

CLASS 10

MATHS

EXTRA QUESTIONS

Class 10 Maths Chapter 2 Extra Questions – Polynomials (HOTS)

These higher-order-thinking questions go beyond the standard Exercise 2.1 pattern -- reverse-engineering, general proofs, assertion-reason, and fresh word problems, all with numbers not used in the NCERT textbook exercise. These Class 10 Mathematics Chapter 2 important questions are handy for last-minute exam practice.

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Q1 (Reverse-engineering). If α, β are the zeroes of $x^2 - 5x + 6$, find a quadratic polynomial whose zeroes are $1/\alpha$ and $1/\beta$.

For $x^2 - 5x + 6$: $\alpha + \beta = 5$, $\alpha\beta = 6$. New sum $= 1/\alpha + 1/\beta = (\alpha + \beta)/(\alpha\beta) = 5/6$. New product $= 1/(\alpha\beta) = 1/6$. Required polynomial: $x^2 - (5/6)x + 1/6$, or clearing fractions, **$6x^2 - 5x + 1$** .

Q2 (General/abstract proof). If α, β are the zeroes of $ax^2 + bx + c$, prove that $\alpha^2 + \beta^2 = (b^2 - 2ac)/a^2$.

Proof: $\alpha + \beta = -b/a$ and $\alpha\beta = c/a$. Now $\alpha^2 + \beta^2 = (\alpha + \beta)^2 - 2\alpha\beta = b^2/a^2 - 2c/a = \mathbf{(b^2 - 2ac)/a^2}$. (Check with $x^2 - 5x + 6$, zeroes 2, 3: $\alpha^2 + \beta^2 = 4 + 9 = 13$, and $(25 - 12)/1 = 13$. ✓)

Q3 (Fresh word problem). A rectangular field has length 3 m more than twice its breadth, and its area is 90 m^2 . Form a quadratic equation in the breadth and find the dimensions.

Let breadth = $x \text{ m}$, length = $(2x + 3) \text{ m}$. Area: $x(2x + 3) = 90 \Rightarrow 2x^2 + 3x - 90 = 0$. Factorising: $(x - 6)(2x + 15) = 0 \Rightarrow x = 6$ or $x = -7.5$ (rejected). **Breadth = 6 m, length = 15 m**. Check: $6 \times 15 = 90$. ✓

Q4 (Assertion-Reason). Assertion (A): If the sum of the zeroes of a quadratic polynomial is 0, the polynomial has no x -term.

Reason (R): For $ax^2 + bx + c$, sum of zeroes $= -b/a$; if this is 0, then $b = 0$.

Options: (a) Both true, R explains A. (b) Both true, R does not explain A. (c) A true, R false. (d) A false, R true.

Answer: (a). Sum = 0 forces $-b/a = 0$, i.e. $b = 0$, so the polynomial reduces to $ax^2 + c$ — R directly explains A.

Q5 (Reverse-engineering). Find the value of k such that the sum of the zeroes of $x^2 - (k + 6)x + 2(2k - 1)$ is half of the product of its zeroes.

Sum $= (k + 6)$, Product $= 2(2k - 1) = 4k - 2$. Given: $k + 6 = (1/2)(4k - 2) = 2k - 1 \Rightarrow 7 = k$. **$k = 7$** . Check: sum = 13, product = 26, half of 26 is 13. ✓

Q6 (Reverse-engineering). If the zeroes of $x^2 + px + q$ are double the zeroes of $2x^2 - 5x - 3$, find p and q .

Zeroes of $2x^2 - 5x - 3 = 0$: $(2x + 1)(x - 3) = 0 \Rightarrow x = 3$ or $-1/2$. Doubled zeroes: 6 and -1 . New sum $= 5 = -p \Rightarrow \mathbf{p = -5}$. New product $= -6 = q \Rightarrow \mathbf{q = -6}$. Check: $x^2 - 5x - 6 = (x - 6)(x + 1) = 0$ gives zeroes 6, -1 . ✓

Class 10 Mathematics Chapter 2 – Solutions

For complete step-by-step answers, check the [Class 10 Mathematics Chapter 2 Solutions](#).