UNIQUE STUDY POINT

MATHS CLASS VI PA 1

Class 06 - Maths (NEW)

1. 2, 3, 10, 15, 26, 35, 50, 63, ? **[1]**

   a) 84 b) 83

   c) 80 d) 82

2. 3, 10, 35, 172, 885, 5346, 37471, **[1]**

   a) 35 b) 885

   c) 5346 d) 10

3. 2, 3, 10, 15, 26, ?, 50 **[1]**

   a) 34 b) 32

   c) 33 d) 35

4. 8, 15, 28, 53, ? **[1]**

   a) 100 b) 106

   c) 98 d) 102

5. What are the next two terms in the pattern? **[1]**

   AB, 12, CD, 34 ...

   a) FG, 47 b) EF, 56

   c) FG, 45 d) EF, 67

6. Complete the pattern: 3, 6, 9, _____, _____, _____ **[1]**

   a) 12, 15, 18 b) 11, 14, 17

   c) 12, 16, 19 d) 9, 12, 15

7. Which of the following number is wrong in this pattern? **[1]**

   3, 5, 8, 11, 17, 23

   a) 8 b) 23

   c) 17 d) 11

8. 5, 10, 13, 26, 29, 58, ?, 122 **[1]**

   a) 91 b) 61

   c) 60 d) 111

9. 1, 2, 7, 7, 13, 12, ? **[1]**

   a) 14 b) 12

   c) 19 d) 18

10. Complete the sequence. 15,30,45,_____ . **[1]**

a) 55 b) 75

c) 50 d) 60

11. 5, 6, 10, 19, 35 ? **[1]**

a) 55 b) 50

c) 71 d) 60

12. Find the value of questions marks (?). **[1]**

3	6	1	18
7	2	4	56
8	4	3	96
?	4	3	48

a) 8 b) 5

c) 4 d) 18

13. 6.25, 9, 12.25, 16, 20.25, 25, 30.25, ? **[1]**

a) 32 b) 40.25

c) 28.25 d) 36

14. The next number in the series 2, 5, 8, 11, _____ is **[1]**

a) 12 b) 14

c) 10 d) 15

15. Find the next term of the series 3, 4, 6, 9, 13, _____ **[1]**

a) 17 b) 19

c) 18 d) 14

16. Match the following. **[2]**

(a) a, aa, aaa,___,____	(i) 9ab, 12ab
(b) a, aaa, aaaaaa,___,____	(ii) 4ab, 5ab
(c) ab, 2ab, 3ab,___,____	(iii) aaaaaaaaa, aaaaaaaaaaaa
(d) ab, 3ab, 6ab,___,____	(iv) aaaa, aaaaa

17. Match the following. **[2]**

(a) 2, 4, 6,___,____,____	(i) 80,100,120
(b) 3, 6, 9,___,____,____	(ii) 40, 50, 60
(c) 10, 20, 30,___,____,____	(iii) 12,15,18
(d) 20, 40, 60,___,____,____	(iv) 8,10,12

18. Match the following: **[2]**

(a) AB,cd,DE,fg,_____,_____.	(i) Ii,Kk
(b) aA, bB, cC,_____,_____	(ii) Ee,Ff

(c) Aa,Bb,Cc,Dd_____,_____.	(iii) dD,eE
(d) Aa,Cc,Ee,Gg_____,____.	(iv) HI,jk

19. Complete the following pattern for the next two terms: **[1]**

1, 20, 39, ?, ?

20. Look carefully for the pattern, and then find which pair of numbers comes next: **[1]**

1, 3, 7, 13, _____, _____, _____, _____, _____.

21. What are the missing numbers in the pattern? 34, _____, 42, 46, _____, 54 **[1]**

22. What should come next Pattern? **[1]**

a) 

b) 

c) 

d) 

23. What is the next term in the pattern? **[1]**

a) 

b) 

c) 

d) 

24. What are the next 2 terms in the pattern? **[1]**

a) 

b) 

c) 

d) 

25. Complete the given pattern : **[1]**

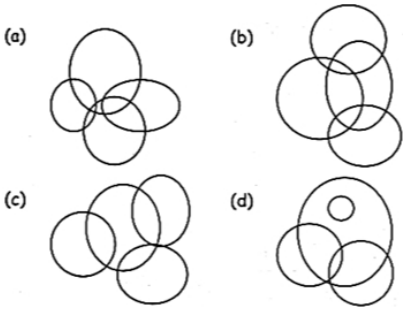
a) 

b) 

c) 

d) 

26. Which figure is different from the rest? **[1]**



a) Figure (c)

b) Figure (a)

c) Figure (b)

d) Figure (d)

27. What comes next? **[1]**

a) 

b) 

c) 

d) 

28. Find the possible outcome next? **[1]**

a) 

b) 

c) 

d) 

29. What pattern should come next ? **[1]**

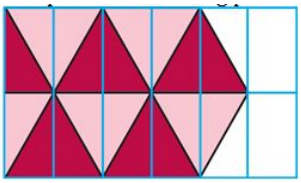
a) 

b) 

c) 

d) 

30. Complete the following pattern: **[1]**



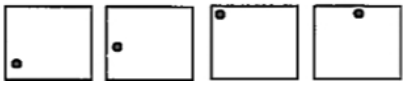
a)

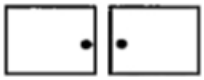
b)

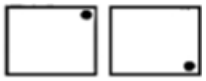

c) 

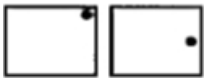
d) 

31. What are the next two terms in the pattern? **[1]**



a) 

b) 

c) 

d) 

32. What comes next? **[1]**

a) 

b) 

c) 

d) 

33. Complete the pattern:- **[1]**

a) 

b) 

c) 

d) 

34. What should come next pattern ? **[1]**

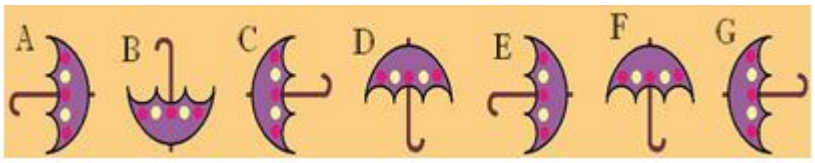
a) 

b) 

c) 

d) 

35. Mark the incorrect picture that is breaking the rule . **[1]**



a) Picture A

b) Picture E

c) Picture F

d) Picture G

36. Mark the incorrect picture that is breaking the rule : **[1]**

a) Picture F

b) Picture G

c) Picture A

d) Picture E

37. Complete the pattern: 72, 66, 60, 54, _____, _____ **[1]**

a) 50, 44

b) 48, 42

c) 50, 46

d) 48, 40

38. Complete the pattern: 28Z, 27Y, 26X, _____, _____. **[1]**

a) 25W, 24V

b) 25U, 24V

c) 25V, 24W

d) 24X, 25Y

39. Complete the pattern: 32, 40, 48, 56, _____, _____ **[1]**

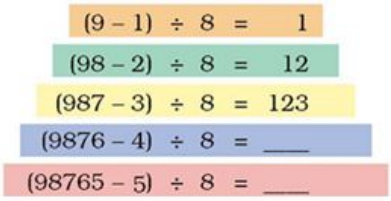
a) 64, 72

b) 62, 70

c) 61, 71

d) 68, 78

40. Look at the numbers below. Look for the pattern. Fill in the blanks **[1]**



a) 1234, 123456

b) 12344, 12345

c) 1234, 12345

d) 1235, 12356

41. What comes next? **[1]**

ZYX, WVU, TSR, ...

a) RQP

b) QPO

c) QRS

d) MNO

42. What comes next in the sequence? **[1]**

ADG, HKN, ORU ...

a) WYZ

b) VWY

c) WZB

d) VYB

43. Rohan has created a number pattern. The first 3 numbers were 4,11 and 18. What comes next? **[1]**

a) 29

b) 24

c) 25 d) 21

44. Describe which pattern describe the best rule for 10, 16, 22, 28, 34. **[1]**

a) multiply by 6 b) add 8

c) multiply by 4 d) add 6

45. Which set of numbers uses the rule of multiply by 3? **[1]**

a) 4,12,30 b) 3,6,9

c) 2,6,18 d) 6,9,18

46. Match the following. **[2]**

(a) 3,7,11,15	(i) Start at 3 and add 3 each time
(b) 3,6,9,12	(ii) Start at 10 and add 10 each time
(c) 10,20,30,40	(iii) Start at 3 and add 4 each time
(d) 10,40,70,100	(iv) Start at 10 and add 30 each time

47. Start at 87 and create a pattern with the rule subtract 10. What is the third number in the pattern? **[1]**

48. Start at 8 and create a pattern with the rule add 6. What is the fourth number in the pattern? **[1]**

49. Using the code A is 1, B is 2, C is 3 and so on, decode the following message: **[2]**

a. 23 5 12 12

b. 4 15 14 5

50. Using the following table write down the numbers for the given symbolic code. **[3]**

NUMBER	0	1	2	3	4	5	6	7	8	9
SIGN	+	-	*	/	@	#	$	%	&	>

1. **+ - * / # ***

2. **& $ @ * / - +**

51. Janish spent 25 minutes on mobile on the 1st date of the month, 27 minutes on mobile on the 2nd date of the month, 29 minutes on mobile on the 3rd date of the month, 31 minutes on mobile on the 4th date of the month. If this pattern continues. then Writedown pattern and pattern rule. How much time did he spend on mobile on the 5th date of the month? How much time did he spend on mobile on the 6th date of the month? **[5]**

52. Ram is planning to start a business of selling clothes for ladies. He explores the cloth market in Rajasthan and is fascinated by the block printing. **[1]**

What will be the next 3 prints on the material?

a) 

b) 

c) 

d) 

53. Sohan wants to gift his friend a book that costs ₹ 20/-. He saves ₹ 4/- every week. In how many weeks will **[1]**

Sohan be able to buy the book?

Week	1	2	3
Money saved	4	8	12

a) 6 weeks

b) 5 weeks

c) 9 weeks

d) 4 weeks

54. **Read the following text carefully and answer the questions that follow:** **[4]**

In a game, players receive cards numbered sequentially from 1 to 10. The cards with odd numbers (1, 3, 5, 7, 9) are red, while those with even numbers (2, 4, 6, 8, 10) are blue. This color-coding system helps distinguish between odd and even-numbered cards, adding a visual element to the gameplay. The sequence of numbers on the cards is straightforward, ranging from 1 to 10, ensuring clarity and simplicity for the players.

a. What is the color of the card with the number 7? **(1)**

b. How many even numbers are there between 1 and 10? **(1)**

c. List all the odd numbers between 1 and 10. **(2)**

OR

d. Explain why the number 10 is an even number. **(2)**

55. **Read the following text carefully and answer the questions that follow:** **[4]**

A computer scientist works with binary numbers, which are based on powers of 2. The sequence of powers of 2 starts as 1, 2, 4, 8, 16, 32, 64, and so on, doubling each time. These numbers are fundamental in computing, representing data storage, memory addressing, and binary logic. Understanding this sequence is crucial for tasks like binary arithmetic, algorithm design, and digital systems, as it forms the backbone of how computers process and store information efficiently.

i. What is the next number in the sequence after 64? **(1)**

ii. How many times do you multiply 2 by itself to get 16? **(1)**

iii. Explain what powers of 2 are and how they are calculated. **(2)**

OR

Write the first 7 numbers in the sequence of powers of 2. **(2)**

56. **Read the following text carefully and answer the questions that follow:** **[4]**

Rahul observed that the number of petals in flowers often follows a specific pattern. For example, lilies have 3 petals, buttercups have 5 petals, and daisies have 34 petals. He noticed that these numbers are part of a special sequence called the Fibonacci sequence, where each number is the sum of the two preceding ones (e.g., 1, 1, 2, 3, 5, 8, 13, 21, 34, ...).

a. What is the next number in the Fibonacci sequence after 34? **(1)**

b. How many petals does a buttercup have? **(1)**

c. Explain why the number of petals in flowers often follows the Fibonacci sequence. **(2)**

OR

Write the first 10 numbers of the Fibonacci sequence. **(2)**

57. **Assertion (A):** The pattern 1, 3, 5, 7, 9 is an arithmetic sequence. **[1]**

Reason (R): In an arithmetic sequence, the difference between consecutive terms is constant.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

58. **Assertion (A):** The sequence 2, 4, 6, 8, 10 follows a pattern of even numbers. **[1]**

Reason (R): Even numbers are divisible by 2.

a) Both A and R are true and R is the correct explanation of A.

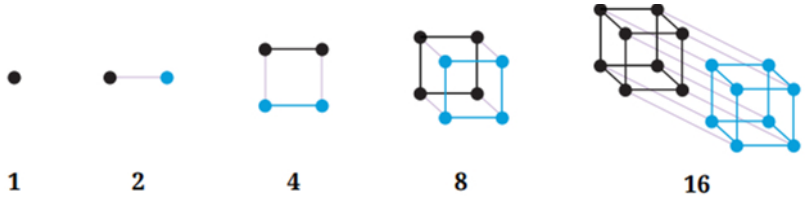
b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

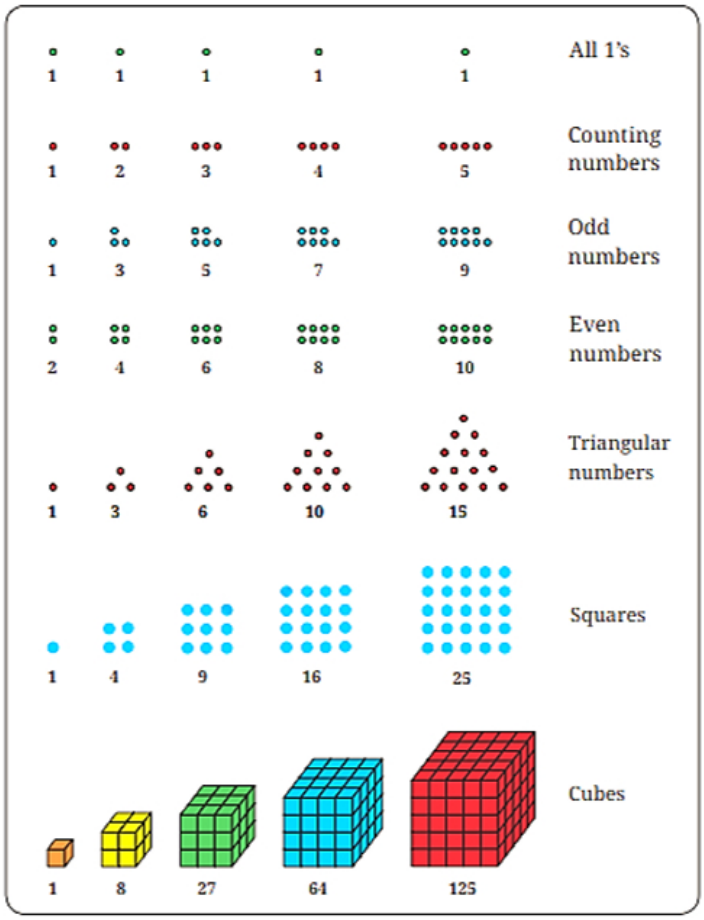
d) A is false but R is true.

59. Can you think of pictorial ways to visualise the sequence of Powers of 2? Powers of 3? **[1]**

Here is one possible way of thinking about Powers of 2:



60. **Pictorial representation of some number sequences** **[2]**



Why are 1, 3, 6, 10, 15, ... called **triangular numbers**? Why are 1, 4, 9, 16, 25, ... called **square numbers** or **squares**? Why are 1, 8, 27, 64, 125, ... called **cubes**?

61. **Read the following text carefully and answer the questions that follow:** **[4]**

In a school, students are arranging chairs in the auditorium for an event. They noticed that arranging chairs in a triangular pattern helps save space. The number of chairs in each row forms a sequence: 1, 3, 6, 10, 15, ... These numbers are called triangular numbers.

a. What is the next triangular number after 15? **(1)**

b. How many chairs are there in the 4th row of the triangular arrangement? **(1)**

c. Explain how triangular numbers are formed. **(2)**

OR

Draw a diagram to show the arrangement of chairs for the first 4 triangular numbers. **(2)**

62. **Assertion (A):** The pattern 1, 4, 9, 16, 25 represents square numbers. **[1]**

Reason (R): Square numbers are the product of a number multiplied by itself.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

63. What happens when you multiply the triangular numbers by 6 and add 1? Which sequence do you get? Can you explain it with a picture? **[1]**

64. What happens when you start to add up hexagonal numbers, i.e., take 1, 1 + 7, 1 + 7 + 19, 1 + 7 + 19 + 37, ...? Which sequence do you get? Can you explain it using a picture of a cube? **[1]**

65. Can you find a similar pictorial explanation for why adding counting numbers up and down, i.e., 1, 1 + 2 + 1, 1 + 2 + 3 + 2 + 1, ..., gives square numbers? **[1]**

66. **Read the following text carefully and answer the questions that follow:** **[4]**

A farmer is planting trees in a structured square grid pattern. The number of trees in each grid follows a specific sequence: 1, 4, 9, 16, 25, and so on. This pattern represents square numbers, where each term is the square of a natural number (1^2, 2^2, 3^2, etc.). As the grid expands, the number of trees increases accordingly, forming perfect squares. This systematic arrangement ensures even spacing and organization in planting. The pattern continues indefinitely, following the principle that the total trees in an $n \times n$ grid is always n^2.

a. What is the next square number after 25? **(1)**

b. How many trees are there in a 5×5 grid? **(1)**

c. Explain why the numbers 1, 4, 9, 16, 25 are called square numbers. **(2)**

OR

Draw a 3×3 grid and count the number of trees to show that it is a square number. **(2)**

67. **Assertion (A):** The sequence 1, 1, 2, 3, 5, 8 is a Fibonacci sequence. **[1]**

Reason (R): In a Fibonacci sequence, each term is the sum of the two preceding ones.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

68. To get from one shape to the next shape in the Koch Snowflake sequence, one replaces each line segment '—' by a **speed bump**  . As one does this more and more times, the changes become tinier and tinier with very very small line segments. How many total line segments are there in each shape of the Koch Snowflake? What is the corresponding number sequence? (The answer is 3, 12, 48, ..., i.e. 3 times Powers of 4; this sequence is not shown in Table) **[1]**

Examples of number sequences

1, 1, 1, 1, 1, 1, 1, ...	(All 1's)
1, 2, 3, 4, 5, 6, 7, ...	(Counting numbers)
1, 3, 5, 7, 9, 11, 13, ...	(Odd numbers)
2, 4, 6, 8, 10, 12, 14, ...	(Even numbers)
1, 3, 6, 10, 15, 21, 28, ...	(Triangular numbers)
1, 4, 9, 16, 25, 36, 49, ...	(Squares)
1, 8, 27, 64, 125, 216, ...	(Cubes)
1, 2, 3, 5, 8, 13, 21, ...	(Virahānka numbers)
1, 2, 4, 8, 16, 32, 64, ...	(Powers of 2)
1, 3, 9, 27, 81, 243, 729, ...	(Powers of 3)

69. How many little squares are there in each shape of the sequence of Stacked Squares? Which number sequence does this give? Can you explain why? **[1]**

70. **Fill in the blanks:** **[6]**

(a) Jacob is creating a growing pattern using numbers, write the next three numbers in the sequence: **[1]**
11, 22, 33, 44, 55, ____, ____, ____

(b) Complete the pattern : 44, 48, 52, 56, ____, ____ **[1]**

(c) Complete the pattern: **[1]**
101, 104, 107, _____, _____, _____

(d) If we add 1 to any odd number we get an _____ number. **[1]**

(e) Examine the number pattern and fill the blank: 10, 18, 26, 34, 42, _____ **[1]**

(f) Start from 50 and subtract 5 each time to fill in the blanks: _____, _____, _____, _____ **[1]**

Solution

MATHS CLASS VI PA 1

Class 06 - Maths (NEW)

1.

(d) 82

Explanation:

There are two series 2, 10, 26, 50, and 3, 15, 35, 63. Difference in the first and second series are 8, 16, 24, 32 etc, and 12, 20, 28, 36 etc.

2. **(a)** 35

Explanation:

Series is $\times$ 2 + 2^2, $\times$ 3 + 3^2, $\times$ 4 + 4^2, ...

3.

(d) 35

Explanation:

The series exhibits the pattern of n^2 + 1, n^2 - 1, alternatively, n taking values 1, 2 .....

4.

(d) 102

Explanation:

Let x = 8

then 15 = 2x - 1 = y

28 = 2y - 2 = z

53 = 2z - 3 = m

Next term in the pattern should be 2m - 4 = 2 $\times$ 3 - 4 = 102

5.

(b) EF, 56

Explanation:

The pattern rule is two alphabet followed by two numbers in increasing order. AB, CD, EF ...

12, 34, 56 ...

6. **(a)** 12, 15, 18

Explanation:

3 $\times$ 1 = 3

3 $\times$ 2 = 6

3 $\times$ 3 = 9

next 3 numbers:

3 $\times$ 4 = 12

3 $\times$ 5 = 15

3 $\times$ 6 = 18

12, 15, 18

7.

(d) 11

Explanation:

Differences between two consecutive terms are 2, 3, 4, 5 and 6 respectively.

8.

(b) 61

Explanation:

Add 3 after doubling the previous number.

9.

(c) 19

Explanation:

Given sequence consists of two series.

1, 7, 13, i.e., difference between consecutive nos is 6.

2, 7, 12, i.e., difference between consecutive nos is 5.

So, next number in the 1st series is 19.

10.

(d) 60

Explanation:

The pattern is following the rule,add 15.

i.e 15,15+15,15+15+15,..

11.

(d) 60

Explanation:

Add 1^2, 2^2, 3^2, 4^2, 5^2 etc.

12.

(c) 4

Explanation:

Pattern of the series is as follow:

As, $3 \times 6 \times 1 = 18$

$7 \times 2 \times 4 = 56$

$8 \times 4 \times 3 = 96$

Similarly, $x \times 4 \times 3 = 48$

$x = \frac{48}{4 \times 3} = 4$

13.

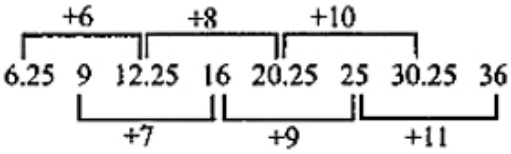
(d) 36

Explanation:

There are two alternate series

Series I - 6.25, 12.25, 20.25, 30.25 (sequence is + 6, + 8, + 10)

Series II - 9, 16, 25, 36, (sequence is + 7, + 9, + 11)

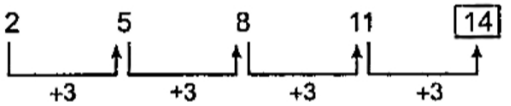


14.

(b) 14

Explanation:

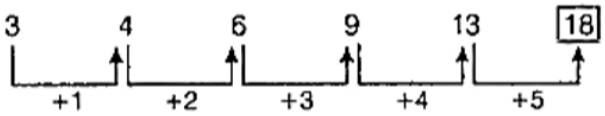
The pattern of series is



15.

(c) 18

Explanation:



It is clear that next term of series is 18.

16. (a) – (iv), (b) – (iii), (c) – (ii), (d) – (i)
17. (a) – (iv), (b) – (iii), (c) – (ii), (d) – (i)

(a) 2, 4, 6, 8, 10, 12 {multiple of 2}
(b) 3, 6, 9, 12, 15, 18 {multiple of 3}
(c) 10, 20, 30, 40, 50, 60 {multiple of 10}
(d) 20, 40, 60, 80, 100, 120 {multiple of 2}

18. (a) – (iv), (b) – (iii), (c) – (ii), (d) – (i)
19. 1, 20, 39, ?, ?

Pattern starts with 1 and follow "add 19" to each rule

1

1 + 19 = 20

20 + 19 = 39

39 + 19 = 58

58 + 19 = 77

1, 20, 39, **58**, **77**

20. First number: 1

Second number: 3 (i.e. 1 + 2)

Third number: 7 (i.e. 3 + 4)

Fourth number: 13 (i.e. 7 + 6)

Thus, next number will be

13 + 8 = 21

21 + 10 = 31

31 + 12 = 43

43 + 14 = 57

57 + 16 = 73

So, the final pattern will be: 1, 3, 7, 13, 21, 31, 43, 57, 73.

21. The rule of the pattern is to add 4:

34 + 4 = 38

38 + 4 = 42

42 + 4 = 46

46 + 4 = 50

50 + 4 = 54

Answer: 38, 50

22.

(d) 

Explanation:

The position of number one is changing from vertical to horizontal directions alternatively. So next 1 is horizontal.

23. **(a)** 

Explanation:

The rule is to rotate the term 1 by 90 degrees anticlockwise to get term2. Term 3 is same as term 2. Thereafter, the pattern repeats itself.

Hence the solution will be repeating  which is this option.

24.

(b) 

Explanation:

The rule is to have 3 apples followed by 2 bananas.

25. **(a)**

Explanation:

The position of arrow is rotating in clockwise direction.

26.

(d) Figure (d)

Explanation:

All 4 figures are made of 4 circles. The figure A, B and C the circles are overlapping each other. In figure D, there is circle that is disjoint from 2 circles and contained completely inside another circle.

27. **(a)** 

Explanation:

The rule two vertical figures (Light and dark) followed by two figures (previous figures rotated by 90 degrees).

28.

(b)

Explanation:

Every next image is getting rotated clockwise by 45° so the new image will be having the line exactly on the middle

29. **(a)** 

Explanation:

The position of picture is rotating in clockwise direction.

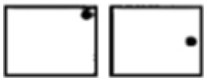
30.

(b) 

Explanation:

Next picture is left half part of kite.

31.

(c) 

Explanation:

The point is moving clockwise at a distance equal to half the length of side from the point in the previous term.

32.

(d) 

Explanation:

The pattern rule to get the next term is to reverse the position of the shapes in the previous term.

In the first term, a star shape contains a sun shape.

In the second term, a sun shape contains a star shape.

In the third shape, a  has two circles within it.

In the 4th term, two circles will have a  within it.

33. **(a)** 

Explanation:

Blue colour move anticlickwise direction. So in upcoming figure blue colour at the top position.

34.

(b) 

Explanation:

The circle is rotating in clock wise direction. So the line will be in horizontal position and yellow colour will be at the top and red colour will be at bottom.

35.

(c) Picture F

Explanation:

All the images are facing each directions starting from east to north in clockwise direction and that repeats after every four image so image F does not follow this pattern

36. **(a)** Picture F

Explanation:

Picture F breaking the rule because pictures move in clockwise direction only F move anticlockwise to previous one.

37.

(b) 48, 42

Explanation:

Here difference between two number is 6. So next numbers are 54 – 6 = 48, 48 – 6 = 42

38. **(a)** 25W, 24V

Explanation:

It's a pattern of combination of reverse order numbers like 28,27,26, 25, 24 and alphabet are Z, Y, X, W, V. So next number in series 25W, 24V.

39. **(a)** 64, 72

Explanation:

Here difference between two number is 8. 40 - 32 = 8, 48 - 40 = 8 and 56 - 48 = 8.

So next numbers are 56 + 8 = 64 and 64 + 8 = 72

40.

(c) 1234, 12345

Explanation:

(9876-4) ÷ 8 = 9872 ÷ 8 = 1234

(98765-5) ÷ 8=98760 ÷ 8 =12345

41.

(b) QPO

Explanation:

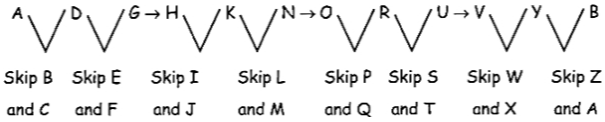
The rule is write 3 alphabet as one term in reverse order starting from Z.

42.

(d) VYB

Explanation:

Within each term each letter skips 2 alphabet to reach next; The next term starts with the letter following the last alphabet in the term before.



43.

(c) 25

Explanation:

As the rule of the pattern above is add 7. i.e (4,4+7,4+7+7.....)

44.

(d) add 6

Explanation:

10 +6 = 16, 16+6 = 22, 22+6 = 28, 28+6 = 34

45.

(c) 2,6,18

Explanation:

As the pattern is 2,2×3,(2×3)×3.

46. (a) – (iii), (b) – (i), (c) – (ii), (d) – (iv)

47. 67. (Hint 87- 10 = 77, 77- 10 = 67)

48. 26 (Hint : 8+6 = 14, 14 +6 = 20, 20+6 = 26)

49. a. W E L L

b. D O N E

50.

NUMBER	0	1	2	3	4	5	6	7	8	9
SIGN	+	-	*	/	@	#	$	%	&	>

1. **+ - * / # ***

= 012352

2. **& $ @ * / - +**

= 8642310

51. Janish spent 25 minutes on mobile on the 1st date of the month, 27 minutes on mobile on the 2nd date of the month, 29 minutes on mobile on the 3rd date of the month, 31 minutes on mobile on the 4th date of the month.

Pattern: 25, 27, 29, 31, ...

Pattern Rule: Pattern starts with 25 and follows add 2 to each rule.

Time spent on 5th date of month = 31 + 2 = 33

Time spent on 6th date of month = 33 + 2 =35

52.

(b) 

Explanation:

The pattern is green leaf, inverted green leaf, inverted green leaf, green leaf, inverted green leaf, inverted green leaf, green leaf ...

Hence the next 3 prints will be inverted leaf, inverted leaf, green leaf.

53.

(b) 5 weeks

Explanation:

Week	1	2	3	4	5
Money saved	4	8	12	16	20

The rule is to add 4 to the previous term to get the next term.

54. a. Red

b. 5

c. 1, 3, 5, 7, 9

OR

The number 10 is an even number because it is divisible by 2 without leaving a remainder (10 ÷ 2 = 5).

55. a. 128

b. 4 times ($2^4 = 16$)

c. Powers of 2 are numbers obtained by multiplying 2 by itself a certain number of times. For example, $2^3 = 2 \times 2 \times 2 = 8$.

OR

1, 2, 4, 8, 16, 32, 64

56. a. 55

b. 5

c. The Fibonacci sequence appears in nature because it allows for optimal packing of seeds, petals, and leaves, ensuring efficient growth and exposure to sunlight.

OR

1, 1, 2, 3, 5, 8, 13, 21, 34, 55

57. **(a)** Both A and R are true and R is the correct explanation of A.

Explanation:

Both A and R are true and R is the correct explanation of A.

58. **(a)** Both A and R are true and R is the correct explanation of A.

Explanation:

Both A and R are true and R is the correct explanation of A.

59. Sure! Here are pictorial ways to visualize the sequences of powers of 2 and powers of 3.|

Powers of 2

The sequence of powers of 2 is:

1, 2, 4, 8, 16, 32, ...

Pictorial Representation:

1 (2^0):

●

2 (2^1):

● ●

4 (2^2):

● ●

● ●

8 (2^3):

● ● ● ●

● ● ● ●

16 (2^4):

● ● ● ●

● ● ● ●

● ● ● ●

● ● ● ●

Powers of 3

The sequence of powers of 3 is:

1, 3, 9, 27, 81, ...

Pictorial Representation:

1 (3^0):

●

3 (3^1):

● ● ●

9 (3^2):

● ● ●

● ● ●

● ● ●

27 (3^3):

● ● ● ● ● ● ●

● ● ● ● ● ● ●

● ● ● ● ● ● ●

81 (3^4):

(This would be a 9×9 grid of dots)

● ● ● ● ● ● ● ● ●

● ● ● ● ● ● ● ● ●

● ● ● ● ● ● ● ● ●

● ● ● ● ● ● ● ● ●

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● ● ● ● ● ● ● ● ●

● ● ● ● ● ● ● ● ●

60. **Triangular numbers**

are formed by adding consecutive numbers (1, 3, 6, 10, 15 ...). These numbers can form equilateral triangles when arranged in dots.

- **Square numbers** (1, 4, 9, 16...) are called so because they can form perfect squares when arranged in dots.
- **Cubes** (1, 8, 27, 64 ...) are called cubes because they represent the volume of cubes with integer side lengths.

61. a. 21

b. 10

c. Triangular numbers are formed by adding consecutive natural numbers. For example, 1 (1), 1 + 2 = 3, 1 + 2 + 3 = 6, 1 + 2 + 3 + 4 = 10, and so on.

OR

The diagram should show:

- 1 chair in the first row,
- 2 chairs in the second row (total 3),
- 3 chairs in the third row (total 6),
- 4 chairs in the fourth row (total 10).

62. **(a)** Both A and R are true and R is the correct explanation of A.

Explanation:

Both A and R are true and R is the correct explanation of A.

63. When you multiply the triangular numbers by 6 and add 1, you generate a specific sequence. Let's explore this step by step.

The first few triangular numbers are:

T1 = 1

T2 = 3

T3 = 6

T4 = 10

T5 = 15

Multiplying by 6 and Adding 1

Now, let’s calculate for the first few triangular numbers:

1. For 1: 1 × 6 + 1 = 7
2. For 3: 3 × 6 + 1 = 19
3. For 6: 6 × 6 + 1 = 37
4. For 10: 10 × 6 + 1 = 61
5. For 15: 15 × 6 + 1 = 91

Resulting Sequence

7, 19, 37, 61, 91

These numbers can be expressed as:

$n^2 + n + 1$ for n = 1, 2, 3, 4, 5.

64. Adding hexagonal numbers, we get

1,

1 + 7 = 8,

1 + 7 + 19 = 27,

1 + 7 + 19 + 37 = 64,

Clearly, we get 1, 8, 27, 64, 125

It is the sequence of cubes.

65. Adding counting numbers up and down creates square numbers, and we can visualize this effectively.

Square Numbers Sequence

The sequence of square numbers is:

1, 4, 9, 16, 25, ...

Pictorial Explanation:

1. 1 (1^2):

●

2. 4 (2^2):

● ●

● ●

3. 9 (3^2):

● ● ●

● ● ●

● ● ●

4. 16 (4^2):

● ● ● ●

● ● ● ●

● ● ● ●

● ● ● ●

5. 25 (5^2):

● ● ● ● ●

● ● ● ● ●

● ● ● ● ●

● ● ● ● ●

● ● ● ● ●

Adding Counting Numbers Up and Down

The pattern is formed by adding numbers in a pyramid-like structure, where each row counts up and then back down:

1:

●

1 + 2 + 1:

●

● ●

●

1 + 2 + 3 + 2 + 1:

●

● ●

● ● ●

● ●

●

1 + 2 + 3 + 4 + 3 + 2 + 1:

●

● ●

● ● ●

● ● ● ●

● ● ●

● ●

●

Visualizing the Squares.

When you combine these structures:

Each added row creates a new level in the square.

The total number of dots equals the area of the square formed by the counting numbers.

66. a. 36

b. 25

c. These numbers are called square numbers because they can be arranged in a perfect square grid. For example, 4 trees can be arranged in a 2×2 grid, 9 trees in a 3×3 grid, and so on.

OR

A 3×3 grid will have 9 trees, which is a square number ($3^2 = 9$).

67. **(a)** Both A and R are true and R is the correct explanation of A.

Explanation:

Both A and R are true and R is the correct explanation of A.

68. By counting line segments, we get the sequence: 3, 12, 48, 192, 768

In this sequence, each term is three times the power of 4,

$3 \times 4^0 = 3$

$3 \times 4^1 = 12$

$3 \times 4^2 = 48$

$3 \times 4^3 = 192$

69. In the sequence of stacked squares the number of little squares can be counted as follows:

i. 1×1 Square: 1 square

ii. 2×2 Square: squares

iii. 3×3 Square: squares

iv. 4×4 Square: squares

v. 5×5 Square: squares

The sequence of little squares is:

1, 4, 9, 16, 25, ...

This sequence corresponds to the squares of the natural numbers.

70. Fill in the blanks:

(i) 66, 77, 88 (Using rule " add 11")

(ii) 60 and 64 (Using rule "add 4" 44 +4 = 48, 48 +4 = 52, 52+4 =56, 56+4 = 60, 60+4 = 64)

(iii)110, 113, 116

The numbers are increasing with the addition of +3 digit.

(iv)Even number

(v) 50

(Rule is add 8. 10 + 8 = 18, 18 + 8 = 26, 26 + 8 = 34, 34 + 8 = 42, 42 + 8 = 50)

(vi)50, 45, 40, 35 (we start from 50 so 50, 50- 5 = 45, 45-5 = 40, 40-5 = 35)