Polynomials Class 10 Important Questions

10 questions · 27 marks · no calculator · step-marked answers

Name _____ Date _____ Score / 27

- Original questions in the board paper's question types, from 1-mark MCQs to a case study. Try every question before you look at the answers.
- No calculator: as in the CBSE board exam, everything works by hand.
- Worked answers with step marks for 5 questions start after the questions. The other 5 open free on the chapter page with a free account (no card): the link is next to each one.
- Online, with more practice: cbsemathrevision.com/class-10/polynomials

Section A · Multiple choice and assertion–reason (1 mark each)

1. **1 mark · Relationship between zeroes and coefficients**

3 is one zero of $3x^2 - 10x + k$. The other zero is

(a) $\frac{1}{3}$ (b) $-\frac{1}{3}$

(c) 1 (d) $\frac{10}{3}$

2. **1 mark · Relationship between zeroes and coefficients**

If α and β are the zeroes of $x^2 - 4x + 1$, then $\alpha^2 + \beta^2$ equals

(a) 16 (b) 18

(c) 14 (d) 12

3. **1 mark · Zeroes of a polynomial**

In the following question, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option.

Assertion (A): The polynomial $x^2 - 6x + 9$ has two equal zeroes.

Reason (R): Every quadratic polynomial has two distinct real zeroes.

(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 · Short answer (2 marks each)

4. **2 marks · Relationship between zeroes and coefficients**

Find the zeroes of $3x^2 - 27$. Check that their sum is $-\frac{b}{a}$ and their product is $\frac{c}{a}$.

5. **2 marks · Forming a quadratic polynomial**

Find a quadratic polynomial with integer coefficients whose zeroes are $-\frac{2}{3}$ and $\frac{1}{2}$.

Section C · Short answer (3 marks each)

6. **3 marks · Relationship between zeroes and coefficients**

α and β are the zeroes of $2x^2 - 3x - 6$. Without finding the zeroes, find $\frac{1}{\alpha} + \frac{1}{\beta}$ and $\alpha^2\beta + \alpha\beta^2$.

7. **3 marks · Relationship between zeroes and coefficients**

Factorise $6x^2 - 13x + 6$ to find its zeroes. Then check that their sum and product agree with the coefficients.

Section D · Long answer (5 marks each)

8. **5 marks · Forming a quadratic polynomial**

The zeroes α and β of $x^2 - 9x + k$ satisfy $\alpha - \beta = 3$. Find k. Hence find a quadratic polynomial whose zeroes are $\frac{\alpha}{\beta}$ and $\frac{\beta}{\alpha}$.

9. **5 marks · Relationship between zeroes and coefficients**

α and β are the zeroes of $p(x) = 2x^2 + 5x + k$, and $\alpha^2 + \beta^2 + \alpha\beta = \frac{21}{4}$. Find k and the zeroes of $p(x)$.

Section E · Case study (4 marks)

10. **4 marks · Geometrical meaning of the zeroes**

Flower bed. The area of a rectangular flower bed is $p(x) = x^2 + x - 12$ square metres, where its length and breadth (in metres) are the two linear factors of $p(x)$.

i. Factorise $p(x)$ to write the length and the breadth in terms of x. *[1 mark]*

ii. Find the zeroes of $p(x)$. *[1 mark]*

iii. The length of the bed is 9 m. Find x and the area of the bed. *[2 marks]*

Answers and worked solutions

Question 1 — 1 mark

$27 - 30 + k = 0 \Rightarrow k = 3$; product of zeroes $= \frac{k}{3} = 1$, so the other zero is $\frac{1}{3}$ **A1**

Correct option: (a) $\frac{1}{3}$

Question 2 — 1 mark

Worked answer: free with a free account (no card) on the chapter page: cbsemathrevision.com/class-10/polynomials#iq-2

Question 3 — 1 mark

Worked answer: free with a free account (no card) on the chapter page: cbsemathrevision.com/class-10/polynomials#iq-3

Question 4 — 2 marks

Answer: 3 and -3

$3x^2 - 27 = 3(x - 3)(x + 3)$, so the zeroes are 3 and -3 **M1**

Sum $= 0 = -\frac{0}{3}$; product $= -9 = \frac{-27}{3}$ **A1**

Question 5 — 2 marks

Worked answer: free with a free account (no card) on the chapter page: cbsemathrevision.com/class-10/polynomials#iq-5

Question 6 — 3 marks

Answer: $-\frac{1}{2}$ and $-\frac{9}{2}$

$\alpha + \beta = \frac{3}{2}$ and $\alpha\beta = -3$ **A1**

$\frac{1}{\alpha} + \frac{1}{\beta} = \frac{\alpha + \beta}{\alpha\beta} = \frac{3/2}{-3} = -\frac{1}{2}$ **A1**

$\alpha^2\beta + \alpha\beta^2 = \alpha\beta(\alpha + \beta) = -3 \times \frac{3}{2} = -\frac{9}{2}$ **A1**

Question 7 — 3 marks

Worked answer: free with a free account (no card) on the chapter page: cbsemathrevision.com/class-10/polynomials#iq-7

Question 8 — 5 marks

Answer: $k = 18$; $2x^2 - 5x + 2$

$\alpha + \beta = 9$ and $\alpha\beta = k$ **M1**

With $\alpha - \beta = 3$: $\alpha = 6$, $\beta = 3$ **A1**

$k = \alpha\beta = 18$ **A1**

$\frac{\alpha}{\beta} = 2$, $\frac{\beta}{\alpha} = \frac{1}{2}$: sum $= \frac{5}{2}$, product $= 1$ **M1**

Polynomial: $x^2 - \frac{5}{2}x + 1$, or $2x^2 - 5x + 2$ **A1**

Question 9 — 5 marks

Worked answer: free with a free account (no card) on the chapter page: cbsemathrevision.com/class-10/polynomials#iq-9

Question 10 — 4 marks

i. $x^2 + 4x - 3x - 12 = (x + 4)(x - 3)$: length $(x + 4)$ m, breadth $(x - 3)$ m **A1**

ii. $(x + 4)(x - 3) = 0 \Rightarrow x = -4$ or $x = 3$ **A1**

iii. $x + 4 = 9 \Rightarrow x = 5$; breadth $= 5 - 3 = 2$ m **M1**
Area $= 9 \times 2 = 18$ m^2 (check: $p(5) = 25 + 5 - 12 = 18$) **A1**

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