

Half-Yearly Examination - (2026-27)
SUBJECT – MATHEMATICS (SET - 3)

TIME – 2½ Hours

Class- VIII

M.M – 60

General Instructions: All questions are compulsory. This question paper contains 29 questions divided into Sections A, B, C, and D.

SECTION – A (1 x 12 = 12M)

Q1. Which of the following numbers is a square number?

- (A) 220 (B) 196 (C) 150 (D) 205

Q2. The scientific notation of 0.0000729 is:

- (A) 7.29×10^{-5} (B) 7.29×10^5 (C) 72.9×10^{-6} (D) 0.729×10^{-4}

Q3. If a population of bacteria quadruples every hour starting with 2 bacteria, what is the count after 4 hours?

- (A) 512 (B) 256 (C) 1024 (D) 128

Q4. The number of basic symbols used in the Roman numeral system is:

- (A) 5 (B) 7 (C) 10 (D) 12

Q5. If the mass of the earth is approximately 6×10^{24} kg and the mass of the moon is 7.4×10^{22} kg, what is their combined mass?

- (A) 6.074×10^{24} kg (B) 1.34×10^{47} kg (C) 13.4×10^{22} kg (D) 6.74×10^{24} kg

Q6. If two parallel lines are cut by a transversal, the interior angles on the same side of the transversal are:

- (A) Equal (B) Complementary (C) Supplementary (D) Vertically opposite

Q7. The HCF and LCM of two numbers are 8 and 96 respectively. If one number is 24, the other number is:

- (A) 32 (B) 48 (C) 64 (D) 16

Q8. Which property states that $a \times b = b \times a$ for integers?

- (A) Closure property (B) Associative property (C) Commutative property (D) Distributive property

Q9. Given $p = 4$, $q = -2$, $r = 3$, evaluate: $p^2 + 2pq + q^2$:

- (A) 4 (B) 8 (C) 16 (D) 0

Q10. A number is divisible by 6 if it is divisible by:

- (A) 2 and 3 (B) 3 and 4 (C) 2 and 4 (D) 1 and 6

Q11. Assertion (A): The square of any negative integer is always positive.

Reason (R): Product of two negative integers is a positive integer.

- (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) Assertion A is true but Reason R is false.
- (D) Assertion A is false but Reason R is true.

Q12. Assertion (A): The sum of interior angles of a pentagon is 540° .

Reason (R): The sum of interior angles of an n-sided polygon is given by $(n - 2) \times 180^\circ$.

- (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) Assertion A is true but Reason R is false.
- (D) Assertion A is false but Reason R is true.

SECTION – B (2 x 7 = 14M)

Q13. Find the smallest square number that is divisible by each of the numbers 4, 9, and 10.

Q14. Evaluate and write in standard form: (i) $(3 \times 10^2) \times (4 \times 10^{-5})$ (ii) $(8.2 \times 10^6) / (2 \times 10^3)$

Q15. Convert the decimal number 105 into binary numeral form.

Q16. Write the Roman numeral equivalent for 2089.

Q17. The exterior angle of a regular polygon is 40° . Find the number of sides of the polygon.

Q18. Check divisibility of 78,540 by 12 without actual long division.

Q19. Expand the product using algebraic identities: $(3a + 4)(3a - 4)$

SECTION – C (3 x 6 = 18M)

Q20. Using distributive property, evaluate: $735 \times 103 - 735 \times 3$.

Q21. [Case Study] A magical water lily pond has plants that triple in coverage every day. On day 15, the pond is completely covered. On which day was the pond one-ninth full?

Q22. [Figure Geometry Case] Construct a rhombus with diagonals 6 cm and 8 cm. Write the construction steps.

Q23. Simplify: $[(5^{-1} \times 7^2) / (5^2 \times 7^{-4})]^{(7/2)}$... or simpler: $(2^3 \times 3^2 \times 5) / (2^2 \times 3 \times 5^2)$.

Q24. A student has 4 textbooks, 3 notebooks, and 2 pens. In how many different ways can the student select one textbook, one notebook, and one pen?

Q25. Find the cube root of 1,75,616 using prime factorization method.

SECTION – D (4 x 4 = 16M)

Q26. [Case Study / Lotus Pond Variation] In a mystical garden pond, lotus flowers grow such that their number increases fivefold every day. If 5 lotuses were placed on day 1 and the pond is completely filled on day 10:

- (i) How many lotuses were there on day 9?
- (ii) On which day was the pond $1/25$ th full?
- (iii) If another pond receives these lotuses on day 6 and they grow 4 times a day, find the total count after 2 more days.

Q27. Use laws of exponents to find x if: $(3/5)^x \times (5/3)^2 = (27/125)$.

Q28. Evaluate using suitable algebraic identities:

- (i) $(99)^2$
- (ii) 54×46

Q29. [Figure Construction / Quadrilateral] Construct a parallelogram ABCD where $AB = 5.5$ cm, $BC = 4$ cm, and diagonal $AC = 6.5$ cm. Write the construction steps.