Chapter 5

Information Processing

Ex 5.1

Question 1.

Match the given patterns of shapes with the appropriate number pattern and its generalization.



Solution:

(i) (d) (ii) (a) (iii) (c) (iv) (c) (v) (b)

Objective Type Questions

Question 2. Identify the correct relationship between x andy from the given table.

	x	1	2	3	4		
	у	4	8	12	16		
((i) y = 4x						

(i) y = x + 4(ii) y = 4(iv) $y = 4 \times 4$

Answer:

(i) y = 4x

Question 3. Identify the correct relationship between x and y from the given table.

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	x	-2	-1	0	1	2		
	у	6	3	0	-3	-6		
(i (i (i (i A (i	(i) $y = -2x$ (ii) $y = +2x$ (iii) $y = +3x$ (iv) $y = -3x$ Answer: (iv) $y = -3x$							
E	Ex 5.2							
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Question 1. Complete the Pascal's Triangle.



Solution:



Question 2.

The following hexagonal shapes are taken from Pascal's Triangle. Fill in the missing numbers.



Question 3. Complete the Pascal's Triangle by taking the numbers 1,2,6,20 as line of symmetry.



Solution:

Corresponding numbers are equal about the line of symmetry.



Objective Type Questions

Question 1. The elements along the sixth row of the Pascal's Triangle is (i) 1,5,10,5,1 (ii) 1,5,5,1 (iii) 1,5,5,10,5,5,1 (iv) 1,5,10,10,5,1

Answer: (iv) 1,5,10,10,5,1

Question 2. The difference between the consecutive terms of the fifth slanting row

containing four elements of a Pascal's Triangle is

(i) 3,6,10,...
(ii) 4,10,20,...
(iii) 1,4,10,...
(iv) 1,3,6,...

Answer:

(ii) 4,10,20,...

Question 3.

What is the sum of the elements of ninth row in the Pascal's Triangle? (i) 128

(ii) 254 (iii) 256 (iv) 126

Answer:

(iii) 256

Ex 5.3

Miscellaneous Practice Problems

Question 1.

Choose the correct relationship between x and y for the given table.

x	-2	-1	0	1	2	
у	4	5	6	7	8	

(i) y = x + 4(ii) y = x + 5(iii) y = x + 6(iv) y = x + 7

Answer:

(iii) y = x + 6

Question 2.

Find the triangular numbers from the Pascal's Triangle and colour them.



Solution:

Triangular numbers are numbers the objects of which can be arranged in the form of equilateral triangle.

Example : 1, 3, 6, 10, 15,...

From Pascal's Triangle, the triangular numbers are



Question 3.

Write the first five numbers in the third slanting row of the Pascal's Triangle and find their squares. What do you infer?

Solution:



Natural Numbers	Cubes	Sum of the cubes	Squares of triangular Nos.
1	$1^3 = 1$	1	1
2	$2^3 = 8$	1 + 8 = 9	9
3	$3^3 = 27$	1 + 8 + 27 = 36	36
4	$4^3 = 64$	1 + 8 + 27 + 64 = 100	100
5	$5^3 = 125$	1 + 8 + 27 + 64 + 125 = 225	225
6	$6^3 = 216$	1 + 8 + 27 + 64 + 125 + 216 = 441	441
7	$7^3 = 343$	1 + 8 + 27 + 64 + 125 + 216 + 343 = 784	784
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Numbers in the 3rd slanding row are 1, 3, 6, 10, 15, 21,.... The squares are 1², 3², 6², 10². 15², 21²,.... = 1, 9, 36, 100, 225, 441,...

From the above table we can conclude that the squares of the triangular numbers are the sum of cubes of natural numbers.

Challenge Problems

Question 4.

Tabulate and find the relationship between the variables (x and y) for the following patterns.



Solution:

(i) Let the number of steps be x and the number of shapes be y. Tabulating the values of x and y

Steps (x).	1	2	3	4
Shapes (y)	1	4	9	16

From the table $x = 1 \Rightarrow y = 1 = 12$ $x = 2 \Rightarrow y = 4 = 22$ $x = 3 \Rightarrow y = 9 = 32$ $x = 4 \Rightarrow y = 16 = 42$ Hence the relationship between x and y is $y = x^2$.

(ii) Let the number of steps be x and the number of shapes be y. Tabulating the values of x and y

Steps (x)	1	2	3	4	5	
Shapes (y)	1	3	5	7	9	

From the table $x = 1 \Rightarrow y = 1 = 1$

 $x = 2 \Rightarrow y = 2 + 1 = 3$ $x = 3 \Rightarrow y = 3 + 2 = 5$ $x = 4 \Rightarrow y = 4 + 3 = 7$ $x = 5 \Rightarrow y = 5 + 4 = 9$ Hence the relationship between y a

Hence the relationship between x and y is y = 2x-1.

Question 5.

Verify whether the following hexogonal shapes form a part of the Pascal's Triangle.



Solution:

In Pascal's Triangle product of the 3 alternate numbers given around the hexagon is equal to the product of remaining three numbers.



 $1 \times 13 \times 66 = 11 \times 1 \times 78 = 858$ \therefore It form a part of Pascal's Triangle.



 $5 \times 21 \times 20 = 10 \times 6 \times 35 = 2100$ \therefore It form a part of Pascal's Triangle



 $8 \times 45 \times 84 = 28 \times 9 \times 120 = 30240$ \therefore It form a part of Pascal's Triangle



 $56 \times 210 \times 126 = 70 \times 84 \times 252 = 1481760$ \therefore It form a part of Pascal's Triangle