

CLASS 10 — MATHEMATICS

Chapter: Polynomials

Practice Worksheet | CBSE Pattern

Maximum Marks: 40

Time Allowed: 1 hour 30 minutes

Name: _____

Class/Section: _____ Date: _____

General Instructions:

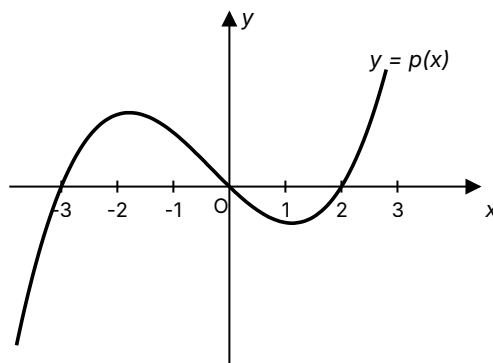
1. All questions are compulsory.
2. Read each question carefully before answering.
3. Show complete working for questions requiring calculations or proofs.
4. Select only one option for each MCQ.
5. Marks for each question are indicated alongside the question.
6. Write mathematical steps clearly and use appropriate notation.

This paper has 21 questions in five sections: A (Q1–Q10, 1 mark each), B (Q11–Q15, 2 marks each), C (Q16–Q19, 3 marks each), D (Q20, 4 marks) and E (Q21, case study, 4 marks).

SECTION A

Multiple Choice Questions — Q1 to Q10 carry 1 mark each.

- Q1.** The degree of the polynomial $(x^2 + 1)(x^3 - 2x)$ is **[1 mark]**
(A) 2 (B) 3
(C) 5 (D) 6
- Q2.** If $x = 2$ is a zero of the polynomial $p(x) = x^2 + kx - 6$, then the value of k is **[1 mark]**
(A) -1 (B) 1
(C) 2 (D) 5
- Q3.** The graph of $y = p(x)$ is shown below. The number of zeroes of $p(x)$ is **[1 mark]**



- (A) 0 (B) 1
(C) 2 (D) 3

- Q4.** The sum of the zeroes of the polynomial $3x^2 - 12x + 7$ is [1 mark]
 (A) -4 (B) 4
 (C) $\frac{7}{3}$ (D) -12
- Q5.** If α and β are the zeroes of $x^2 - 5x + 6$, then the value of $\frac{1}{\alpha} + \frac{1}{\beta}$ is [1 mark]
 (A) $\frac{5}{6}$ (B) $\frac{6}{5}$
 (C) $-\frac{5}{6}$ (D) $\frac{1}{6}$
- Q6.** A quadratic polynomial whose zeroes are -3 and 4 is [1 mark]
 (A) $x^2 + x - 12$ (B) $x^2 - 7x + 12$
 (C) $x^2 + 7x - 12$ (D) $x^2 - x - 12$
- Q7.** If the zeroes of the quadratic polynomial $ax^2 + bx + c$, $a \neq 0$, are non-zero real numbers equal in magnitude but opposite in sign, then [1 mark]
 (A) $a = c$ (B) $c = 0$
 (C) $a = -c$ (D) $b = 0$
- Q8.** If one zero of the polynomial $2x^2 - 5x + k$ is the reciprocal of the other, then k is [1 mark]
 (A) 2 (B) 5
 (C) $\frac{1}{2}$ (D) -2

In Q9 and Q10, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option.

- Q9.** **Assertion (A):** The polynomial $x^2 + 4$ has no real zero. [1 mark]
Reason (R): The graph of $y = x^2 + 4$ lies entirely above the x -axis and does not intersect it.
 (A) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).
 (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
 (C) Assertion (A) is true, but Reason (R) is false.
 (D) Assertion (A) is false, but Reason (R) is true.

Q10. Assertion (A): The zeroes of the polynomial $x^2 - 2x - 8$ are 4 and -2. **[1 mark]**

Reason (R): If α and β are the zeroes of $ax^2 + bx + c$, then $\alpha\beta = -c/a$.

(A) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).

(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).

(C) Assertion (A) is true, but Reason (R) is false.

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

SECTION B

Very Short Answer Questions — Q11 to Q15 carry 2 marks each.

Q11. Find the zeroes of the quadratic polynomial $4x^2 - 4x - 3$ and verify [2 marks]
the relationship between the zeroes and the coefficients.

Q12. Find a quadratic polynomial, the sum and product of whose zeroes [2 marks]
are $-\frac{3}{2}$ and -1 respectively. Also find its zeroes.

Q13. Find the zeroes of the polynomial $p(y) = y^2 - 7$ and verify the [2 marks]
relationship between the zeroes and the coefficients.

Q14. If α and β are the zeroes of the polynomial $x^2 - 6x + 4$, find the [2 marks]
value of $\alpha^2 + \beta^2$.

Q15. For the polynomial $p(x) = x^3 - 9x$, find $p(-3)$, $p(0)$ and $p(3)$. What [2 marks]
can you conclude about the zeroes of $p(x)$? Give a reason.

SECTION C

Short Answer Questions — Q16 to Q19 carry 3 marks each.

- Q16.** If α and β are the zeroes of the polynomial $2x^2 + 5x - 3$, find a quadratic polynomial whose zeroes are 2α and 2β . **[3 marks]**
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- Q17.** If one zero of the polynomial $3x^2 - 8x + 2k + 1$ is seven times the other, find both the zeroes and the value of k . **[3 marks]**
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- Q18.** If α and β are the zeroes of the polynomial $x^2 - 5x + k$ such that $\alpha - \beta = 1$, find the value of k . **[3 marks]**
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- Q19.** Find a quadratic polynomial whose zeroes are $3 + \sqrt{2}$ and $3 - \sqrt{2}$. **[3 marks]**
Also find the value of this polynomial at $x = 3$.
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SECTION D

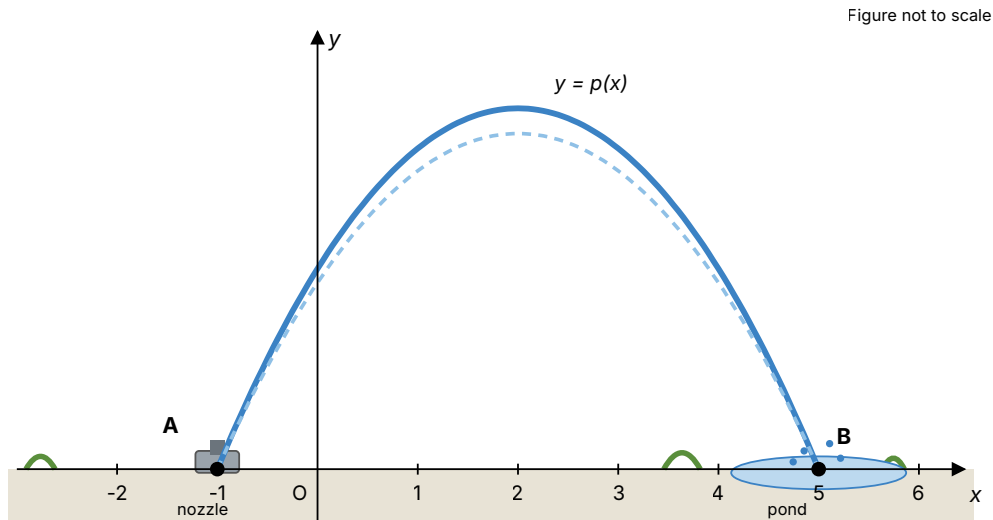
Long Answer Question — Q20 carries 4 marks.

- Q20.** Find the zeroes of the quadratic polynomial $\sqrt{3}x^2 - 8x + 4\sqrt{3}$ and verify the relationship between the zeroes and the coefficients. **[4 marks]**
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SECTION E

Case Study Based Question — Q21 carries 4 marks.

- Q21.** A garden fountain throws a jet of water that follows the shape of a parabola. The ground is taken as the x -axis. The water leaves the nozzle at point A($-1, 0$) and falls into a pond at point B($5, 0$), as shown in the figure. The path of the water is the graph of $y = p(x)$, where $p(x)$ is a quadratic polynomial whose coefficient of x^2 is -1 . Here y is the height of the water (in metres) above the ground at a horizontal position x (in metres). **[4 marks]**



Based on the above information, answer the following questions:

- (i) Write the zeroes of the polynomial $p(x)$. **[1 mark]**
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- (ii) Find the sum and the product of the zeroes of $p(x)$. **[1 mark]**
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- (iii) Find the polynomial $p(x)$. Hence find the height of the water jet at $x = 2$. **[2 marks]**
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— End of Question Paper —