 2, 4 \leftrightarrow 4, 16 \leftrightarrow 61, 256 \leftrightarrow 652...$$

Hence, the numerical component of the next term in the sequence should be the "mirror image" of 65536, i.e., 63556.

The sequence of letters combined with these "mirror image" numbers simply follows the sequence

a Z b Y c X d W e V f U g...

Thus, next in sequence will be "c". Combining this with 63556, we get **63556c**.

42. *Ans. E. At.*

Every other term is the reverse of the previous term, i.e.,

Nb ↔ bN

aC ↔ Ca

Sf ↔ fS

tA ↔ At

43. *Ans. B. 1wG8.*

The first components are numbers following the sequence

8, 7, 6, 5, 4, 3, 2, 1

The fourth components follow the sequence

1, 2, 3, 4, 5, 6, 7, 8

The two middle terms are pairs of letters. Although the choice of letters do not follow a fixed pattern per se, the way they are arranged follow a pattern.

gW sL dH mN nM hD lS ??

The first components of each pair are lowercase letters of the sequence

g s d m n h l ?

The letter choice is random. The second components of each letter pair are uppercase letters of the sequence

W L H N M D S ?

This sequence is a reversal of the previous sequence, that is,

g s d m n h l ?

and

W L H N M D S ?

are just the reversals of each other. Hence, the two '?'s can be replaced by "w" and "G", respectively, as these are the first terms of the other sequence, except that the "forms" (upper/lowercase) are reversed.

Combining these with "1" and "8", we get **1wG8**.

44. *Ans. D. 12A.*

Every other term starting from 0A follows the pattern

0A 7a 4A 7e 0A 7i 8A 7o 0A 7u

where the numbers simply follow the pattern

0, 4, 0, 8, 0...

i.e., multiples of 4 "sandwiched" between 0's. Hence, the next number should be 12, the next multiple of 4 after 8. The letter paired with it is simply "A", as the pattern of the letters combined with these 0's and multiples of 4 is simply a series of A's. Hence, 12A comes next after 7u.

Incidentally, every second term starting from the second term 7a, that is,

0A 7a 4A 7e 0A 7i 8A 7o 0A 7u

are simply paired components of the number 7 and vowels listed alphabetically.

45. *Ans. A. a.*

The sequence is as follows:

Z YXW V UT S RQP O NM L KJI H GF E DCB A
 3 2 3 2 3 2 3

Then, we revert certain letters to lowercase form according to the following pattern:

z V s o L h E a...
 ↓ ↓ ↓ ↓
 2 1 2
 1 1

46. *Ans. C. 52C54p.*

The first components of each term are

2 12 22 32 42 52
 +10 +10 +10 +10 +10

The second components of each term are

M L K J I H G F E D C...

The third components are correlated with the sequence of the first components. The third components can be derived from the sequence of the first components this way:



$$\begin{array}{cccccc}
 0 & 14 & 20 & 34 & 40 & 54 \\
 \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & \downarrow \\
 (2-2) & (12+2) & (22-2) & (32+2) & (42-2) & (52+2)
 \end{array}$$

That is, the third components' sequence is derived from the first sequence through a pattern of $(-2, +2\dots)$.

The fourth components of each term of the entire sequence in question are all letters that follow the pattern

Z y X w V u t s r q p...

Combining all of these, we get **52C54p** as the next term in the entire sequence.

47. **Ans. B. N.**

The sequence is made of the first letters of the planets in the solar system, which are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, and Pluto. In addition, the letters alternate between lowercase and uppercase. Since the given ended with "u" (Uranus), the next letter in the sequence is "N" (Neptune).

48. **Ans. D. C.**

The given letters (I, V, X, and L) are the succeeding numerals in the Roman system, where I = 1, V = 5, X = 10, L = 50. The next Roman numeral is C, where C = 100.

49. **Ans. E. 23w.**

The number components of each term in the sequence are succeeding, increasing prime numbers starting from 2. That is, 2, 3, 5, 7, 11, 13, 17, 19, 23...

The letter components are simply the letters in the alphabet corresponding to that number (A=1, B=2, C=3, etc.), with an alternating pattern of lowercase/uppercase letters as follows:

\underbrace{b}_1 C $\underbrace{e\ g}_2$ K \underbrace{m}_1 Q $\underbrace{s\ w}_2$...

Thus, the next term in the sequence is **23w**.



50. *Ans. A. $(i \div 40320)^8$.*

The terms are of the form

$$(A ? n!)^n$$

where

A is a letter

$?$ is an operation

n is a number that follows the sequence

$$1, 2, 3, 4, \dots$$

The A component is simply the letter in the alphabet corresponding to a number ($A=1, B=2, C=3$, etc.). This number depends on the value of the sums of the digits of $n!$

For example, if $n = 4$, $n! = 24$, and the sum of the digits of 24 is 6 ($2 + 4 = 6$), which corresponds to the letter "f". This can be seen in the sequence in the term $(f \div 24)^4$.

The "?" component is simply an alternation of the basic operations: $+$, $-$, \times , and \div .

Thus, the next term in the given sequence - which ends with $(i \times 5040)^7$ - will have an n value of 8. Thus,

$$(A ? 8!)^8$$

or simply

$$(A ? 40320)^8$$

Note: $8! = 40320$ can be easily calculated by multiplying $7!$ and 8. From the previous term, $7! = 5040$, and thus it can be seen that $8! = 7! \times 8 = 5040 \times 8 = 40320$.

The A component depends on 40320. The sum of the digits of 40320 is 9 ($4 + 0 + 3 + 2 + 0 = 9$), and the letter corresponding to 9 is i . Therefore,

$$(i ? 40320)^8$$

Finally, the operation is division (\div) since the preceding operation is multiplication (\times) and the pattern is an alternation of $+$, $-$, \times , and \div . Hence, the final answer is

$$(i \div 40320)^8$$