CLASS VIII – MATHEMATICS

Chapter Test: Algebra Play

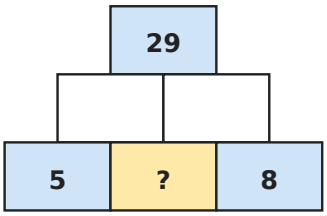
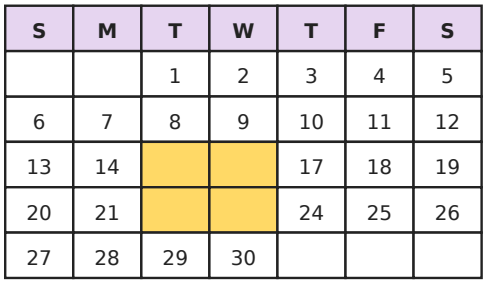
(Ganita Prakash, Grade 8, Part II – Chapter 6)

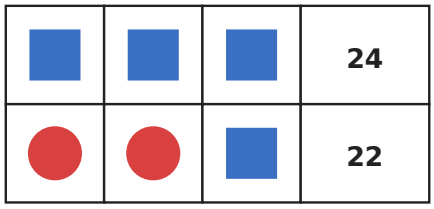
Time: 1½ Hours **M. M.: 40**

General Instructions:

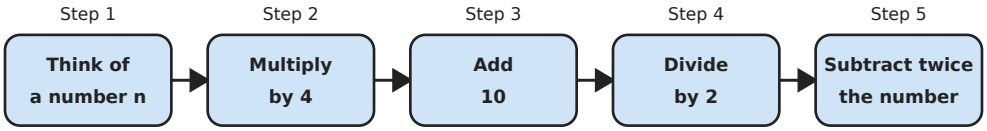
1. This paper contains 20 questions. All questions are compulsory.
2. This paper is divided into 4 sections: **A, B, C** and **D**.
3. In **Section A**, Questions no. 1 to 10 are Multiple Choice Questions carrying 1 mark each.
4. In **Section B**, Questions no. 11 to 13 are Very Short Answer type questions carrying 2 marks each.
5. In **Section C**, Questions no. 14 to 17 are Short Answer type questions carrying 3 marks each.
6. In **Section D**, Questions no. 18 to 20 are Long Answer / Case-based questions carrying 4 marks each.
7. There is no overall choice. However, an internal choice has been provided in 1 question of Section B, 3 questions of Section C and 2 questions of Section D.
8. Figures are only for reference and are not drawn to scale. Questions 9, 10, 11, 14 and 18 are figure-based.
9. Show all the steps of your working.
10. Use of calculator is **not** allowed.

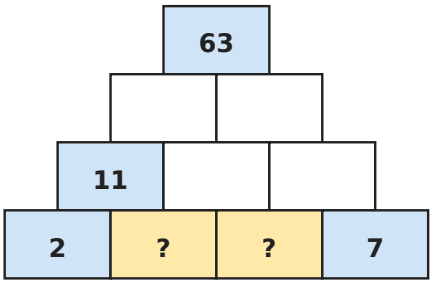
Q. No.	Section – A	Marks
1	In a trick, a person thinks of a number n, multiplies it by 3, adds 12, divides by 3 and then subtracts n. The result is (A) 4 (B) 3 (C) 12 (D) n	**[1]**
2	In a date trick, the month M is multiplied by 4, 5 is added, the result is multiplied by 25 and then the day D is added. The final answer is 654. The date is (A) 5 September (B) 24 June (C) 29 May (D) 29 September	**[1]**
3	In a number pyramid, each number is the sum of the two numbers just below it. If the bottom row of a 3-row pyramid is 2, 5, 3, the number at the top is (A) 10 (B) 13 (C) 20 (D) 15	**[1]**
4	The bottom row of a 4-row number pyramid is a, b, c, d. The number at the top is (A) a + 2b + 2c + d (B) a + 3b + 3c + d (C) a + b + c + d (D) 3a + b + c + 3d	**[1]**
5	Three identical squares add up to 21, and a square together with a circle adds up to 13. The value of the circle is (A) 5 (B) 7 (C) 6 (D) 8	**[1]**
6	Using the digits 2, 4 and 7 once each to form a 2-digit number multiplied by a 1-digit number, the largest possible product is (A) 294 (B) 288 (C) 148 (D) 282	**[1]**
7	When a two-digit number ab (with a > b) is reversed and the smaller number is subtracted from the larger, the result is always divisible by (A) 11 (B) 9 (C) 7 (D) 13	**[1]**

Q. No.	Section – A	Marks
8	For any 3-digit number abc, the sum of abc, bca and cab is always divisible by (A) 11 (B) 7 (C) 37 (D) 13	**[1]**
9	Fig. 1 shows a 3-row number pyramid in which each number is the sum of the two numbers just below it. The value of the "?" in the bottom row is  Fig. 1: A number pyramid (A) 6 (B) 8 (C) 7 (D) 9	**[1]**
10	In Fig. 2, the sum of the four shaded numbers in the 2 × 2 grid is 76. The smallest of these four numbers is  Fig. 2: A month's calendar (shaded numbers are hidden) (A) 14 (B) 19 (C) 16 (D) 15	**[1]**

Q. No.	Section – B	Marks
11	Fig. 3 shows a grid in which different shapes stand for numbers. In each row, the last column is the sum of the shapes in that row.  Fig. 3: In each row the last column is the sum of the shapes Find the value of (i) the square [1] and (ii) the circle. [1]	**[2]**
12	(A) A person thinks of a number n, multiplies it by 5, adds 10, divides by 5 and subtracts n. Using algebra, show that the answer is always 2. **OR** (B) Let ab be a two-digit number (a > b) and ba the number obtained by reversing its digits. Show that (ab) − (ba) is divisible by 9.	**[2]**

Q. No.	Section – B	Marks
13	Fill the digits 4, 6 and 8, using each once, in the boxes □□ × □ to get the largest possible product. Write the arrangement and the product.	**[2]**

Q. No.	Section – C	Marks
14	Fig. 4 shows the steps of a 'Think of a Number' trick.  Fig. 4: A 'Think of a Number' trick (i) Write the expression obtained after each of the five steps. [1] (ii) What is the final result? Does it depend on the number chosen? [1] (iii) Step 3 "Add 10" is changed to "Add k". Find k so that the final result is 8? [1]	**[3]**
15	(A) Without building the whole pyramid, find the number at the top of a 3-row pyramid with bottom row 7, 12, 5. Then build the pyramid to verify your answer. **OR** (B) Without building the whole pyramid, find the number at the top of a 4-row pyramid with bottom row 2, 5, 3, 6. Then build the pyramid to verify your answer.	**[3]**
16	(A) The sum of the four numbers in a 2 × 2 grid of a calendar page is 108. Using algebra, find the four numbers. **OR** (B) The sum of three dates written one below the other in the same column of a calendar page is 57. Find the three dates.	**[3]**
17	(A) Using the digits 2, 6 and 9 once each in □□ × □, find the largest possible product. Compare the two best candidates by expanding them, to explain your choice. **OR** (B) A merchant crosses three toll bridges. At each bridge the goods he carries double, and then he gives 4 items to the guard. After the third bridge he is left with 12 items. How many items did he start with?	**[3]**

Q. No.	Section – D	Marks
18	(A) In the number pyramid of Fig. 5, each number is the sum of the two numbers just below it.  Fig. 5: A number pyramid with four rows (i) Find the number b in the second cell of the bottom row. [1] (ii) If the third cell of the bottom row is c, write the two numbers of the second row and the number at the top in terms of c. [1] (iii) Find c. [1] (iv) Write all the numbers of the pyramid. [1] **OR** (B) A 3 × 3 square of nine dates is chosen on a calendar page. Let the smallest date be a. (i) Write the nine dates in terms of a and find their sum. [2] (ii) If the sum is 135, find a and write the nine dates. [2]	**[4]**
19	(A) A zoo has some ducks and goats. The total number of heads is 40 and the total number of legs is 112. (i) Write two equations using d for ducks and g for goats. [1] (ii) Find the number of ducks and goats. [2] (iii) Verify your answer. [1] **OR** (B) A father is 4 times as old as his son. After 8 years, the father will be 2½ times as old as the son. (i) Form an equation. [1] (ii) Find their present ages. [2] (iii) Verify your answer. [1]	**[4]**
20	**Case Study:** A tea stall owner pays a rent of ₹800 per day. Making one cup of tea costs ₹6 (including milk, sugar and fuel). (i) Write an expression for the total daily cost if n cups are sold. [1] (ii) If she sells 200 cups in a day and wants a profit of ₹400, at what price per cup should she sell the tea? [1] (iii) If the price per cup is ₹14, how many cups must she sell in a day to make a profit of ₹1200? [1] (iv) At ₹14 per cup, how many cups must she sell to just cover her costs (no profit, no loss)? [1]	**[4]**

— End of Question Paper —