CLASS VIII – MATHEMATICS

Chapter Test: We Distribute, Yet Things Multiply

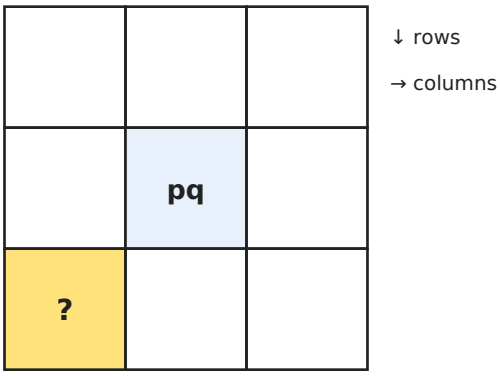
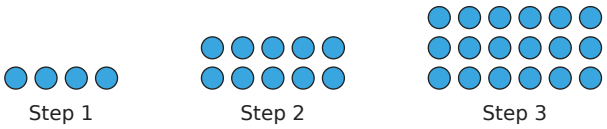
(Ganita Prakash, Grade 8, Part I – Chapter 6)

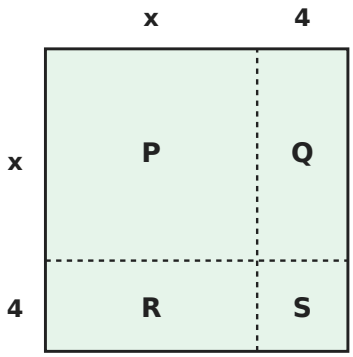
Time: 1½ Hours **M. M.: 40**

General Instructions:

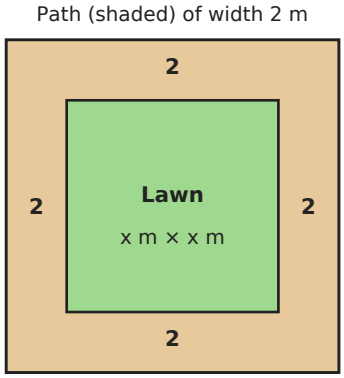
1. This paper contains 20 questions. All questions are compulsory.
2. This paper is divided into 4 sections: **A, B, C** and **D**.
3. In **Section A**, Questions no. 1 to 10 are Multiple Choice Questions carrying 1 mark each.
4. In **Section B**, Questions no. 11 to 13 are Very Short Answer type questions 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.

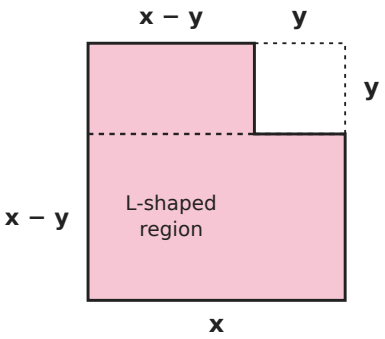
Q. No.	Section – A	Marks
1	When the first number in the product 36×45 is increased by 1, the product increases by (A) 36 (B) 45 (C) 81 (D) 1	**[1]**
2	The expansion of $(x + 3)(x + 5)$ is (A) $x^2 + 15$ (B) $x^2 + 8x + 8$ (C) $x^2 + 8x + 15$ (D) $x^2 + 15x + 8$	**[1]**
3	The expansion of $(2a - 3)^2$ is (A) $4a^2 - 9$ (B) $4a^2 + 12a + 9$ (C) $2a^2 - 12a + 9$ (D) $4a^2 - 12a + 9$	**[1]**
4	Using an identity, 103×97 equals (A) 9991 (B) 9999 (C) 10009 (D) 9909	**[1]**
5	The value of 52^2 is (A) 2504 (B) 2704 (C) 2740 (D) 2604	**[1]**
6	If $a + b = 7$ and $ab = 12$, then $a^2 + b^2$ equals (A) 31 (B) 19 (C) 25 (D) 37	**[1]**
7	The product 4321×11 equals (A) 47531 (B) 47521 (C) 48531 (D) 43531	**[1]**
8	$(x + y)^2 - (x - y)^2$ is equal to (A) 2xy (B) 4xy (C) $2x^2 + 2y^2$ (D) 0	**[1]**

Q. No.	Section – A	Marks
9	Fig. 1 shows a 3 × 3 frame cut from a multiplication table. In the table, rows run downwards and columns run to the right, and the centre of the frame is pq. The number in the shaded cell is  Fig. 1: A 3 × 3 frame of a multiplication table (A) (p + 1)(q − 1) (B) (p − 1)(q + 1) (C) (p + 1)(q + 1) (D) (p − 1)(q − 1)	**[1]**
10	Step k of the dot pattern in Fig. 2 has k rows, each with some dots. The number of dots in Step k is  Fig. 2: A pattern of dots (A) $k^2 + 3$ (B) $(k + 3)^2$ (C) $k^2 + 3k$ (D) $k + 3k$	**[1]**

Q. No.	Section – B	Marks
11	Fig. 3 shows a square of side (x + 4) divided into four parts P, Q, R and S.  Fig. 3: A square of side (x + 4) (i) Write the area of each of the parts P, Q, R and S. [1] (ii) Hence write the expansion of $(x + 4)^2$. [1]	**[2]**
12	(A) Expand and simplify (3a + 2b)(a − 4b). **OR** (B) Expand (2x/3)(9x − 6y + 3).	**[2]**

Q. No.	Section – B	Marks
13	Using a suitable identity, find the value of 998^2.	**[2]**

Q. No.	Section – C	Marks
14	A square lawn of side x metres has a path of width 2 m all around it, as shown in Fig. 4.  Fig. 4: A lawn with a path around it (i) Write the area of the outer square (lawn and path together). [1] (ii) Write an expression for the area of the path and simplify it. [1] (iii) Find the area of the path when x = 10. [1]	**[3]**
15	(A) Using suitable identities, find (i) 87 × 93 (ii) 71^2. **OR** (B) Using the one-line rules for multiplying by 11 and by 101, find (i) 7264 × 11 (ii) 5230 × 101.	**[3]**
16	(A) If a + b = 9 and ab = 14, find the values of $a^2 + b^2$ and $(a - b)^2$. **OR** (B) Show that $(a + b)^2 - (a - b)^2 = 4ab$. Hence evaluate $22^2 - 12^2$ by choosing a and b suitably.	**[3]**
17	(A) A student wrote: (i) $(3x + 2)^2 = 9x^2 + 4$ and (ii) $(4a - 3)(a + 2) = 4a^2 - 6$. Find the mistake in each and write the correct expansion. **OR** (B) The number of dots in Step k of a pattern is k(k + 3). Find the number of dots in Step 10 and show that k(k + 3) = (k + 1)(k + 2) − 2.	**[3]**

Q. No.	Section – D	Marks
18	(A) Fig. 5 shows a square plot of side x metres from which a square corner of side y metres has been removed, leaving an L-shaped region. The dashed line splits the L-shaped region into two rectangles.  Fig. 5: Square of side x with a corner square of side y removed (i) Write the area of the L-shaped region as a difference of two areas. [1] (ii) Find the area of each of the two rectangles and show that their sum equals (x + y)(x − y). [2] (iii) Find the area of the L-shaped region when x = 14 and y = 6. [1] **OR** (B) A rectangular hall has length (2x + 5) m and breadth (x + 3) m. (i) Find its area as an expression in x. [2] (ii) Find the area when x = 5. [1] (iii) The hall is changed: its length is increased by 3 m and its breadth is decreased by 1 m. Find the increase in its area. [1]	**[4]**
19	(A) (i) Prove that $2(a^2 + b^2) = (a + b)^2 + (a - b)^2$. [2] (ii) Use it to write $2(7^2 + 4^2)$ as the sum of two squares. [1] (iii) Check the identity for a = −3 and b = 5. [1] **OR** (B) In a calendar, take any 2 × 2 square of dates with numbers a, a + 1 in the top row and a + 7, a + 8 in the bottom row. (i) Find the product of the numbers on each diagonal and show that these products always differ by 7. [2] (ii) Explain why the difference does not depend on a. [1] (iii) Verify for the square with top-left date 20. [1]	**[4]**
20	**Case Study:** Meera is learning the *ista-gunana* methods of fast multiplication that Brahmagupta described, which use the distributive property. Her teacher asks her to compute the following without long multiplication. (i) 56 × 99, by writing 99 = 100 − 1. [1] (ii) 3142 × 101, using the one-line rule for 101. [1] (iii) 197^2, by writing 197 = 200 − 3. [1] (iv) 48 × 52, using an identity. [1]	**[4]**

— End of Question Paper —