MIND CURVE · INFINITY THINK BEYOND

Polynomials

Chapter 2 · Previous Year Questions with Answers · Class X Mathematics Basic (241)

01 TOPIC 1 Zeroes of a Polynomial & their Graphs

QUICK RECAP

- A zero of $p(x)$ is a value k with $p(k) = 0$. Graphically, the zeroes of $y = p(x)$ are the x-coordinates of the points where the graph **meets the x-axis**.
- A polynomial of degree n has **at most** n zeroes. The graph of $ax^2 + bx + c$ is a parabola: opening **downward if** $a < 0$, upward if $a > 0$; it cuts the y-axis at $(0, c)$.
- Recall (Class IX): to find zeroes, factorise. E.g. $x^2 - x - 6 = (x - 3)(x + 2)$ gives zeroes $3, -2$.

Q1 MCQ · 1 mark — **2023** – 430/C/1, 430/C/3

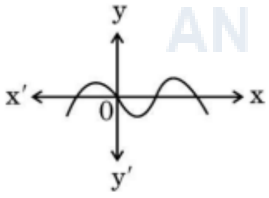
Degree of a zero polynomial is :

(A) 0
(B) 1
(C) any real number
(D) not defined

ANSWER **(D) not defined**

Q2 MCQ · 1 mark — **2023** – 430/C/2

In the given figure, graph of a polynomial $p(x)$ is given. Number of zeroes of $p(x)$ is :

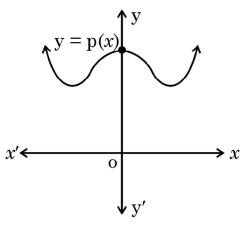


(A) 3
(B) 4
(C) 5
(D) 2

ANSWER **(B) 4**

Q3 MCQ · 1 mark — **2023** – 430/1/1, 430/1/2

The graph of $y = p(x)$ is shown in the figure for some polynomial $p(x)$. The number of zeroes of $p(x)$ is/are :



(A) 0
(B) 1

(C) 2
(D) 3

ANSWER *
The graph does not meet the x-axis.
(A) 0

Q4 MCQ · 1 mark **2023** – 430/1/2

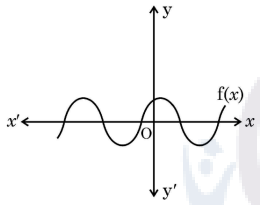
The zeroes of the polynomial $p(x) = x^2 + 3x + 2$ are given as.

(A) $1,\ 2$
(B) $2,\ -1$
(C) $-2,\ 1$
(D) $-2,\ -1$

ANSWER *
$x^2 + 3x + 2 = (x + 1)(x + 2)$
(D) $-2,\ -1$

Q5 MCQ · 1 mark **2023** – 430/1/3

The graph of $y = f(x)$ is shown in the figure for some polynomial $f(x)$. The number of zeroes of $f(x)$ is



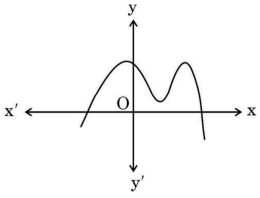
(A) 5
(B) 6
(C) 4
(D) 8

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ANSWER *
The graph meets the x-axis at 5 points.
(A) 5

Q6 MCQ · 1 mark **2023** – 430/2/1, 430/2/3

Graph of a polynomial $p(x)$ is given in the figure. The number of zeroes of $p(x)$ is :



(A) 2
(B) 3
(C) 4
(D) 5

ANSWER *
The graph meets the x-axis at 2 points.
(A) 2

Q7 MCQ · 1 mark **2023** – 430/4/1, 430/4/2, 430/4/3

If $p(x) = x^2 + 5x + 6$, then $p(-2)$ is :

(A) 20
(B) 0
(C) -8
(D) 8

ANSWER *

$p(-2) = 4 - 10 + 6 = 0$

(B) 0

Q8 MCQ · 1 mark **2023** – 430/5/1, 430/5/2, 430/5/3

If one zero of the quadratic polynomial $kx^2 + 3x + k$ is 2, then the value of k is :

(A) $-\frac{6}{5}$
(B) $\frac{6}{5}$
(C) $\frac{5}{6}$
(D) $-\frac{5}{6}$

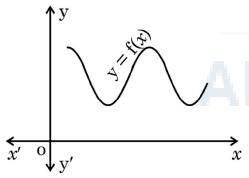
ANSWER *

$4k + 6 + k = 0 \Rightarrow k = -\frac{6}{5}$

(A) $-\frac{6}{5}$

Q9 MCQ · 1 mark **2023** – 430/6/1, 430/6/2

The graph of $y = f(x)$ is shown in the figure for some polynomial $f(x)$. The number of zeroes of $f(x)$ is



(A) 0
(B) 2
(C) 3
(D) 4

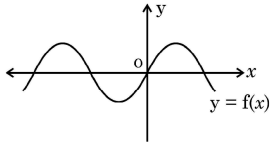
ANSWER *

The graph does not meet the x-axis.

(A) 0

Q10 MCQ · 1 mark **2023** – 430/6/3

The graph of $y = f(x)$ is shown in the figure for some polynomial $f(x)$. The number of zeroes of $f(x)$ are



(A) 4
(B) 3
(C) 2
(D) 1

ANSWER *

The graph meets the x-axis at 4 points.

(A) 4

Q11 MCQ · 1 mark **2023** – 430/6/1

The zeroes of the quadratic polynomial $16x^2 - 9$ are :

(A) $\frac{3}{4}, \frac{3}{4}$
(B) $-\frac{3}{4}, \frac{3}{4}$
(C) $\frac{9}{16}, \frac{9}{16}$
(D) $-\frac{3}{4}, -\frac{3}{4}$

ANSWER *

$16x^2 - 9 = (4x - 3)(4x + 3)$

(B) $-\frac{3}{4}, \frac{3}{4}$

Q12 MCQ · 1 mark **2023** – 430/6/2

The zeroes of the polynomial $p(x) = 25x^2 - 49$ are :

(A) $\frac{49}{25}, \frac{49}{25}$
(B) $-\frac{49}{25}, +\frac{49}{25}$
(C) $\frac{7}{5}, -\frac{7}{5}$
(D) $\frac{7}{5}, \frac{7}{5}$

ANSWER *

$25x^2 - 49 = (5x - 7)(5x + 7)$

(C) $\frac{7}{5}, -\frac{7}{5}$

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Q13 MCQ · 1 mark **2023** – 430/6/3

The zeroes of the polynomial $p(x) = 2x^2 - x - 3$ are

(A) $-\frac{3}{2}, 1$
(B) $\frac{3}{2}, 1$
(C) $-\frac{3}{2}, -1$
(D) $\frac{3}{2}, -1$

ANSWER *

$2x^2 - 3x + 2x - 3 = (2x - 3)(x + 1)$

(D) $\frac{3}{2}, -1$

Q14 MCQ · 1 mark **2024** – 430(B)/S

The zeroes of the polynomial $x^2 + 5x + 6$ are :

(A) $2, 3$
(B) $3, -2$
(C) $-3, -2$
(D) $-3, 2$

ANSWER **(C) $-3, -2$**

Q15 MCQ · 1 mark — **2024** – 430(B)

If 1 is a zero of the polynomial $x^2 + ax + 2$, then 'a' is :

(A) 5
(B) 3
(C) -3
(D) -5

ANSWER *

$1 + a + 2 = 0 \Rightarrow a = -3$

(C) -3

Q16 MCQ · 1 mark — **2024** – 430/1/1, 430/1/2, 430/1/3

If one of the zeroes of the quadratic polynomial $(\alpha - 1)x^2 + \alpha x + 1$ is -3, then the value of α is :

(A) $-\frac{2}{3}$
(B) $\frac{2}{3}$
(C) $\frac{4}{3}$
(D) $\frac{3}{4}$

ANSWER *

$9(\alpha - 1) - 3\alpha + 1 = 0 \Rightarrow 6\alpha = 8 \Rightarrow \alpha = \frac{4}{3}$

(C) $\frac{4}{3}$

Q17 MCQ · 1 mark — **2024** – 430/2/1

The zeroes of the polynomial $3x^2 + 11x - 4$ are :

(A) $\frac{1}{3}, 4$
(B) $\frac{-1}{3}, -4$
(C) $\frac{1}{3}, -4$
(D) $\frac{-1}{3}, 4$

ANSWER *

$3x^2 + 12x - x - 4 = (3x - 1)(x + 4)$

(C) $\frac{1}{3}, -4$

Q18 MCQ · 1 mark — **2024** – 430/2/2

The zeroes of the polynomial $3x^2 - 5x - 2$, are :

(A) $\frac{1}{3}, 2$
(B) $\frac{-1}{3}, 2$
(C) $\frac{-1}{3}, -2$
(D) $\frac{1}{3}, -2$

ANSWER *

$3x^2 - 6x + x - 2 = (3x + 1)(x - 2)$

(B) $\frac{-1}{3}, 2$

Q19 MCQ · 1 mark — **2024** – 430/2/3

The zeroes of the polynomial $3x^2 + 8x - 3$ are :

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(A) $\frac{1}{3}, 3$
(B) $\frac{1}{3}, -3$
(C) $\frac{-1}{3}, 3$
(D) $\frac{-1}{3}, -3$

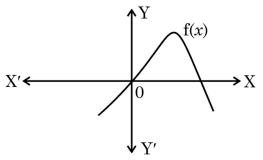
ANSWER *

$3x^2 + 9x - x - 3 = (3x - 1)(x + 3)$

(B) $\frac{1}{3}, -3$

Q20 MCQ · 1 mark — **2024** – 430/3/1, 430/3/2

In the given figure, graph of a polynomial $f(x)$ is shown. The number of zeroes of polynomial $f(x)$ is :



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

ANSWER *

The graph meets the x-axis at 2 points (one at the origin).

(D) 2

Q21 MCQ · 1 mark — **2024** – 430/4/1, 430/4/2

If one zero of a quadratic polynomial $kx^2 + 4x + k$ is 1, then the value of k is :

(A) 2
(B) -2
(C) 4
(D) -4

ANSWER *

$k + 4 + k = 0 \Rightarrow k = -2$

(B) -2

Q22 MCQ · 1 mark — **2024** – 430/4/3

What should be added to the polynomial $x^2 - 5x + 4$, so that 3 is a zero of the resulting polynomial ?

(A) 1
(B) 2
(C) 4
(D) 5

ANSWER *

$p(3) = 9 - 15 + 4 = -2$; adding 2 makes the value 0

(B) 2

Q23 MCQ · 1 mark — **2025** – 430(B)

The graph of the polynomial $ax^2 + bx + c$ is a downward parabola if

(A) $a > 0$
(B) $a < 0$
(C) $a = 0$
(D) $a > 1$

ANSWER *

The parabola opens downward when $a < 0$.

(B) $a < 0$

Q24 MCQ · 1 mark **2025** – 430/4/1, 430/4/3

One of the zeroes of the polynomial $p(x) = kx^2 - 9x + 3$ is $\left(-\frac{3}{2}\right)$. The value of k is :

(A) $\frac{22}{3}$ (B) $-\frac{14}{3}$

(C) $\frac{14}{3}$ (D) $-\frac{22}{3}$

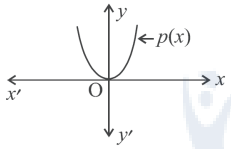
ANSWER *

$\frac{9k}{4} + \frac{27}{2} + 3 = 0 \Rightarrow \frac{9k}{4} = -\frac{33}{2} \Rightarrow k = -\frac{22}{3}$

(D) $-\frac{22}{3}$

Q25 MCQ · 1 mark **2025** – 430/4/2

In the given figure, graph of $p(x)$ is shown. Number of distinct zeroes of $p(x)$ is :



(A) 0 (B) 1

(C) 2 (D) many

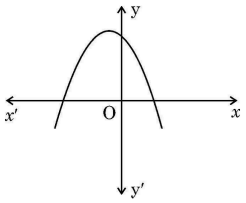
ANSWER *

The graph touches the x-axis only at the origin.

(B) 1

Q26 MCQ · 1 mark **2025** – 430/5/1, 430/5/2, 430/5/3

Observe the given graph of polynomial $p(x)$. The number of zeroes of $p(x)$ is



(A) 0 (B) 1

(C) 3 (D) 2

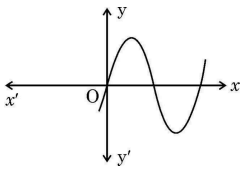
ANSWER *

The graph meets the x-axis at 2 points.

(D) 2

Q27 MCQ · 1 mark **2025** – 430/6/1

In the given figure, graph of polynomial $p(x)$ is shown. Number of zeroes of $p(x)$ is

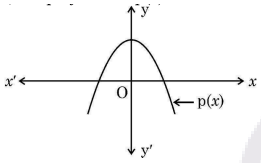


(A) 3
(B) 2
(C) 1
(D) 4

ANSWER *
The graph meets the x-axis at 3 points.
(A) 3

Q28 MCQ · 1 mark **2025** – 430/6/3

In the given graph, the polynomial $p(x)$ is shown. Number of zeroes of $p(x)$ is



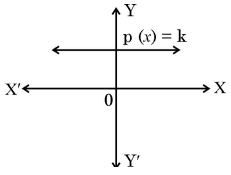
(A) 3
(B) 2
(C) 1
(D) 4

ANSWER *
The graph meets the x-axis at 2 points.
(B) 2

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Q29 MCQ · 1 mark **2026 (I)** – 430/4/1, 430/4/2, 430/4/3

The graph of polynomial $p(x) = k$ is shown here. Number of zeroes of polynomial $p(x)$ is :

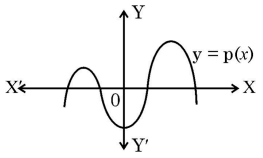


(A) 0
(B) 1
(C) 2
(D) infinitely many

ANSWER *
The line $y = k$ is parallel to the x-axis and does not meet it.
(A) 0

Q30 MCQ · 1 mark — **2026 (I)** – 430/5/1, 430/5/2, 430/5/3

The graph of a polynomial $p(x)$ is shown here. The number of zeroes of the polynomial $p(x)$ is



(A) 5
(B) 1
(C) 0
(D) 4

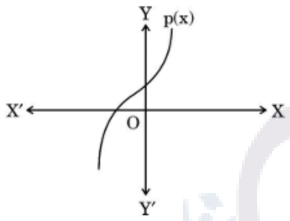
ANSWER *

The graph meets the x-axis at 4 points.

(D) 4

Q31 MCQ · 1 mark — **2026 (II)** – 430/7/1, 430/7/2, 430/7/3

The graph of the polynomial $p(x)$ is shown here. The number of zeroes of $p(x)$ is :



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

ANSWER **(D) 1**

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Q32 MCQ · 1 mark — **2026 (II)** – 430/8/1, 430/8/2, 430/8/3

If $x = 3$ is a zero of the polynomial $p(x) = x^2 - 9k$, then k is equal to

(A) 1
(B) 10
(C) 0.1
(D) 100

ANSWER **(A) 1**

Q33 Assertion–Reason · 1 mark — **2023** – 430/2/1, 430/2/2, 430/2/3

Assertion (A) : Polynomial $x^2 + 4x$ has two real zeroes.
Reason (R) : Zeroes of the polynomial $x^2 + ax$ $(a \neq 0)$ are 0 and a.

(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 *

$x^2 + 4x = x(x + 4)$: zeroes $0,\ -4$, so A is true.

$x^2 + ax = x(x + a)$ has zeroes 0 and $-a$ (not a), so R is false.

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

Q34 Very Short Answer · 2 marks — **2023** – 430/2/3

If (-3) is one of the zeroes of the polynomial $(k-1)x^2 + kx + 1$, find the value of k.

ANSWER *

$p(-3) = 0 \Rightarrow 9(k-1) - 3k + 1 = 0$

$6k - 8 = 0 \Rightarrow k = \frac{4}{3}$

$\boxed{k = \frac{4}{3}}$

Q35 Very Short Answer · 2 marks · Internal choice (OR) part — **2023** – 430/6/1, 430/6/2, 430/6/3

Find the zeroes of the polynomial $x^2 + 4x - 12$.

ANSWER *

$x^2 + 6x - 2x - 12 = (x+6)(x-2)$

Zeroes are 2 and -6

$\boxed{2,\ -6}$

Q36 Very Short Answer · 2 marks · Internal choice (OR) part — **2026 (I)** – 430(B)

Find the zeroes of the polynomial $p(x) = 15x^2 - 19x + 6$.

ANSWER *

$15x^2 - 10x - 9x + 6 = (3x-2)(5x-3)$

Zeroes are $\frac{2}{3}$ and $\frac{3}{5}$

$\boxed{\frac{2}{3}, \frac{3}{5}}$

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Q37 Very Short Answer · 2 marks · Internal choice (OR) part — **2026 (I)** – 430(B)

If one zero of the polynomial $p(x) = (k-1)x^2 - (4k+1)x + 10$ is 5, find the value of k.

ANSWER *

$p(5) = 0 \Rightarrow 25(k-1) - 5(4k+1) + 10 = 0$

$5k - 20 = 0 \Rightarrow k = 4$

$\boxed{k = 4}$

Q38 Case Study · 4 marks — **2026 (II)** – 430/8/1, 430/8/2, 430/8/3

Case study: A parabolic fountain in a park is designed such that its shape follows the polynomial $p(x) = -x^2 + 6x - 5$, where $p(x)$ is the height (in metres) above ground level at a horizontal distance x metre from the origin.

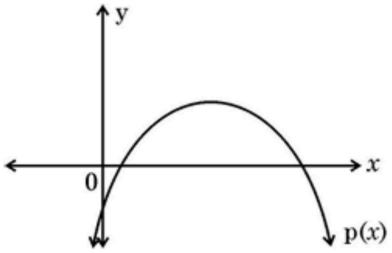
(i) What are the zeroes of $p(x)$? **[1]**

(ii) What is the height of the fountain at a horizontal distance of 2 metres from origin ? **[1]**

(iii) (a) If $q(x)$ is a reflection of $p(x)$, that is $q(x) = -p(x)$, write its value as polynomial and draw its figure. **[2]**

OR

(iii) (b) At what horizontal distance from the origin does water hit the ground ? **[2]**



ANSWER

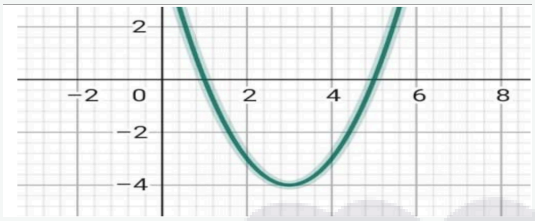
(i) $p(x) = -x^2 + 6x - 5 = -(x-5)(x-1)$; zeroes of $p(x)$ are 5 & 1 — 1

(ii) $p(2) = -(2)^2 + 6(2) - 5 = 12 - 9 = 3$ m — 1

(iii)(a) Figure (below) — 1

Reflection of $p(x)$ is $q(x) = -p(x) = x^2 - 6x + 5$ — 1

OR (iii)(b) Water hits the ground when $p(x) = 0$, at 1 metre or 5 metre away from origin. — 2



02 TOPIC 2 Relationship between Zeroes and Coefficients

QUICK RECAP

- For $ax^2 + bx + c$ with zeroes α, β: $\alpha + \beta = -\frac{b}{a}$, $\alpha\beta = \frac{c}{a}$.
- Useful identities: $\alpha^2 + \beta^2 = (\alpha+\beta)^2 - 2\alpha\beta$, $(\alpha-\beta)^2 = (\alpha+\beta)^2 - 4\alpha\beta$, $\frac{1}{\alpha} + \frac{1}{\beta} = \frac{\alpha+\beta}{\alpha\beta}$.
- Zeroes reciprocal of each other $\Rightarrow \alpha\beta = 1$, i.e. $c = a$. Zeroes negatives of each other $\Rightarrow \alpha + \beta = 0$, i.e. $b = 0$.

Q39 MCQ · 1 mark — **2023** – 430/C/B

Sum of the zeroes of the quadratic polynomial $p(x) = x^2 - 7x + 10$ is :

(A) 7 (B) -7

(C) 10 (D) -10

ANSWER (A) 7

Q40 MCQ · 1 mark — **2023** – 430/C/B

If the zeroes of the polynomial $p(x) = 5x^2 - 26x + k$ are reciprocal of each other, then the value of k is :

(A) $\frac{1}{5}$ (B) 5

(C) 1 (D) 25

ANSWER (B) 5

Q41 MCQ · 1 mark — **2023** – 430/1/1

The sum and the product of zeroes of the polynomial $p(x) = x^2 + 5x + 6$ are respectively

(A) $5,\ -6$
(B) $-5,\ 6$
(C) $2,\ 3$
(D) $-2,\ -3$

ANSWER *

Sum $= -\frac{b}{a} = -5$, product $= \frac{c}{a} = 6$

(B) $-5,\ 6$

Q42 MCQ · 1 mark — **2023** – 430/1/3

The sum and product of zeroes of the polynomial $p(x) = 3x^2 - 5x + 2$ are

(A) $\frac{5}{3}, \frac{2}{3}$
(B) $\frac{-5}{3}, \frac{2}{3}$
(C) $1, \frac{2}{3}$
(D) $\frac{-5}{3}, \frac{-2}{3}$

ANSWER *

Sum $= -\frac{b}{a} = \frac{5}{3}$, product $= \frac{c}{a} = \frac{2}{3}$

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

Q43 MCQ · 1 mark — **2024** – 430(B)/S

If the product of the zeroes of the quadratic polynomial $5x^2 + 7x + k$ is $\frac{2}{5}$, then the value of k is :

(A) -2
(B) 3
(C) 5
(D) 2

ANSWER **(D) 2**

Q44 MCQ · 1 mark — **2024** – 430(B)

If one zero of the polynomial $(k-2)x^2 - 10x + 3$ is reciprocal of the other, then the value of 'k' is :

(A) 3
(B) 5
(C) -5
(D) -3

ANSWER *

Product of zeroes $= 1 \Rightarrow \frac{3}{k-2} = 1 \Rightarrow k = 5$

(B) 5

Q45 MCQ · 1 mark — **2024** – 430/1/1, 430/1/2, 430/1/3

For what value of k, the product of zeroes of the polynomial $kx^2 - 4x - 7$ is 2 ?

(A) $-\frac{1}{14}$
(B) $-\frac{7}{2}$
(C) $\frac{7}{2}$
(D) $-\frac{2}{7}$

ANSWER *

$\frac{-7}{k} = 2 \Rightarrow k = -\frac{7}{2}$

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

Q46 MCQ · 1 mark — 2025 – 430(B)

If α and β are zeroes of the polynomial $x^2 - x - 4$, then the value of $\left(\frac{1}{\alpha} + \frac{1}{\beta}\right)$ is

(A) -4
(B) $-\frac{1}{4}$
(C) $\frac{1}{4}$
(D) 4

ANSWER *

$\frac{\alpha+\beta}{\alpha\beta} = \frac{1}{-4} = -\frac{1}{4}$

(B) $-\frac{1}{4}$

Q47 MCQ · 1 mark — 2025 – 430/4/1, 430/4/2

α, β are zeroes of the polynomial $2x^2 + 5x + 1$. The value of $\left(\frac{1}{\alpha} + \frac{1}{\beta}\right)$ is :

(A) $-\frac{5}{4}$
(B) 5
(C) $\frac{5}{4}$
(D) -5

ANSWER *

$\frac{\alpha+\beta}{\alpha\beta} = \frac{-5/2}{1/2} = -5$

(D) -5

Q48 MCQ · 1 mark — 2025 – 430/4/3

If α, β are zeroes of the polynomial $3x^2 + 14x - 5$, then the value of $3\left(\frac{\alpha+\beta}{\alpha\beta}\right)$ is :

(A) $\frac{14}{5}$
(B) $\frac{42}{5}$
(C) $-\frac{14}{5}$
(D) $-\frac{42}{5}$

ANSWER *

$\alpha + \beta = -\frac{14}{3}, \alpha\beta = -\frac{5}{3}; 3 \times \frac{14}{5} = \frac{42}{5}$

(B) $\frac{42}{5}$

Q49 MCQ · 1 mark — 2026 (I) – 430(B)

If α and β are two zeroes of the quadratic polynomial $p(x) = x^2 - 11x + 30$, then $\frac{1}{\alpha} + \frac{1}{\beta}$ is equal to :

(A) $\frac{30}{11}$
(B) $\frac{11}{30}$

(C) $-\frac{11}{30}$
(D) $-\frac{30}{11}$

ANSWER *
$\frac{\alpha+\beta}{\alpha\beta}=\frac{11}{30}$
(B) $\frac{11}{30}$

Q50 MCQ · 1 mark — **2026 (I)** – 430/5/1, 430/5/3

The value of k for which sum of the zeroes of the polynomial $p(x)=3x^2-kx+6$ is 2, is

(A) 2
(B) -6
(C) -2
(D) 6

ANSWER *
$\frac{k}{3}=2\Rightarrow k=6$
(D) 6

Q51 MCQ · 1 mark — **2026 (I)** – 430/5/2

If the zeroes of the polynomial $p(x)=2x^2-7x+6$ are α and β, then the value of $\frac{1}{\alpha}+\frac{1}{\beta}$ is

(A) $\frac{7}{2}$
(B) $\frac{6}{7}$
(C) $\frac{-7}{6}$
(D) $\frac{7}{6}$

ANSWER *
$\frac{\alpha+\beta}{\alpha\beta}=\frac{7/2}{3}=\frac{7}{6}$
(D) $\frac{7}{6}$

Q52 MCQ · 1 mark — **2026 (II)** – 430(B)

If one zero of the polynomial $p(x)=3x^2-10x+3$ is $\frac{1}{3}$, then the other zero is :

(A) $-\frac{1}{3}$
(B) $\frac{1}{3}$
(C) 3
(D) -3

ANSWER **(C) 3**

Q53 Very Short Answer · 2 marks — **2023** – 430/C/B

Find the zeroes of the polynomial $p(x)=x^2-25$ and verify the relation between the zeroes and the

coefficients.

ANSWER

Zeroes of the polynomial are 5 & -5 — 1

$a = 1,\ b = 0,\ c = -25$. Sum of zeroes $= 0 = \dfrac{-b}{a}$ — ½

Product of zeroes $= -25 = \dfrac{c}{a}$ — ½

Zeroes are 5 and -5

Q54 Very Short Answer · 2 marks — **2023** – 430/2/1

Find the value of 'k' such that the polynomial $p(x) = 3x^2 + 2kx + x - k - 5$ has the sum of zeroes equal to half of their product.

ANSWER *

$p(x) = 3x^2 + (2k+1)x - (k+5)$; sum $= -\dfrac{2k+1}{3}$, product $= -\dfrac{k+5}{3}$

$$-\frac{2k+1}{3} = \frac{1}{2}\left(-\frac{k+5}{3}\right) \Rightarrow 4k + 2 = k + 5 \Rightarrow k = 1$$

$k = 1$

Q55 Very Short Answer · 2 marks — **2023** – 430/2/2

α, β are the zeroes of the quadratic polynomial $p(x) = x^2 - 8x + k$, such that $\alpha^2 + \beta^2 = 40$. Find the value of k.

ANSWER *

$\alpha + \beta = 8,\ \alpha\beta = k$

$\alpha^2 + \beta^2 = (\alpha+\beta)^2 - 2\alpha\beta \Rightarrow 64 - 2k = 40 \Rightarrow k = 12$

$k = 12$

Q56 Very Short Answer · 2 marks · Internal choice (OR) part — **2024** – 430/4/1, 430/4/2, 430/4/3

If α, β are zeroes of the polynomial $8x^2 + 14x + 3$, then find the value of $\left(\dfrac{1}{\alpha} + \dfrac{1}{\beta}\right)$.

ANSWER *

$\alpha + \beta = -\dfrac{14}{8},\ \alpha\beta = \dfrac{3}{8}$

$$\frac{1}{\alpha} + \frac{1}{\beta} = \frac{\alpha+\beta}{\alpha\beta} = -\frac{14}{8} \times \frac{8}{3} = -\frac{14}{3}$$

$-\dfrac{14}{3}$

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Q57 Very Short Answer · 2 marks | Internal choice (OR) part | **2024** – 430/5/1, 430/5/2, 430/5/3

If α, β are zeroes of the quadratic polynomial $2x^2 + 7x + 5$, then find the value of $\alpha^2 + \beta^2 + \alpha\beta$.

ANSWER *

$\alpha + \beta = -\frac{7}{2}, \alpha\beta = \frac{5}{2}$

$\alpha^2 + \beta^2 + \alpha\beta = (\alpha + \beta)^2 - \alpha\beta = \frac{49}{4} - \frac{5}{2} = \frac{39}{4}$

$\boxed{\frac{39}{4}}$

Q58 Very Short Answer · 2 marks | Internal choice (OR) part | **2024** – 430/5/1, 430/5/2, 430/5/3

If one zero of the quadratic polynomial $6x^2 + 37x - (p - 2)$ is reciprocal of the other, then find the value of p.

ANSWER *

Product of zeroes $= 1 \Rightarrow \frac{-(p-2)}{6} = 1$

$p - 2 = -6 \Rightarrow p = -4$

$\boxed{p = -4}$

Q59 Very Short Answer · 2 marks | Internal choice (OR) part | **2026 (I)** – 430/4/1

If α, β are the zeroes of polynomial $p(x) = 6x^2 - 5x - 3$, then find the value of $\frac{1}{\alpha} + \frac{1}{\beta}$.

ANSWER *

$\alpha + \beta = \frac{5}{6}, \alpha\beta = -\frac{1}{2}$

$\frac{\alpha + \beta}{\alpha\beta} = \frac{5}{6} \times (-2) = -\frac{5}{3}$

$\boxed{-\frac{5}{3}}$

Q60 Very Short Answer · 2 marks | Internal choice (OR) part | **2026 (I)** – 430/4/1

One zero of the polynomial $4x^2 - 12x + (2k + 1)$ is five times the other. Find the value of k.

ANSWER *

Let the zeroes be $\alpha,\ 5\alpha$: $6\alpha = 3 \Rightarrow \alpha = \frac{1}{2}$

$5\alpha^2 = \frac{5}{4} = \frac{2k+1}{4} \Rightarrow k = 2$

$\boxed{k = 2}$

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Q61 Very Short Answer · 2 marks · Internal choice (OR) part — **2026 (I)** – 430/4/2

If α, β are the zeroes of polynomial $p(x) = -9x^2 - 6x + 1$. Find the value of $\alpha^2 + \beta^2$.

ANSWER *

$\alpha + \beta = -\frac{6}{9} = -\frac{2}{3}, \alpha\beta = -\frac{1}{9}$

$\alpha^2 + \beta^2 = \frac{4}{9} + \frac{2}{9} = \frac{2}{3}$

$\boxed{\frac{2}{3}}$

Q62 Very Short Answer · 2 marks · Internal choice (OR) part — **2026 (I)** – 430/4/3

If α, β are zeroes of the polynomial $x^2 - 6x + 7$, then find the value of $4\left(\frac{1}{\alpha^2} + \frac{1}{\beta^2}\right)$.

ANSWER *

$\alpha + \beta = 6, \alpha\beta = 7; \alpha^2 + \beta^2 = 36 - 14 = 22$

$4 \cdot \frac{\alpha^2 + \beta^2}{(\alpha\beta)^2} = 4 \cdot \frac{22}{49} = \frac{88}{49}$

$\boxed{\frac{88}{49}}$

Q63 Very Short Answer · 2 marks — **2026 (II)** – 430(B)

Find the zeroes of the polynomial $p(x) = 4x^2 - 4x + 1$ and verify the relationship between the zeroes and the coefficients.

ANSWER

$p(x) = 4x^2 - 4x + 1 = (2x - 1)(2x - 1)$; zeroes are $\frac{1}{2}, \frac{1}{2}$ — 1

Sum of zeroes $= \frac{1}{2} + \frac{1}{2} = 1 = -\frac{(-4)}{4} = -\frac{b}{a}$ — ½

Product of zeroes $= \frac{1}{4} = \frac{1}{4} = \frac{c}{a}$ — ½

Zeroes are $\frac{1}{2}, \frac{1}{2}$

Q64 Very Short Answer · 2 marks · Internal choice (OR) part — **2026 (II)** – 430(B)

If α, β are the zeroes of the quadratic polynomial $p(x) = x^2 - 4x - 12$, then find the value of $\frac{1}{\alpha^2} + \frac{1}{\beta^2}$.

ANSWER

$p(x) = x^2 - 4x - 12 = (x - 6)(x + 2)$; zeroes are $6, -2$ — 1

$\therefore \frac{1}{\alpha^2} + \frac{1}{\beta^2} = \frac{5}{18}$ — 1

$\boxed{\frac{5}{18}}$

Q65 Short Answer · 3 marks — **2023** – 430/C/1

Find the zeroes of the polynomial $x^2 - 11x + 18$ and verify the relationship between the zeroes and the

coefficients.

ANSWER

$x^2 - 11x + 18 = (x - 9)(x - 2)$ 1

$\Rightarrow x = 9$ & $x = 2$ are the zeroes of the given polynomial 1

Sum of zeroes $= 9 + 2 = \frac{11}{1} = -\frac{\text{coefficient of } x}{\text{coefficient of } x^2}$ ½

Product of zeroes $= 9 \times 2 = \frac{18}{1} = \frac{\text{constant term}}{\text{coefficient of } x^2}$ ½

Zeroes are 9 and 2

Q66 Short Answer · 3 marks **2023** – 430/C/2

Find the zeroes of the polynomial $4x^2 + 17x - 15$ and verify the relationship between the zeroes and the coefficients.

ANSWER

$4x^2 + 17x - 15 = (4x - 3)(x + 5)$ 1

$\therefore x = \frac{3}{4}$ & $x = -5$ are the zeroes of the polynomial 1

$a = 4,\ b = 17,\ c = -15$. Sum of zeroes $= \frac{-17}{4} = \frac{-\text{coefficient of } x}{\text{coefficient of } x^2}$ ½

Product of zeroes $= \frac{-15}{4} = \frac{\text{constant term}}{\text{coefficient of } x^2}$ ½

Zeroes are $\frac{3}{4}$ and -5

Q67 Short Answer · 3 marks **2023** – 430/C/3

Find the zeroes of the quadratic polynomial $8x^2 + 3x - 5$ and verify the relationship between the zeroes and the coefficients.

ANSWER

$8x^2 + 3x - 5 = (x + 1)(8x - 5)$ 1

$\therefore x = -1$ and $x = \frac{5}{8}$ are the zeroes of the polynomial 1

Sum of zeroes $= \frac{-3}{8} = -\frac{\text{coefficient of } x}{\text{coefficient of } x^2}$ ½

Product of zeroes $= \frac{-5}{8} = \frac{\text{constant term}}{\text{coefficient of } x^2}$ ½

Zeroes are -1 and $\frac{5}{8}$

Q68 Short Answer · 3 marks **2023** – 430(B), 430/4/1, 430/4/3

Find the zeroes of the quadratic polynomial $x^2 - 5x - 6$ and verify the relationship between the zeroes and the coefficients.

ANSWER *

$x^2 - 5x - 6 = (x - 6)(x + 1)$; zeroes are 6 and -1

Sum of zeroes $= 6 + (-1) = 5 = -\frac{(-5)}{1} = -\frac{b}{a}$

Product of zeroes $= 6 \times (-1) = -6 = \frac{-6}{1} = \frac{c}{a}$

Zeroes are $6,\ -1$

Q69 Short Answer · 3 marks — **2023** – 430/2/1, 430/2/2, 430/2/3

Find the zeroes of the polynomial $p(x) = 2x^2 - 7x - 15$ and verify the relationship between its coefficients and zeroes.

ANSWER *

$2x^2 - 10x + 3x - 15 = (x - 5)(2x + 3)$; zeroes are 5 and $-\frac{3}{2}$

$\text{Sum} = 5 - \frac{3}{2} = \frac{7}{2} = -\frac{(-7)}{2} = -\frac{b}{a}$

$\text{Product} = 5 \times \left(-\frac{3}{2}\right) = -\frac{15}{2} = \frac{c}{a}$

Zeroes are $5,\ -\frac{3}{2}$

Q70 Short Answer · 3 marks — **2024** – 430/S/2

If one zero of the polynomial $x^2 - 6x + b$ is twice the other, find the value of b. Also, find the zeroes of the polynomial so obtained.

ANSWER

Let zeroes be α and 2α — ½

Sum of zeroes $= 3\alpha = 6 \Rightarrow \alpha = 2$ — 1

Product of zeroes $= b = 2\alpha^2 = 8$ — 1

$\therefore$ Zeroes are 2 and 4 — ½

$b = 8$; zeroes 2 and 4

Q71 Short Answer · 3 marks — **2024** – 430/S/3

Find the zeroes of the polynomial $4\sqrt{3}x^2 + 5x - 2\sqrt{3}$ and verify the relationship between the zeroes and its coefficients.

ANSWER

$4\sqrt{3}x^2 + 5x - 2\sqrt{3} = 0 \Rightarrow (4x - \sqrt{3})(\sqrt{3}x + 2) = 0$ — 1

$x = \frac{\sqrt{3}}{4},\ -\frac{2}{\sqrt{3}}$ — ½+½

$\text{Sum of the zeroes} = \frac{\sqrt{3}}{4} - \frac{2}{\sqrt{3}} = \frac{-5}{4\sqrt{3}} = \frac{-(\text{Coeff. of } x)}{\text{Coeff. of } x^2}$ — ½

$\text{Product of the zeroes} = \frac{\sqrt{3}}{4} \times \frac{-2}{\sqrt{3}} = \frac{-2\sqrt{3}}{4\sqrt{3}} = \frac{\text{Constant term}}{\text{Coeff. of } x^2}$ — ½

Zeroes are $\frac{\sqrt{3}}{4}$ and $-\frac{2}{\sqrt{3}}$

Q72 Short Answer · 3 marks · Internal choice (OR) part — **2024** – 430/2/1, 430/2/2, 430/2/3

Find the zeroes of the polynomial $4x^2 - 4x + 1$ and verify the relationship between the zeroes and the

coefficients.

ANSWER *

$4x^2 - 4x + 1 = (2x-1)^2$; zeroes $\frac{1}{2},\ \frac{1}{2}$

$\text{Sum} = 1 = -\frac{(-4)}{4} = -\frac{b}{a}$

$\text{Product} = \frac{1}{4} = \frac{c}{a}$

Zeroes are $\frac{1}{2},\ \frac{1}{2}$

Q73 Short Answer · 3 marks **2024** – 430/3/1, 430/5/1

Find the zeroes of the quadratic polynomial $5x^2 + 3x - 2$ and verify the relationship between the zeroes and the co-efficients.

ANSWER *

$5x^2 + 5x - 2x - 2 = (5x-2)(x+1)$; zeroes $\frac{2}{5},\ -1$

$\text{Sum} = \frac{2}{5} - 1 = -\frac{3}{5} = -\frac{b}{a}$

$\text{Product} = -\frac{2}{5} = \frac{c}{a}$

Zeroes are $\frac{2}{5},\ -1$

Q74 Short Answer · 3 marks **2024** – 430/3/2, 430/5/3

Find the zeroes of the polynomial $2x^2 + 3x - 9$ and verify the relationship between the zeroes and the co-efficients of polynomial.

ANSWER *

$2x^2 + 6x - 3x - 9 = (2x-3)(x+3)$; zeroes $\frac{3}{2},\ -3$

$\text{Sum} = \frac{3}{2} - 3 = -\frac{3}{2} = -\frac{b}{a}$

$\text{Product} = -\frac{9}{2} = \frac{c}{a}$

Zeroes are $\frac{3}{2},\ -3$

Q75 Short Answer · 3 marks **2024** – 430/3/3

If one zero of the polynomial $x^2 - 8x + k$ exceeds the other by 2, then find the zeroes and the value of k.

ANSWER *

Let the zeroes be α and $\alpha + 2$: sum $2\alpha + 2 = 8 \Rightarrow \alpha = 3$

Zeroes are 3 and 5

$k = \text{product} = 15$

Zeroes $5,\ 3$; $k = 15$

Q76 Short Answer · 3 marks **2024** – 430/5/2

Find the zeroes of the quadratic polynomial $6x^2 - 7x - 3$ and verify the relationship between the zeroes and the coefficients of the polynomial.

ANSWER *

$6x^2 - 9x + 2x - 3 = (2x - 3)(3x + 1)$; zeroes $\frac{3}{2}, -\frac{1}{3}$

Sum $= \frac{3}{2} - \frac{1}{3} = \frac{7}{6} = -\frac{(-7)}{6} = -\frac{b}{a}$

Product $= -\frac{1}{2} = \frac{-3}{6} = \frac{c}{a}$

Zeroes are $\frac{3}{2}, -\frac{1}{3}$

Q77 Short Answer · 3 marks **2025** – 430/2/1, 430/2/3, 430/4/1

Find the zeroes of the polynomial $p(x) = 3x^2 - 2x - 1$ and verify the relationship between the zeroes of $p(x)$ and the coefficients of $p(x)$.

ANSWER *

$3x^2 - 3x + x - 1 = (x - 1)(3x + 1)$; zeroes $1, -\frac{1}{3}$

Sum $= 1 - \frac{1}{3} = \frac{2}{3} = -\frac{b}{a}$

Product $= -\frac{1}{3} = \frac{c}{a}$

Zeroes are $1, -\frac{1}{3}$

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Q78 Short Answer · 3 marks **2025** – 430/2/2, 430/3/2

Find the zeroes of the polynomial $p(x) = 2x^2 + 5x + 2$ and verify the relationship between zeroes of $p(x)$ and its coefficients.

ANSWER *

$2x^2 + 4x + x + 2 = (2x + 1)(x + 2)$; zeroes $-\frac{1}{2}, -2$

Sum $= -\frac{5}{2} = -\frac{b}{a}$

Product $= 1 = \frac{2}{2} = \frac{c}{a}$

Zeroes are $-\frac{1}{2}, -2$

Q79 Short Answer · 3 marks **2025** – 430/3/1

Find the zeroes of the polynomial $9s^2 - 6s + 1$ and verify the relationship between the zeroes and the

coefficients of the given polynomial.

ANSWER *

$9s^2 - 6s + 1 = (3s - 1)^2$; zeroes $\frac{1}{3}, \frac{1}{3}$

Sum $= \frac{2}{3} = \frac{6}{9} = -\frac{b}{a}$

Product $= \frac{1}{9} = \frac{c}{a}$

Zeroes are $\frac{1}{3}, \frac{1}{3}$

Q80 Short Answer · 3 marks **2025** – 430/3/3

Find the zeroes of the polynomial $25a^2 - 10a + 1$ and verify the relationship between the zeroes and coefficients of the given polynomial.

ANSWER *

$25a^2 - 10a + 1 = (5a - 1)^2$; zeroes $\frac{1}{5}, \frac{1}{5}$

Sum $= \frac{2}{5} = \frac{10}{25} = -\frac{b}{a}$

Product $= \frac{1}{25} = \frac{c}{a}$

Zeroes are $\frac{1}{5}, \frac{1}{5}$

Q81 Short Answer · 3 marks **2025** – 430/4/2, 430/4/3

Find the zeroes of the polynomial $p(x) = 4x^2 - 4x - 3$ and verify the relationship between zeroes and its coefficients.

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ANSWER *

$4x^2 - 6x + 2x - 3 = (2x - 3)(2x + 1)$; zeroes $\frac{3}{2}, -\frac{1}{2}$

Sum $= 1 = -\frac{(-4)}{4} = -\frac{b}{a}$

Product $= -\frac{3}{4} = \frac{c}{a}$

Zeroes are $\frac{3}{2}, -\frac{1}{2}$

Q82 Short Answer · 3 marks Internal choice (OR) part **2025** – 430/5/1, 430/5/2, 430/5/3, 430/6/1, 430/6/2

Find zeroes of the polynomial $6x^2 - 7x - 3$ and verify the relationship between zeroes and its coefficients.

ANSWER *

$6x^2 - 9x + 2x - 3 = (2x - 3)(3x + 1)$; zeroes $\frac{3}{2}, -\frac{1}{3}$

Sum $= \frac{7}{6} = -\frac{b}{a}$

Product $= -\frac{1}{2} = \frac{-3}{6} = \frac{c}{a}$

Zeroes are $\frac{3}{2}, -\frac{1}{3}$

Q83 Short Answer · 3 marks · Internal choice (OR) part — **2025** – 430/6/3

α, β are zeroes of the polynomial $3x^2 - 8x + k$. Find the value of k, if $\alpha^2 + \beta^2 = \frac{40}{9}$.

ANSWER *

$\alpha + \beta = \frac{8}{3}, \alpha\beta = \frac{k}{3}$

$(\alpha + \beta)^2 - 2\alpha\beta = \frac{64}{9} - \frac{2k}{3} = \frac{40}{9}$

$\frac{2k}{3} = \frac{24}{9} \Rightarrow k = 4$

$\boxed{k = 4}$

Q84 Short Answer · 3 marks · Internal choice (OR) part — **2025** – 430/6/3

Find the zeroes of the polynomial $2x^2 + 7x + 5$ and verify the relationship between its zeroes and co-efficients.

ANSWER *

$2x^2 + 2x + 5x + 5 = (2x + 5)(x + 1)$; zeroes $-1, -\frac{5}{2}$

Sum $= -\frac{7}{2} = -\frac{b}{a}$

Product $= \frac{5}{2} = \frac{c}{a}$

Zeroes are $-1, -\frac{5}{2}$

Q85 Short Answer · 3 marks · Internal choice (OR) part — **2026 (I)** – 430/5/1, 430/5/3

Find the zeroes of the polynomial $p(x) = 3x^2 + 7x - 20$ and verify the relationship between its zeroes and the coefficients.

ANSWER *

$3x^2 + 12x - 5x - 20 = (3x - 5)(x + 4)$; zeroes $\frac{5}{3}, -4$

Sum $= -\frac{7}{3} = -\frac{b}{a}$

Product $= -\frac{20}{3} = \frac{c}{a}$

Zeroes are $\frac{5}{3}, -4$

Q86 Short Answer · 3 marks · Internal choice (OR) part — **2026 (I)** – 430/5/2

Find the zeroes of the polynomial $p(x) = 4x^2 - 8x + 3$ and verify the relationship between its zeroes and

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co-efficients.

ANSWER *

$4x^2 - 2x - 6x + 3 = (2x - 1)(2x - 3)$; zeroes $\frac{1}{2}, \frac{3}{2}$

Sum $= 2 = -\frac{(-8)}{4} = -\frac{b}{a}$

Product $= \frac{3}{4} = \frac{c}{a}$

Zeroes are $\frac{1}{2}, \frac{3}{2}$

Q87 Short Answer · 3 marks — **2026 (II)** – 430/7/1

Find the zeroes of the polynomial $p(x) = 6x^2 - 7x - 3$. Hence, verify the relationship between the zeroes and its coefficients.

ANSWER

$p(x) = 6x^2 - 7x - 3 = (2x - 3)(3x + 1)$; zeroes of $p(x)$ are $\frac{3}{2}$ and $-\frac{1}{3}$ — 1

Sum of zeroes $= \frac{3}{2} - \frac{1}{3} = \frac{7}{6} = -\frac{\text{Coefficient of } x}{\text{Coefficient of } x^2}$ — 1

Product of zeroes $= \frac{3}{2} \times \left(-\frac{1}{3}\right) = \frac{-3}{6} = \frac{\text{Constant}}{\text{Coefficient of } x^2}$ — 1

Zeroes are $\frac{3}{2}$ and $-\frac{1}{3}$

Q88 Short Answer · 3 marks — **2026 (II)** – 430/7/2

Find the zeroes of the polynomial $p(x) = 16x^2 - 8x - 3$ and verify the relationship between the zeroes and its coefficients.

ANSWER

$p(x) = 16x^2 - 8x - 3 = (4x - 3)(4x + 1)$; zeroes of $p(x)$ are $\frac{3}{4}, \frac{-1}{4}$ — 1

Sum of zeroes $= \frac{3}{4} + \frac{-1}{4} = \frac{2}{4} = -\frac{-8}{16} = -\frac{\text{coefficient of } x}{\text{coefficient of } x^2}$ — 1

Product of zeroes $= \frac{3}{4} \times \left(\frac{-1}{4}\right) = \frac{-3}{16} = \frac{\text{constant}}{\text{coefficient of } x^2}$ — 1

Zeroes are $\frac{3}{4}$ and $-\frac{1}{4}$

Q89 Short Answer · 3 marks — **2026 (II)** – 430/7/3

Find the zeroes of a polynomial $p(x) = 25x^2 + 5x - 6$ and verify the relationship between the zeroes and its coefficients.

ANSWER

$p(x) = 25x^2 + 5x - 6 = (5x + 3)(5x - 2)$; zeroes of $p(x) = \frac{-3}{5}, \frac{2}{5}$ — 1

Sum of zeroes $= \frac{-3}{5} + \frac{2}{5} = -\frac{1}{5} = -\frac{5}{25} = -\frac{\text{coefficient of } x}{\text{coefficient of } x^2}$ — 1

Product of zeroes $= \frac{-3}{5} \times \frac{2}{5} = \frac{-6}{25} = \frac{\text{constant}}{\text{coefficient of } x^2}$ — 1

Zeroes are $-\frac{3}{5}$ and $\frac{2}{5}$

TOPIC 3

03 Forming a Quadratic Polynomial

QUICK RECAP

- A quadratic polynomial with sum of zeroes S and product P is $k\,(x^2 - Sx + P)$, $k \neq 0$.
- So there are infinitely many quadratic polynomials with given zeroes (one for each k).

Q90 MCQ · 1 mark — **2023** – 430/C/1, 430/C/2

A quadratic polynomial having zeroes 7 and 0 is :

(A) $x(x^2 - 7)$
(B) $7x^2 - 1$
(C) $\frac{1}{7}(x^2 - x)$
(D) $7(x^2 - 7x)$

ANSWER **(D) $7(x^2 - 7x)$**

Q91 MCQ · 1 mark — **2023** – 430/C/3

A quadratic polynomial having zeroes -6 and 0 is :

(A) $x(x^2 + 6)$
(B) $6x(x + 6)$
(C) $6x^2 - 1$
(D) $6(x^2 - x)$

ANSWER **(B) $6x(x + 6)$**

Q92 MCQ · 1 mark — **2023** – 430(B)

A quadratic polynomial whose zeroes are 2 and 3 is :

(A) $x^2 + 5x + 6$
(B) $x^2 - 5x - 6$
(C) $x^2 + x - 6$
(D) $x^2 - 5x + 6$

ANSWER *
Sum $= 5$, product $= 6$: $x^2 - 5x + 6$

(D) $x^2 - 5x + 6$

Q93 MCQ · 1 mark — **2023** – 430/4/1

A quadratic polynomial the sum and product of whose zeroes are -3 and 2 respectively, is :

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

ANSWER *
$x^2 - (-3)x + 2 = x^2 + 3x + 2$

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

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Q94 MCQ · 1 mark **2023** – 430/4/2

A quadratic polynomial whose sum and product of zeroes are 2 and -1 respectively is :

(A) $x^2 + 2x + 1$
(B) $x^2 - 2x - 1$
(C) $x^2 + 2x - 1$
(D) $x^2 - 2x + 1$

ANSWER *

$x^2 - 2x + (-1) = x^2 - 2x - 1$

(B) $x^2 - 2x - 1$

Q95 MCQ · 1 mark **2023** – 430/4/3

The number of polynomials having zeroes -3 and 4 is :

(A) 1
(B) 2
(C) 3
(D) more than 3

ANSWER *

$k(x^2 - x - 12)$ for every real $k \neq 0$: infinitely many

(D) more than 3

Q96 MCQ · 1 mark **2024** – 430/2/1, 430/2/2, 430/2/3

A quadratic polynomial, the sum of whose zeroes is -5 and their product is 6, is

(A) $x^2 + 5x + 6$
(B) $x^2 - 5x + 6$
(C) $x^2 - 5x - 6$
(D) $-x^2 + 5x + 6$

ANSWER *

$x^2 - (-5)x + 6 = x^2 + 5x + 6$

(A) $x^2 + 5x + 6$

Q97 MCQ · 1 mark **2024** – 430/3/2

A quadratic polynomial whose zeroes are -8 and 3, is

(A) $(x + 8)(x + 3)$
(B) $x^2 + 5x + 24$
(C) $(x - 8)(x - 3)$
(D) $x^2 + 5x - 24$

ANSWER *

$(x + 8)(x - 3) = x^2 + 5x - 24$

(D) $x^2 + 5x - 24$

Q98 MCQ · 1 mark **2024** – 430/3/3

If the two zeroes of a quadratic polynomial are $\pm\sqrt{5}$, then the quadratic polynomial is :

(A) $x^2 + 5$
(B) $(x + \sqrt{5})^2$
(C) $4(x^2 - 5)$
(D) $x^2 - \sqrt{5}$

ANSWER *

Sum $= 0$, product $= -5$: $k(x^2 - 5)$; with $k = 4$: $4(x^2 - 5)$

(C) $4(x^2 - 5)$

Q99 MCQ · 1 mark — **2024** – 430/4/1, 430/4/2, 430/4/3

The number of quadratic polynomials having zeroes -1 and 3 is :

(A) 1
(B) 2
(C) 3
(D) more than 3

ANSWER *

$k(x^2 - 2x - 3)$ for every real $k \neq 0$: infinitely many

(D) more than 3

Q100 MCQ · 1 mark — **2025** – 430(B)

A quadratic polynomial, the sum and product of whose zeroes are -1 and -2 respectively, is

(A) $x^2 - x - 2$
(B) $2x^2 + x - 1$
(C) $x^2 + x - 2$
(D) $\frac{1}{2}x^2 + x - 4$

ANSWER *

$x^2 - (-1)x + (-2) = x^2 + x - 2$

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

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Q101 MCQ · 1 mark — **2025** – 430/5/1, 430/5/2, 430/5/3

A quadratic polynomial having only zero (-2) is

(A) $(x - 2)^2$
(B) $x^2 - 2$
(C) $x^2 + 2x$
(D) $(x + 2)^2$

ANSWER *

Both zeroes equal -2: $(x + 2)^2$

(D) $(x + 2)^2$

Q102 MCQ · 1 mark — **2025** – 430/6/2

A quadratic polynomial having zeroes 0 and -2, is

(A) $x(x - 2)$
(B) $4x(x + 2)$
(C) $x^2 + 2$
(D) $2x^2 + 2x$

ANSWER *

$k\,x(x + 2)$; with $k = 4$: $4x(x + 2)$

(B) $4x(x + 2)$

Q103 MCQ · 1 mark — **2026 (II)** – 430/7/1, 430/7/2, 430/7/3

A quadratic polynomial having sum and product of its zeroes as 2 and -7 respectively, is :

(A) $x^2 - 2x + 7$
(B) $4(x^2 + 2x - 7)$
(C) $(x - 2)(x + 7)$
(D) $3(x^2 - 2x - 7)$

ANSWER **(D) $3(x^2 - 2x - 7)$**

Q104 Very Short Answer · 2 marks — Internal choice (OR) part — **2023** – 430/6/1, 430/6/2, 430/6/3

Find a quadratic polynomial whose zeroes are 6 and -3.

ANSWER *
Sum $= 3$, product $= -18$
Polynomial: $k(x^2 - 3x - 18)$, e.g. $x^2 - 3x - 18$
$x^2 - 3x - 18$

Q105 Very Short Answer · 2 marks — Internal choice (OR) part — **2024** – 430/4/1, 430/4/2, 430/4/3

Find a quadratic polynomial whose zeroes are -9 and 6.

ANSWER *
Sum $= -3$, product $= -54$
Polynomial: $k(x^2 + 3x - 54)$, e.g. $x^2 + 3x - 54$
$x^2 + 3x - 54$

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Q106 Very Short Answer · 2 marks — Internal choice (OR) part — **2026 (I)** – 430/4/2

Form a quadratic polynomial whose zeroes are twice the zeroes of polynomial $p(x) = x^2 - 3x - 5$.

ANSWER *
$\alpha + \beta = 3$, $\alpha\beta = -5$; new sum $= 6$, new product $= 4\alpha\beta = -20$
Polynomial: $x^2 - 6x - 20$
$x^2 - 6x - 20$

Q107 Very Short Answer · 2 marks — Internal choice (OR) part — **2026 (I)** – 430/4/3

Form a quadratic polynomial whose sum and product of the zeroes are $\frac{1}{2}$ and $-\frac{1}{9}$ respectively. Hence, find the zeroes of the polynomial.

ANSWER *
$x^2 - \frac{1}{2}x - \frac{1}{9} = \frac{1}{18}(18x^2 - 9x - 2)$
$18x^2 - 12x + 3x - 2 = (3x - 2)(6x + 1)$; zeroes $\frac{2}{3}$, $-\frac{1}{6}$
$18x^2 - 9x - 2$; **zeroes** $\frac{2}{3}$, $-\frac{1}{6}$

Q108 Short Answer · 3 marks — **2023** – 430/1/1, 430/1/2, 430/1/3

If α, β are zeroes of the quadratic polynomial $x^2 + 3x + 2$, find a quadratic polynomial whose zeroes are $\alpha + 1,\ \beta + 1$.

ANSWER *

$x^2 + 3x + 2 = (x + 1)(x + 2)$; $\alpha = -1,\ \beta = -2$

New zeroes: $0,\ -1$; sum $= -1$, product $= 0$

Required polynomial: $k(x^2 + x)$, e.g. $x^2 + x$

$x^2 + x$

Q109 Short Answer · 3 marks — **2023** – 430/4/2

If α, β are zeroes of the quadratic polynomial $x^2 - 5x + 6$, form another quadratic polynomial whose zeroes are $\frac{1}{\alpha},\ \frac{1}{\beta}$.

ANSWER *

$\alpha + \beta = 5$, $\alpha\beta = 6$

$\frac{1}{\alpha} + \frac{1}{\beta} = \frac{\alpha + \beta}{\alpha\beta} = \frac{5}{6}$, $\frac{1}{\alpha} \cdot \frac{1}{\beta} = \frac{1}{6}$

Required polynomial: $x^2 - \frac{5}{6}x + \frac{1}{6}$, i.e. $\frac{1}{6}(6x^2 - 5x + 1)$

$6x^2 - 5x + 1$ **(or any** $k\left(x^2 - \frac{5}{6}x + \frac{1}{6}\right)$**)**

Q110 Short Answer · 3 marks — **2024** – 430/S/1

Find a quadratic polynomial each of whose zeroes is respectively twice the zeroes of the polynomial $2x^2 - 5x + 2$.

ANSWER

$2x^2 - 5x + 2 = (2x - 1)(x - 2)$ — 1

Zeroes of the given polynomial are $\frac{1}{2}$ and 2 — ½

Zeroes of required polynomial are 1 and 4 — ½

$\therefore$ one of the required quadratic polynomial is $x^2 - 5x + 4$. General expression for all such polynomials : $k(x^2 - 5x + 4)$ — 1

$x^2 - 5x + 4$

Q111 Short Answer · 3 marks · Internal choice (OR) part — **2024** – 430/2/1, 430/2/2, 430/2/3

Zeroes of the quadratic polynomial $x^2 - 3x + 2$ are α and β. Construct a quadratic polynomial whose zeroes are $2\alpha + 1$ and $2\beta + 1$.

ANSWER *

$x^2 - 3x + 2 = (x - 1)(x - 2)$; $\alpha = 1,\ \beta = 2$

New zeroes: $3,\ 5$; sum $= 8$, product $= 15$

Required polynomial: $k(x^2 - 8x + 15)$, e.g. $x^2 - 8x + 15$

$x^2 - 8x + 15$

Q112 Short Answer · 3 marks — **2025** – 430/1/1

Find a quadratic polynomial whose sum and product of zeroes are 0 and -9, respectively. Also, find the zeroes of the polynomial so obtained.

ANSWER *

Polynomial: $x^2 - (0)x + (-9) = x^2 - 9$

$x^2 - 9 = (x - 3)(x + 3)$

Zeroes are 3 and -3

$x^2 - 9$; **zeroes** $3,\ -3$

Q113 Short Answer · 3 marks — **2025** – 430/1/2

Find a quadratic polynomial, sum and product of whose zeroes are 5 and -6, respectively. Also, find the zeroes of the polynomial so obtained.

ANSWER *

Polynomial: $x^2 - 5x - 6$

$x^2 - 6x + x - 6 = (x - 6)(x + 1)$

Zeroes are 6 and -1

$x^2 - 5x - 6$; **zeroes** $6,\ -1$

Q114 Short Answer · 3 marks — **2025** – 430/1/3

Determine a quadratic polynomial, sum and product of whose zeroes are -10 and 24, respectively. Also, determine the zeroes of the polynomial so obtained.

ANSWER *

Polynomial: $x^2 + 10x + 24$

$(x + 4)(x + 6)$

Zeroes are -4 and -6

$x^2 + 10x + 24$; **zeroes** $-4,\ -6$

Q115 Short Answer · 3 marks · Internal choice (OR) part — **2025** – 430/5/1, 430/5/2, 430/5/3, 430/6/1, 430/6/2

If α, β are zeroes of the polynomial $3x^2 - 8x + 4$, then form a quadratic polynomial in x whose zeroes are $\frac{1}{\alpha}$ and $\frac{1}{\beta}$.

ANSWER *

$\alpha + \beta = \frac{8}{3}, \alpha\beta = \frac{4}{3}$

$\frac{1}{\alpha} + \frac{1}{\beta} = \frac{\alpha + \beta}{\alpha\beta} = 2,\ \frac{1}{\alpha\beta} = \frac{3}{4}$

Polynomial: $x^2 - 2x + \frac{3}{4}$, i.e. $\frac{1}{4}(4x^2 - 8x + 3)$

$4x^2 - 8x + 3$

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Q116 Short Answer · 3 marks Internal choice (OR) part **2026 (I)** – 430/5/1, 430/5/3

If α, β are zeroes of the polynomial $p(x) = 5x^2 - 7x - 3$, then form a quadratic polynomial whose zeroes are $\frac{2}{\alpha}$ and $\frac{2}{\beta}$.

ANSWER *

$\alpha + \beta = \frac{7}{5}, \alpha\beta = -\frac{3}{5}$

Sum $= \frac{2(\alpha+\beta)}{\alpha\beta} = -\frac{14}{3}$, product $= \frac{4}{\alpha\beta} = -\frac{20}{3}$

Polynomial: $x^2 + \frac{14}{3}x - \frac{20}{3}$, i.e. $\frac{1}{3}(3x^2 + 14x - 20)$

$3x^2 + 14x - 20$

Q117 Short Answer · 3 marks Internal choice (OR) part **2026 (I)** – 430/5/2

Form a polynomial whose zeroes are α^2 and β^2, where α and β are zeroes of the polynomial $p(x) = x^2 - 3\sqrt{2}x + 4$.

ANSWER *

$\alpha + \beta = 3\sqrt{2}, \alpha\beta = 4$

$\alpha^2 + \beta^2 = 18 - 8 = 10, \alpha^2\beta^2 = 16$

Polynomial: $x^2 - 10x + 16$

$x^2 - 10x + 16$

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