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Polynomials — CBSE Class 10 Mathematics Chapter Test

FREE CHAPTER TEST · CLASS X · MATHEMATICS (041) · PATTERN OF THE CBSE SAMPLE QUESTION PAPER 2026-27

TIME ALLOWED	MAXIMUM MARKS	QUESTIONS	NAME / ROLL NO.
1½ hours	40	19 (A 10 · B 3 · C 2 · D 2 · E 2)	

GENERAL INSTRUCTIONS

Read the following instructions very carefully and strictly follow them:

1. This question paper contains 19 questions. All questions are compulsory.
2. This question paper is divided into five sections: A, B, C, D and E.
3. In Section A, Questions 1 to 8 are multiple choice questions (MCQs) and Questions 9 and 10 are assertion-reason based questions of 1 mark each.
4. In Section B, Q11–13 are very short answer (VSA) type questions, carrying 2 marks each.
5. In Section C, Q14–15 are short answer (SA) type questions, carrying 3 marks each.
6. In Section D, Q16–17 are long answer (LA) type questions, carrying 5 marks each.
7. In Section E, Q18–19 are case study based questions, carrying 4 marks each, with sub-parts of the values of 1, 1 and 2 marks.
8. There is no overall choice. However, an internal choice has been provided in 1 question of Section B, 1 question of Section C, 1 question of Section D and in the 2-mark sub-part of each question of Section E.
9. Use of calculators is not allowed.
10. This chapter test follows the section structure, question types and marks per question of the CBSE Class X Mathematics (Standard, 041) Sample Question Paper 2026-27, at half the length of the 80-mark board paper: 40 marks in 1½ hours.
11. The answer key and the marking scheme are at the end of this booklet. Attempt the paper in 1½ hours before you look at them.

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Chapter: Polynomials · **Topics:** Zeroes of a polynomial · Graphical meaning of zeroes · Sum and product of zeroes · Forming a quadratic polynomial · Symmetric expressions in α and β

SECTION A

This section comprises 10 questions of 1 mark each: 8 multiple choice questions (MCQs) and 2 assertion-reason based questions.

1. The zeroes of the polynomial $x^2 - 3x - 10$ are 1

(A) 5 and −2 (B) −5 and 2

(C) 10 and −1 (D) 2 and 5

2. The sum of the zeroes of $3x^2 - 5x + 2$ is 1

(A) $\frac{2}{3}$ (B) $\frac{5}{3}$

(C) $-\frac{5}{3}$ (D) $\frac{3}{5}$

3. The product of the zeroes of $2x^2 + 7x - 4$ is 1

(A) 2 (B) $\frac{7}{2}$

(C) −2 (D) −4

4. A quadratic polynomial whose zeroes have sum −3 and product 2 is 1

(A) $x^2 - 3x + 2$ (B) $x^2 + 2x - 3$

(C) $x^2 - 2x + 3$ (D) $x^2 + 3x + 2$

5. If 2 is a zero of $x^2 + kx - 6$, then k is 1

(A) −1 (B) 1

(C) 2 (D) 3

6. The graph of $y = p(x)$ cuts the x-axis at exactly three points. The number of zeroes of $p(x)$ is 1

(A) 1 (B) 2

(C) 3 (D) 0

7. If α and β are the zeroes of $x^2 - 5x + 6$, then $\alpha^2 + \beta^2$ is 1

(A) 13 (B) 25

(C) 37 (D) 1

8. The zeroes of $x^2 - 5$ are 1

(A) 5 and −5 (B) √5 only

(C) 5 only (D) √5 and −√5

9. **Assertion (A):** The polynomial $x^2 + 4$ has no real zeroes. 1

Reason (R): The graph of $y = x^2 + 4$ does not meet the x-axis.

(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.

10. **Assertion (A):** The polynomial $x^2 + x + 1$ has two real zeroes. 1

Reason (R): The graph of $y = x^2 + x + 1$ lies entirely above the x-axis.

(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

This section comprises 3 very short answer (VSA) type questions of 2 marks each.

11. (a) Find the zeroes of $6x^2 - 6 - 5x$ and verify the relationship between the zeroes and the coefficients. 2

OR

(b) Find a quadratic polynomial whose zeroes have sum $-\frac{1}{3}$ and product -2.

12. The zeroes of $x^2 - kx + 6$ are in the ratio 3 : 2. Find k. 2

13. If α and β are the zeroes of $x^2 - 4x + 3$, find $\frac{1}{\alpha} + \frac{1}{\beta}$. 2

SECTION C

This section comprises 2 short answer (SA) type questions of 3 marks each.

14. (a) Find the zeroes of $5t^2 - 15t$ and verify the relationship between the zeroes and the coefficients. 3

OR

(b) If α and β are the zeroes of $x^2 + 7x + 10$, find a quadratic polynomial whose zeroes are 2α and 2β.

15. Find k if the sum of the zeroes of $x^2 - (k + 4)x + 3(k - 1)$ is equal to half of their product. 3

SECTION D

This section comprises 2 long answer (LA) type questions of 5 marks each.

16. (a) If α and β are the zeroes of $x^2 - 6x + 8$, find the values of (i) $\alpha^2 + \beta^2$, (ii) $\alpha^3 + \beta^3$, (iii) $\frac{1}{\alpha} + \frac{1}{\beta}$, (iv) $\alpha - \beta$, where $\alpha > \beta$. 5

OR

(b) Find the zeroes of $\sqrt{2}x^2 - 5x + 2\sqrt{2}$ and verify the relationship between the zeroes and the coefficients.

17. (i) One zero of $9x^2 + 6kx - 16$ is the negative of the other. Find k and the zeroes. (ii) The product of the zeroes of $ax^2 + 7x + 6$ is 3. Find a and the sum of the zeroes. 5

SECTION E

This section comprises 2 case study based questions of 4 marks each, with sub-parts of 1, 1 and 2 marks.

18. A ball thrown across a playground follows the path $y = -x^2 + 6x - 5$, where x is the horizontal distance and y the height (in metres), measured from a point on the ground.

(i) How many zeroes does the polynomial $-x^2 + 6x - 5$ have? [1]

(ii) Find its zeroes. [1]

(iii) Find the sum and the product of the zeroes, and check them against the coefficients. [2]

OR

(iii) Find the height of the ball when $x = 3$. [2]

19. A road crosses a small valley. The cross-section of the valley has the shape of the graph of $p(x) = x^2 - 4x - 12$ below the x-axis, the x-axis being the level of the road (1 unit = 1 m).

(i) Find the zeroes of p(x). [1]

(ii) Find the width of the valley at road level. [1]

(iii) Find a quadratic polynomial whose zeroes are each 1 more than the zeroes of p(x). [2]

OR

(iii) Find p(2). [2]

END OF THE QUESTION PAPER

ANSWER KEY — SECTION A

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
(A)	(B)	(C)	(D)	(B)	(C)	(A)	(D)	(A)	(D)

MARKING SCHEME AND WORKED SOLUTIONS

Marks for each step are shown in brackets, as in the CBSE marking scheme. Any correct alternative method earns full marks.

Q1. Answer (A). $x^2 - 3x - 10 = (x - 5)(x + 2)$.

Q2. Answer (B). Sum $= -b/a = 5/3$.

Q3. Answer (C). Product $= c/a = -4/2 = -2$.

Q4. Answer (D). $x^2 - (\text{sum})x + \text{product} = x^2 + 3x + 2$.

Q5. Answer (B). $4 + 2k - 6 = 0$ gives $k = 1$.

Q6. Answer (C). The zeroes are the x-coordinates of the points where the graph meets the x-axis.

Q7. Answer (A). $(\alpha + \beta)^2 - 2\alpha\beta = 25 - 12 = 13$.

Q8. Answer (D). $x^2 = 5$, $x = \pm\sqrt{5}$.

Q9. Answer (A). $x^2 + 4 \geq 4$ for all real x, so its graph lies above the x-axis: no point where $y = 0$. R explains A. Answer (A).

Q10. Answer (D). $x^2 + x + 1 = (x + ½)^2 + ¾ > 0$, so it has no real zeroes: A is false, R is true. Answer (D).

Q11. (2 marks) Answer: (a) $-2/3$ and $3/2$; (b) $3x^2 + x - 6$.
(a) $6x^2 - 5x - 6 = (3x + 2)(2x - 3)$; zeroes $-2/3$ and $3/2$. [1] Sum $= 5/6 = -(-5)/6$; product $= -1 = -6/6$. [1]
OR (b) $x^2 - (-1/3)x + (-2) = x^2 + (1/3)x - 2$, [1] or any multiple, such as $3x^2 + x - 6$. [1]

Q12. (2 marks) Answer: $k = \pm 5$.
Let the zeroes be $3a$ and $2a$. Product $6a^2 = 6$, so $a = \pm 1$. [1] Sum $= 5a = k$, so $k = 5$ or $k = -5$. [1]

Q13. (2 marks) Answer: 4/3.
$\alpha + \beta = 4$, $\alpha\beta = 3$. [1] $1/\alpha + 1/\beta = (\alpha + \beta)/\alpha\beta = 4/3$. [1]

Q14. (3 marks) Answer: (a) 0 and 3; (b) $x^2 + 14x + 40$.
(a) $5t^2 - 15t = 5t(t - 3)$: zeroes 0 and 3. [1] Sum $= 3 = -(-15)/5$ [1]; product $= 0 = 0/5$. [1]
OR (b) $\alpha + \beta = -7$, $\alpha\beta = 10$. [1] New sum $2(\alpha + \beta) = -14$, new product $4\alpha\beta = 40$. [1] Polynomial: $x^2 + 14x + 40$. [1]

Q15. (3 marks) Answer: $k = 11$.
Sum $= k + 4$, product $= 3(k - 1)$. [1] $k + 4 = 3(k - 1)/2$ [1], so $2k + 8 = 3k - 3$, $k = 11$. [1]

Q16. (5 marks) Answer: (a) 20, 72, 3/4, 2; (b) $1/\sqrt{2}$ and $2\sqrt{2}$.
(a) $\alpha + \beta = 6$, $\alpha\beta = 8$. [1] (i) $36 - 16 = 20$. [1] (ii) $(\alpha + \beta)^3 - 3\alpha\beta(\alpha + \beta) = 216 - 144 = 72$. [1] (iii) $6/8 = 3/4$. [1] (iv) $(\alpha - \beta)^2 = 36 - 32 = 4$, so $\alpha - \beta = 2$. [1]
OR (b) $\sqrt{2}x^2 - 5x + 2\sqrt{2} = \sqrt{2}x^2 - 4x - x + 2\sqrt{2} = \sqrt{2}x(x - 2\sqrt{2}) - 1(x - 2\sqrt{2}) = (\sqrt{2}x - 1)(x - 2\sqrt{2})$. [2] Zeroes $1/\sqrt{2}$ and $2\sqrt{2}$. [1] Sum $= 1/\sqrt{2} + 2\sqrt{2} = 5/\sqrt{2} = -(-5)/\sqrt{2}$; product $= 2 = 2\sqrt{2}/\sqrt{2}$. [2]

Q17. (5 marks) Answer: (i) $k = 0, \pm 4/3$; (ii) $a = 2$, sum $-7/2$.
(i) The zeroes add to 0: $-6k/9 = 0$, so $k = 0$. [1] Then $9x^2 - 16 = 0$, zeroes $4/3$ and $-4/3$. [1½]
(ii) Product $= 6/a = 3$, so $a = 2$. [1½] Sum $= -7/a = -7/2$. [1]

Q18. (4 marks) Answer: (i) 2; (ii) 1 and 5; (iii) 6 and 5, or 4 m.
(i) 2. [1]
(ii) $-x^2 + 6x - 5 = -(x - 1)(x - 5)$: zeroes 1 and 5. [1]
(iii)(a) Sum $6 = -6/(-1)$; [1] product $5 = -5/(-1)$. [1]
OR (iii)(b) $y = -9 + 18 - 5$ [1] = 4 m. [1]

Q19. (4 marks) Answer: (i) 6, −2; (ii) 8; (iii) $x^2 - 6x - 7$, or −16.
(i) $(x - 6)(x + 2)$: 6 and −2. [1]
(ii) $6 - (-2) = 8$ m. [1]
(iii)(a) Zeroes 7 and −1: sum 6, product −7 [1]; polynomial $x^2 - 6x - 7$. [1]
OR (iii)(b) $p(2) = 4 - 8 - 12$ [1] = −16. [1]

All questions are original and © Master Testing Agency. Free to download and use for personal practice; not for resale. Every answer in this paper was checked independently by computer: zeroes found numerically and substituted back, sums, products and symmetric expressions computed from the actual zeroes.