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Polynomials

Chapter 2 · Previous Year Questions with Answers · Class X Mathematics Standard (041)

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** – 30/C/1, 30/C/2, 30/C/3, 30/6/3

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

(A) $\frac{1}{2}, -4$ (B) $\frac{1}{4}, -3$
(C) $\frac{1}{3}, -4$ (D) $\frac{1}{3}, 4$

In 30/6/3 the same options are lettered (A) 1/3, −4 · (B) −1/3, 4 · (C) 1/3, 4 · (D) −1/3, −4; answer (A).

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

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Q2 MCQ · 1 mark — **2023** – 30(B)

The number of zeroes of a quadratic polynomial, whose graph intersects the y-axis at exactly one point and does not intersect the x-axis, is :

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

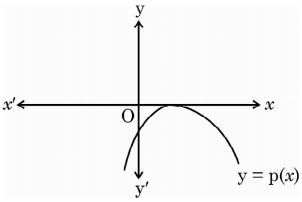
ANSWER *

Zeroes are the points where the graph meets the x-axis; it does not meet the x-axis, so 0 zeroes.

(a) 0

Q3 MCQ · 1 mark — **2023** – 30/1/1, 30/1/2

The graph of $y = p(x)$ is given, for a polynomial $p(x)$. The number of zeroes of $p(x)$ from the graph is



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

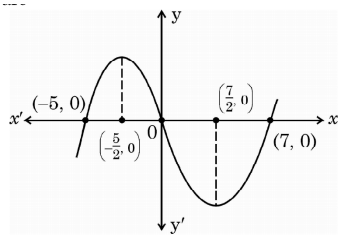
ANSWER *

The graph touches the x-axis at exactly one point.

(B) 1

Q4 MCQ · 1 mark **2023** – 30/1/3

The graph of $y = p(x)$ is given in the adjoining figure. Zeroes of the polynomial $p(x)$ are



(A) $-5, 7$

(B) $\frac{-5}{2}, \frac{-7}{2}$

(C) $-5, 0, 7$

(D) $-5, \frac{-5}{2}, \frac{7}{2}, 7$

ANSWER *

The graph meets the x-axis at $(-5, 0)$, $(0, 0)$ and $(7, 0)$.

(C) −5, 0, 7

Q5 MCQ · 1 mark **2023** – 30/2/1, 30/2/3

The zeroes of the polynomial $p(x) = x^2 + 4x + 3$ are given by :

(A) 1, 3

(B) −1, 3

(C) 1, −3

(D) −1, −3

ANSWER *

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

(d) −1, −3

Q6 MCQ · 1 mark **2023** – 30/6/2

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

(A) −10

(B) 10

(C) 5

(D) −5

ANSWER *

$4 + 6 + k = 0 \Rightarrow k = -10$

(A) −10

Q7 MCQ · 1 mark **2024** – 30(B)

The graph of a polynomial intersects the y-axis at one point and the x-axis at two points. The number of

zeroes of this polynomial are :

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

ANSWER *
Number of zeroes = number of points where the graph meets the x-axis = 2

(B) 2

Q8 MCQ · 1 mark **2024** – 30/3/1, 30/3/2

The zeroes of the quadratic polynomial $2x^2 - 3x - 9$ are :

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

ANSWER *
$2x^2 - 6x + 3x - 9 = (2x + 3)(x - 3)$

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

Q9 MCQ · 1 mark **2024** – 30/3/2

What should be subtracted from the polynomial $x^2 - 16x + 30$, so that 15 is the zero of the resulting polynomial ?

(A) 30
(B) 14
(C) 15
(D) 16

ANSWER *
$p(15) = 225 - 240 + 30 = 15$; subtracting 15 makes 15 a zero.

(C) 15

Q10 MCQ · 1 mark **2024** – 30/3/3

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

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

ANSWER *
$p(3) = 9 - 15 + 4 = -2$; adding 2 makes 3 a zero.

(B) 2

Q11 MCQ · 1 mark **2024** – 30/4/1, 30/4/3

If a polynomial $p(x)$ is given by $p(x) = x^2 - 5x + 6$, then the value of $p(1) + p(4)$ is :

(A) 0
(B) 4
(C) 2
(D) −4

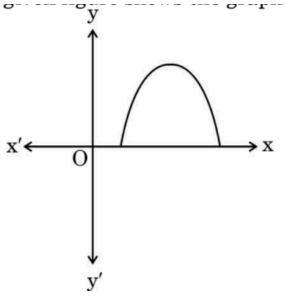
ANSWER *

$p(1) = 2,\ p(4) = 2;$ sum $= 4$

(B) 4

Q12 MCQ · 1 mark **2025** – 30/S/1, 30/S/2, 30/S/3

If the given figure shows the graph of polynomial $y = ax^2 + bx + c$, then :



(A) $a < 0$

(B) $b^2 < 4ac$

(C) $c > 0$

(D) a and b are of same sign

ANSWER **(A) $a < 0$**

Q13 MCQ · 1 mark **2025** – 30(B)

The value of x, for which the polynomials $9 - x^2$ and $6x + x^2 + 9$ vanish simultaneously, is

(A) 3

(B) 2

(C) −2

(D) −3

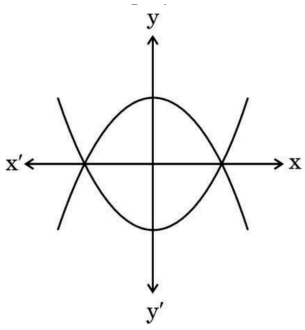
ANSWER *

$9 - x^2 = 0 \Rightarrow x = \pm 3;\ x^2 + 6x + 9 = (x + 3)^2 = 0 \Rightarrow x = -3$

(D) −3

Q14 MCQ · 1 mark **2025** – 30/1/1, 30/1/2, 30/1/3

Two polynomials are shown in the graph below. The number of distinct zeroes of both the polynomials is :



(A) 3

(B) 5

(C) 2

(D) 4

ANSWER *

Both graphs cut the x-axis at the same two points.

(C) 2

Q15 MCQ · 1 mark **2025** – 30/2/1, 30/2/2

If -4 is a zero of the polynomial $p(x) = x^2 - x - (2 + 2k)$, then the value of k is :

(A) 3
(B) 9
(C) 6
(D) −9

ANSWER *

$16 + 4 - 2 - 2k = 0 \Rightarrow k = 9$

(B) 9

Q16 MCQ · 1 mark **2025** – 30/3/1, 30/3/3

Zeroes of the polynomial $p(x) = x^2 - 3\sqrt{2}x + 4$ are :

(A) $2,\ \sqrt{2}$
(B) $2\sqrt{2},\ \sqrt{2}$
(C) $4\sqrt{2},\ -\sqrt{2}$
(D) $\sqrt{2},\ 2$

ANSWER *

$x^2 - 2\sqrt{2}x - \sqrt{2}x + 4 = (x - 2\sqrt{2})(x - \sqrt{2})$

(B) $2\sqrt{2},\ \sqrt{2}$

Q17 MCQ · 1 mark **2025** – 30/3/2

Zeroes of the polynomial $p(y) = 7y^2 - \frac{11}{3}y - \frac{2}{3}$ are :

(A) $-\frac{2}{3}, -\frac{1}{7}$
(B) $-\frac{2}{7}, -\frac{1}{3}$
(C) $\frac{2}{3}, \frac{1}{7}$
(D) $\frac{2}{3}, -\frac{1}{7}$

ANSWER *

$p(y) = \frac{1}{3}(21y^2 - 11y - 2) = \frac{1}{3}(3y - 2)(7y + 1)$

(D) $\frac{2}{3}, -\frac{1}{7}$

Q18 MCQ · 1 mark **2025** – 30/4/1, 30/4/2, 30/4/3

Which of the following statements is true for a polynomial $p(x)$ of degree 3?

(A) $p(x)$ has at most two distinct zeroes.
(B) $p(x)$ has at least two distinct zeroes.
(C) $p(x)$ has exactly three distinct zeroes.
(D) $p(x)$ has at most three distinct zeroes.

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ANSWER *

A polynomial of degree n has at most n zeroes.

(d) p(x) has at most three distinct zeroes.

Q19 MCQ · 1 mark **2026 (I)** – 30(B)

At which of the following points, the quadratic polynomial $p(x) = -3x + 18x^2 - 1$ intersects the positive x-axis ?

(A) $\left(\frac{1}{6}, 0\right)$ (B) $\left(-\frac{1}{3}, 0\right)$

(C) $\left(-\frac{1}{6}, 0\right)$ (D) $\left(\frac{1}{3}, 0\right)$

ANSWER *

$18x^2 - 3x - 1 = (6x + 1)(3x - 1)$; positive zero $\frac{1}{3}$

(D) $\left(\frac{1}{3}, 0\right)$

Q20 MCQ · 1 mark **2026 (I)** – 30(B)

The graph of a quadratic polynomial $f(x)$ passes through $(5, 0)$, $(0, -1)$ and $(-2, 0)$. The two factors of the polynomial are

(A) $(x + 2)$, $(x - 5)$ (B) $(x + 5)$, $(x - 2)$

(C) $(x + 1)$, $(x - 5)$ (D) $(x - 1)$, $(x + 2)$

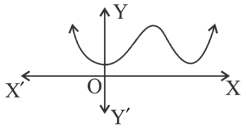
ANSWER *

Zeroes are 5 and -2

(A) $(x + 2)$, $(x - 5)$

Q21 MCQ · 1 mark **2026 (I)** – 30/1/1, 30/1/2, 30/1/3

The graph of $y = f(x)$ is given. The number of zeroes of $f(x)$ is :



(A) 0 (B) 1

(C) 2 (D) 4

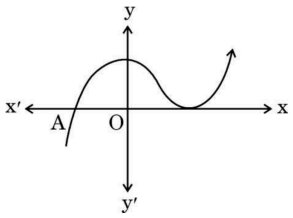
ANSWER *

The graph does not meet the x-axis.

(a) 0

Q22 MCQ · 1 mark **2026 (I)** – 30/2/1, 30/2/2

The graph of $y = f(x)$ is given. The number of distinct zeroes of $y = f(x)$ is :



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

ANSWER *

The graph cuts the x-axis at A and touches it at one more point: 2 distinct zeroes.

(C) 2

Q23 MCQ · 1 mark **2026 (I)** – 30/2/3

How many zeroes does $p(x) = (x - 2)(x + 3)$ have ?

(A) Zero
(B) One
(C) Two
(D) Three

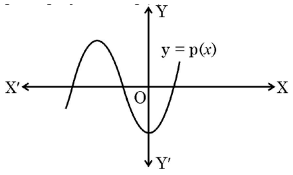
ANSWER *

Zeroes are 2 and −3.

(C) Two

Q24 MCQ · 1 mark **2026 (I)** – 30/4/1, 30/4/2

Observe the graph of polynomial $p(x)$. Number of zeroes of $p(x)$ is



(A) 5
(B) 4
(C) 6
(D) 3

ANSWER *

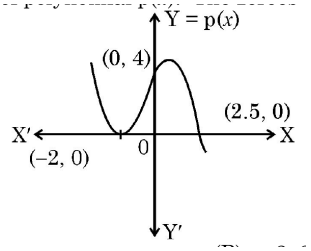
The graph cuts the x-axis at three points.

(D) 3

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Q25 MCQ · 1 mark — **2026 (I)** – 30/4/3

Observe the graph of polynomial $p(x)$. The zeroes of the polynomial are



(A) −2, 0, 2.5
(B) −2, 2.5
(C) 0, 4
(D) −2, 0

ANSWER *

The graph meets the x-axis at $(-2, 0)$ and $(2.5, 0)$.

(B) −2, 2.5

Q26 MCQ · 1 mark — **2026 (II)** – 30/7/1, 30/7/2, 30/7/3

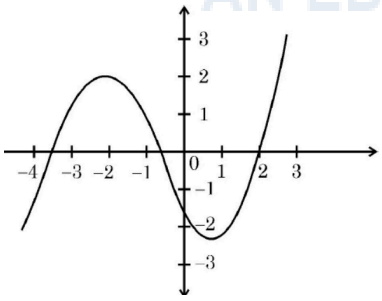
The zeroes of the polynomial $p(x) = x^2 - x - 6$ are :

(A) 3, 2
(B) −3, 2
(C) 3, −2
(D) −3, −2

ANSWER **(C) 3, −2**

Q27 MCQ · 1 mark — **2026 (II)** – 30/8/1, 30/8/2, 30/8/3

Here is the geometrical representation of a polynomial. How many zeroes does it have ?



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

ANSWER **(A) 3**

Q28 MCQ · 1 mark — **2026 (II)** – 30(B)

If one zero of the quadratic polynomial $p(x) = (k-2)x^2 - (k+2)x - 14$ is -2, then the value of k is :

(A) −2
(B) 2
(C) −3
(D) 3

ANSWER **(D) 3**

Q29 Assertion–Reason · 1 mark — **2023** – 30/2/1, 30/2/3, 30/2/2

Assertion (A) : The polynomial $p(x) = x^2 + 3x + 3$ has two real zeroes.
Reason (R) : A quadratic polynomial can have at most two real zeroes.

(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 *
$D = 9 - 12 = -3 < 0$, so $p(x)$ has no real zero; A is false. R is true.

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

Q30 Assertion–Reason · 1 mark — **2024** – 30/S/1, 30/S/2, 30/S/3

Assertion (A): If the graph of a polynomial intersects the x-axis at exactly two points, then the number of zeroes of that polynomial is 2.
Reason (R): The number of zeroes of a polynomial is equal to the number of points where the graph of the polynomial intersects x-axis.

(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) Both A and R are true and R is the correct explanation of A.**

Q31 Assertion–Reason · 1 mark — **2024** – 30/1/1, 30/1/2, 30/1/3

Assertion (A) : If the graph of a polynomial touches x-axis at only one point, then the polynomial cannot be a quadratic polynomial.
Reason (R) : A polynomial of degree $n (n > 1)$ can have at most n zeroes.

(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 quadratic like x^2 touches the x-axis at only one point, so A is false; R is true.

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

Q32 Assertion–Reason · 1 mark — **2024** – 30/5/1, 30/5/2, 30/5/3

Assertion (A) : Degree of a zero polynomial is not defined.
Reason (R) : Degree of a non-zero constant polynomial is 0.

(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 *
Both statements are true, but R (about non-zero constants) does not explain A.

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

Q33 Very Short Answer · 2 marks — **2025** – 30/1/1, 30/1/3

Find the zeroes of the polynomial $p(x) = x^2 + \frac{4}{3}x - \frac{4}{3}$.

ANSWER *

$p(x) = \frac{1}{3}(3x^2 + 4x - 4) = \frac{1}{3}(3x - 2)(x + 2)$

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

$\frac{2}{3}$ and -2

Q34 Case Study · 4 marks — **2023** – 30/C/1, 30/C/2, 30/C/3

Case study: While playing in a garden, Samaira saw a honeycomb and asked her mother what is that. Her mother replied that it's a honeycomb made by honey bees to store honey. Also, she told her that the shape of the honeycomb formed is a mathematical structure. The mathematical representation of the honeycomb is shown in the graph.

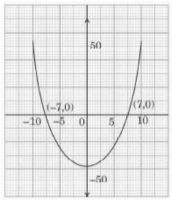
(i) How many zeroes are there for the polynomial represented by the graph given ? **[1]**

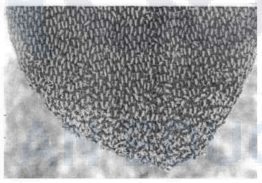
(ii) Write the zeroes of the polynomial. **[1]**

(iii)(a) If the zeroes of a polynomial $x^2 + (a + 1)x + b$ are 2 and -3, then determine the values of a and b. **[2]**

OR

(iii)(b) If the square of difference of the zeroes of the polynomial $x^2 + px + 45$ is equal to 144, then find the value of p. **[2]**





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ANSWER

(i) Two — 1

(ii) 7 and -7 — 1

(iii)(a) $-(a + 1) = 2 + (-3) \Rightarrow a = 0$ — 1

$b = 2 \times (-3) \Rightarrow b = -6$ — 1

OR (iii)(b) $\alpha + \beta = -p,\ \alpha\beta = 45$ — ½

$(\alpha - \beta)^2 = 144$ — ½

$\Rightarrow (\alpha + \beta)^2 - 4\alpha\beta = 144 \Rightarrow (-p)^2 - 4 \times 45 = 144$ — ½

$\Rightarrow p = \pm 18$ — ½

(i) Two (ii) $7, -7$ (iii)(a) $a = 0,\ b = -6$ OR (b) $p = \pm 18$

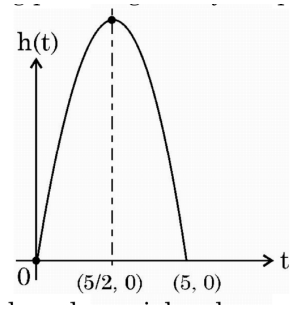
Q35 Case Study · 4 marks — **2024** – 30/2/1, 30/2/2

Case study: A ball is thrown in the air so that t seconds after it is thrown, its height h metre above its starting point is given by the polynomial $h = 25t - 5t^2$.

(i) Write zeroes of the given polynomial. **[1]**

(ii) Find the maximum height achieved by ball. **[1]**

(iii)(a) After throwing upward, how much time did the ball take to reach to the height of 30 m ? **[2]** OR (b) Find the two different values of t when the height of the ball was 20 m. **[2]**



ANSWER *

(i) $25t - 5t^2 = 5t(5 - t) = 0 \Rightarrow t = 0,\ 5$

(ii) Maximum height at $t = \frac{5}{2}$: $h = 25 \times \frac{5}{2} - 5 \times \frac{25}{4} = 31.25$ m

(iii)(a) $25t - 5t^2 = 30 \Rightarrow t^2 - 5t + 6 = 0 \Rightarrow (t - 2)(t - 3) = 0$; going upward it reaches 30 m first at $t = 2$ seconds

OR (b) $25t - 5t^2 = 20 \Rightarrow t^2 - 5t + 4 = 0 \Rightarrow (t - 1)(t - 4) = 0 \Rightarrow t = 1$ s and $t = 4$ s

(i) 0, 5 (ii) 31.25 m (iii)(a) 2 seconds OR (b) $t = 1$ s and $t = 4$ s

Q36 Case Study · 4 marks — **2026 (I)** – 30/3/1, 30/3/2, 30/3/3

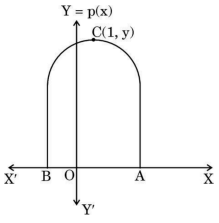
Case study: During a theatre drama, a backdrop of building arches was used. The shape of the curve shown can be represented by the polynomial $p(x) = -x^2 + 2x + 8$, where x is the length (in feet) on stage level.

(i) Determine the height of the arch. **[1]**

(ii)(a) Find zeroes of the polynomial $p(x)$. Which points on the graph represent the zeroes ? **[2]** OR (b) Find the span of the arch on the stage floor. **[2]**

(iii) Write the coordinates of the point of intersection of the above curve with the y-axis. **[1]**





ANSWER *

(i) Height at $C(1, y)$: $p(1) = -1 + 2 + 8 = 9$ feet

(ii)(a) $-x^2 + 2x + 8 = 0 \Rightarrow (x - 4)(x + 2) = 0 \Rightarrow x = 4,\ -2$; points A(4, 0) and B(−2, 0)

OR (b) Span $= 4 - (-2) = 6$ feet

(iii) $p(0) = 8$; point $(0, 8)$

(i) 9 feet (ii)(a) 4, −2; A(4, 0), B(−2, 0) OR (b) 6 feet (iii) (0, 8)

TOPIC 2

02 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. $b=0$.

Q37 MCQ · 1 mark — **2023** – 30/C/B

If α and β are the zeroes of the polynomial $p(x)=2x^2-7x+3$, then the value of $\alpha^2+\beta^2$ is :

(A) 10
(B) $\frac{37}{4}$
(C) $\frac{23}{2}$
(D) 37

ANSWER (b) $\frac{37}{4}$

Q38 MCQ · 1 mark — **2023** – 30/C/B

If the sum of the zeroes of the quadratic polynomial $p(x)=kx^2+2x+3k$ is equal to the product of its zeroes, then the value of k is :

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

ANSWER (a) $-\frac{2}{3}$

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Q39 MCQ · 1 mark — **2023** – 30/1/1, 30/1/2

If α, β are the zeroes of a polynomial $p(x)=x^2+x-1$, then $\frac{1}{\alpha}+\frac{1}{\beta}$ equals to

(A) 1
(B) 2
(C) −1
(D) $\frac{-1}{2}$

ANSWER *
$\frac{\alpha+\beta}{\alpha\beta}=\frac{-1}{-1}=1$
(A) 1

Q40 MCQ · 1 mark — **2023** – 30/1/3

If α, β are zeroes of a polynomial $p(x)=2x^2-x-1$ then $\alpha^2+\beta^2$ is equal to

(A) $\frac{-3}{4}$
(B) $\frac{5}{4}$
(C) $\frac{1}{4}$
(D) $\frac{3}{4}$

ANSWER *

$\alpha+\beta=\frac{1}{2},\ \alpha\beta=-\frac{1}{2};\ \alpha^2+\beta^2=\frac{1}{4}+1=\frac{5}{4}$

(B) $\frac{5}{4}$

Q41 MCQ · 1 mark — **2023** – 30/2/1, 30/2/3

If one zero of the polynomial $6x^2+37x-(k-2)$ is reciprocal of the other, then what is the value of k ?

(A) -4
(B) -6
(C) 6
(D) 4

ANSWER *

Product of zeroes $=1\Rightarrow\frac{-(k-2)}{6}=1\Rightarrow k=-4$

(a) −4

Q42 MCQ · 1 mark — **2023** – 30/2/1, 30/2/2

If α and β are the zeroes of the quadratic polynomial $p(x)=x^2-ax-b$, then the value of $\alpha^2+\beta^2$ is :

(A) a^2-2b
(B) a^2+2b
(C) b^2-2a
(D) b^2+2a

ANSWER *

$\alpha+\beta=a,\ \alpha\beta=-b;\ \alpha^2+\beta^2=a^2+2b$

(b) a^2+2b

Q43 MCQ · 1 mark — **2023** – 30/2/2

If one zero of the polynomial $x^2-3kx+4k$ be twice the other, then the value of k is :

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

ANSWER *

Zeroes $\alpha, 2\alpha$: $3\alpha=3k\Rightarrow\alpha=k;\ 2\alpha^2=4k\Rightarrow 2k^2=4k\Rightarrow k=2\ (k\neq 0)$

(b) 2

Q44 MCQ · 1 mark — **2023** – 30/2/2

If 'α' and 'β' are the zeroes of the polynomial ax^2-5x+c and $\alpha+\beta=\alpha\beta=10$, then :

(A) $a=5,\ c=\frac{1}{2}$
(B) $a=1,\ c=\frac{5}{2}$
(C) $a=\frac{5}{2},\ c=1$
(D) $a=\frac{1}{2},\ c=5$

ANSWER *

$\frac{5}{a}=10\Rightarrow a=\frac{1}{2};\ \frac{c}{a}=10\Rightarrow c=5$

(d) $a=\frac{1}{2},\ c=5$

Q45 MCQ · 1 mark — **2023** – 30/2/3

The sum of zeroes of the polynomial $\sqrt{2}x^2 - 17$ are given as :

(A) $\frac{17\sqrt{2}}{2}$ (B) $-\frac{17\sqrt{2}}{2}$
(C) 0 (D) 1

ANSWER *

Coefficient of x is 0, so sum $= -\frac{0}{\sqrt{2}} = 0$

(c) 0

Q46 MCQ · 1 mark — **2023** – 30/4/1, 30/4/2, 30/4/3, 30/6/3

If α, β are zeroes of the polynomial $x^2 - 1$, then value of $(\alpha + \beta)$ is :

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

ANSWER *

$x^2 - 1$ has zeroes $1, -1$; sum $= 0$

(d) 0

Q47 MCQ · 1 mark — **2023** – 30/4/1, 30/4/2, 30/4/3

If α, β are the zeroes of the polynomial $p(x) = 4x^2 - 3x - 7$, then $\left(\frac{1}{\alpha} + \frac{1}{\beta}\right)$ is equal to :

(A) $\frac{7}{3}$ (B) $\frac{-7}{3}$
(C) $\frac{3}{7}$ (D) $\frac{-3}{7}$

ANSWER *

$\frac{\alpha+\beta}{\alpha\beta} = \frac{3/4}{-7/4} = -\frac{3}{7}$

(d) $\frac{-3}{7}$

Q48 MCQ · 1 mark — **2023** – 30/6/1, 30/6/2, 30/6/3

If the zeroes of the quadratic polynomial $x^2 + (a+1)x + b$ are 2 and -3, then

(A) $a = -7,\ b = -1$ (B) $a = 5,\ b = -1$
(C) $a = 2,\ b = -6$ (D) $a = 0,\ b = -6$

ANSWER *

$-(a+1) = 2 - 3 = -1 \Rightarrow a = 0; b = 2 \times (-3) = -6$

(D) $a = 0,\ b = -6$

Q49 MCQ · 1 mark — **2024** – 30(B)/S

If α and β are the zeroes of the polynomial $2x^2 + 5x + 1$, then the value of $\alpha + \beta + 3\alpha\beta$ is :

(A) -4
(B) $-\frac{3}{2}$
(C) 1
(D) -1

ANSWER (D) -1

Q50 MCQ · 1 mark **2024** – 30/1/1

If the sum of zeroes of the polynomial $p(x) = 2x^2 - k\sqrt{2}x + 1$ is $\sqrt{2}$, then value of k is :

(A) $\sqrt{2}$
(B) 2
(C) $2\sqrt{2}$
(D) $\frac{1}{2}$

ANSWER *

Sum $= \frac{k\sqrt{2}}{2} = \sqrt{2} \Rightarrow k = 2$

(b) 2

Q51 MCQ · 1 mark **2024** – 30/1/3

If α, β are the zeroes of the polynomial $6x^2 - 5x - 4$, then $\frac{1}{\alpha} + \frac{1}{\beta}$ is equal to :

(A) $\frac{5}{4}$
(B) $-\frac{5}{4}$
(C) $\frac{4}{5}$
(D) $\frac{5}{24}$

ANSWER *

$\frac{\alpha+\beta}{\alpha\beta} = \frac{5/6}{-4/6} = -\frac{5}{4}$

(b) $-\frac{5}{4}$

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Q52 MCQ · 1 mark **2024** – 30/2/1

If α and β are zeroes of the polynomial $5x^2 + 3x - 7$, the value of $\frac{1}{\alpha} + \frac{1}{\beta}$ is

(A) $-\frac{3}{7}$
(B) $\frac{3}{5}$
(C) $\frac{3}{7}$
(D) $-\frac{5}{7}$

ANSWER *

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

(C) $\frac{3}{7}$

Q53 MCQ · 1 mark **2024** – 30/2/2

If α and β are zeroes of the polynomial $2x^2 - 9x + 5$, then value of $\alpha^2 + \beta^2$ is

(A) $\frac{1}{4}$
(B) $\frac{61}{4}$
(C) 1
(D) $\frac{71}{4}$

ANSWER *

$\alpha+\beta=\frac{9}{2},\ \alpha\beta=\frac{5}{2};\ \frac{81}{4}-5=\frac{61}{4}$

(B) $\frac{61}{4}$

Q54 MCQ · 1 mark — **2024** – 30/5/1, 30/5/2, 30/5/3; **2025** – 30/3/3

If α and β are the zeroes of the polynomial $p(x)=kx^2-30x+45k$ and $\alpha+\beta=\alpha\beta$, then the value of k is :

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

ANSWER *

$\frac{30}{k}=\frac{45k}{k}=45\Rightarrow k=\frac{2}{3}$

(D) $\frac{2}{3}$

Q55 MCQ · 1 mark — **2025** – 30(B)/S

If one zero of the quadratic polynomial $4x^2+4x-m$ is $\frac{3}{2}$, then the other zero is :

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

ANSWER **(C) $-\frac{5}{2}$**

Q56 MCQ · 1 mark — **2025** – 30(B)/S

The zeroes of the quadratic polynomial $x^2+99x+127$ are :

(A) both positive
(B) both negative
(C) one positive and one negative
(D) both equal

ANSWER **(B) both negative**

Q57 MCQ · 1 mark — **2025** – 30(B)

If the square of the difference of the zeroes of the quadratic polynomial $y^2+py+36$ is equal to 81, then the values of p are

(A) ±5
(B) ±15
(C) ±18
(D) ±12

ANSWER *

$(\alpha-\beta)^2=(\alpha+\beta)^2-4\alpha\beta=p^2-144=81\Rightarrow p^2=225$

(B) ±15

Q58 MCQ · 1 mark — **2025** – 30/1/1, 30/1/2

If α and β are the zeroes of polynomial $3x^2 + 6x + k$ such that $\alpha + \beta + \alpha\beta = -\frac{2}{3}$, then the value of k is :

(A) -8
(B) 8
(C) -4
(D) 4

ANSWER *

$\alpha + \beta = -2,\ \alpha\beta = \frac{k}{3}; -2 + \frac{k}{3} = -\frac{2}{3} \Rightarrow k = 4$

(D) 4

Q59 MCQ · 1 mark — **2025** – 30/1/3

The sum of the zeroes of the polynomial $p(x) = 5x - 7x^2 + 3$ is :

(A) $\frac{-7}{5}$
(B) $\frac{7}{5}$
(C) $\frac{5}{7}$
(D) $\frac{-5}{7}$

ANSWER *

$a = -7,\ b = 5;\ \text{sum} = -\frac{5}{-7} = \frac{5}{7}$

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

Q60 MCQ · 1 mark — **2025** – 30/2/3

If one zero of the polynomial $q(x) = (p^2 + 4)x^2 + 65x + 4p$ is reciprocal of the other, then the value of 'p' is :

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

ANSWER *

$\text{Product} = 1 \Rightarrow 4p = p^2 + 4 \Rightarrow (p-2)^2 = 0 \Rightarrow p = 2$

(D) 2

Q61 MCQ · 1 mark — **2025** – 30/3/1, 30/3/2

If α and β are the zeroes of the polynomial $p(x) = x^2 - ax - b$, then the value of $(\alpha + \beta + \alpha\beta)$ is equal to :

(A) $a + b$
(B) $-a - b$
(C) $a - b$
(D) $-a + b$

ANSWER *

$\alpha + \beta = a,\ \alpha\beta = -b$

(C) $a - b$

Q62 MCQ · 1 mark — **2025** – 30/6/1, 30/6/3, 30/6/2

If the zeroes of the polynomial $ax^2 + bx + \frac{2a}{b}$ are reciprocal of each other, then the value of b is

(A) 2
(B) $\frac{1}{2}$

(C) -2
(D) $-\frac{1}{2}$

ANSWER *

Product $= \frac{2a/b}{a} = \frac{2}{b} = 1 \Rightarrow b = 2$

(A) 2

Q63 MCQ · 1 mark **2026 (I)** – 30/2/1, 30/2/3

If α and β are two zeroes of a polynomial $f(x) = px^2 - 2x + 3p$ and $\alpha + \beta = \alpha\beta$, then value of p is :

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

ANSWER *

$\frac{2}{p} = 3 \Rightarrow p = \frac{2}{3}$

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

Q64 MCQ · 1 mark **2026 (II)** – 30/7/1, 30/7/3

If α and β are the zeroes of a polynomial $f(x) = px^2 - 2x + 3p$ and $\alpha + \beta - \alpha\beta = 0$, then the value of p is :

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

ANSWER **(B) $\frac{2}{3}$**

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Q65 MCQ · 1 mark **2026 (II)** – 30/7/2

If m and n are the zeroes of the polynomial $f(x) = 2x^2 - 8 - 8x$, then the value of $m^2 + n^2$ is :

(A) 0
(B) 32
(C) 24
(D) 16

ANSWER **(C) 24**

Q66 Assertion–Reason · 1 mark **2026 (II)** – 30(B)

Assertion (A): If one zero of a quadratic polynomial $x^2 - \frac{3}{2}kx + 7$ is negative of the other, then the value of k is $\frac{2}{3}$.

Reason (R): Sum of zeroes of a quadratic polynomial $ax^2 + bx + c$ is $-\frac{b}{a}$.

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

Q67 Very Short Answer · 2 marks — **2023** – 30/C/B

If p and q are the zeroes of the quadratic polynomial $f(x) = 6x^2 + x - 2$, then find the value of $\frac{1}{p} + \frac{1}{q} - pq$.

ANSWER

$p + q = -\frac{1}{6},\ pq = -\frac{1}{3}$ — 1

$\frac{1}{p} + \frac{1}{q} = \frac{p+q}{pq} = \frac{1}{2}$ — ½

$\therefore \frac{1}{p} + \frac{1}{q} - pq = \frac{1}{2} + \frac{1}{3} = \frac{5}{6}$ — ½

$\boxed{\frac{5}{6}}$

Q68 Very Short Answer · 2 marks — **2023** – 30/4/1, 30/4/2, 30/4/3

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

ANSWER *

Let the zeroes be α and $\frac{1}{\alpha}$; product $= 1$

$\frac{-(k-2)}{6} = 1 \Rightarrow -k + 2 = 6 \Rightarrow k = -4$

$\boxed{k = -4}$

Q69 Very Short Answer · 2 marks — **2024** – 30/5/1, 30/5/3

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

ANSWER *

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

$\alpha + \beta + \alpha\beta = \frac{6}{5} + \frac{1}{5} = \frac{7}{5}$

$\boxed{\frac{7}{5}}$

Q70 Very Short Answer · 2 marks — **2024** – 30/5/2

If α and β are zeroes of the quadratic polynomial $p(x) = x^2 - 5x + 4$, then find the value of $\frac{1}{\alpha} + \frac{1}{\beta} - 2\alpha\beta$.

ANSWER *

$\alpha + \beta = 5,\ \alpha\beta = 4$

$\frac{1}{\alpha} + \frac{1}{\beta} = \frac{5}{4}$

$\frac{5}{4} - 2 \times 4 = -\frac{27}{4}$

$\boxed{-\frac{27}{4}}$

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Q71 Very Short Answer · 2 marks — **2025** – 30/1/2

If the zeroes of the polynomial $x^2 + ax + b$ are in the ratio $3 : 4$, then prove that $12a^2 = 49b$.

ANSWER *

Let the zeroes be $3k$ and $4k$. Sum: $7k = -a \Rightarrow k = -\frac{a}{7}$

Product: $12k^2 = b \Rightarrow 12 \times \frac{a^2}{49} = b \Rightarrow 12a^2 = 49b$

$12a^2 = 49b$ **(proved)**

Q72 Very Short Answer · 2 marks — **2025** – 30/2/1, 30/2/3

If p and q are zeroes of the polynomial $p(y) = 21y^2 - y - 2$, then find the value of $(1 - p)(1 - q)$.

ANSWER *

$p + q = \frac{1}{21},\ pq = -\frac{2}{21}$

$(1 - p)(1 - q) = 1 - (p + q) + pq = 1 - \frac{1}{21} - \frac{2}{21} = \frac{18}{21} = \frac{6}{7}$

$\frac{6}{7}$

Q73 Very Short Answer · 2 marks · Internal choice (OR) part — **2025** – 30/3/1, 30/3/3

If 'α' and 'β' are the zeroes of the polynomial $p(y) = y^2 - 5y + 3$, then find the value of $\alpha^4\beta^3 + \alpha^3\beta^4$.

ANSWER *

$\alpha + \beta = 5,\ \alpha\beta = 3$

$\alpha^4\beta^3 + \alpha^3\beta^4 = (\alpha\beta)^3(\alpha + \beta) = 27 \times 5 = 135$

135

Q74 Very Short Answer · 2 marks · Internal choice (OR) part — **2025** – 30/3/2

If the sum of the zeroes of the polynomial $p(x) = (p + 1)x^2 + (2p + 3)x + (3p + 4)$ is -1, then find the value of 'p'.

ANSWER *

Sum $= -\frac{2p + 3}{p + 1} = -1$

$\Rightarrow 2p + 3 = p + 1 \Rightarrow p = -2$

$p = -2$

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Q75 Very Short Answer · 2 marks · Internal choice (OR) part — **2025** – 30/3/2

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

ANSWER *

$\alpha + \beta = 2,\ \alpha\beta = -1$

$\frac{\alpha+\beta}{2\alpha\beta} + 3\alpha\beta = \frac{2}{-2} + 3(-1) = -4$

-4

Q76 Very Short Answer · 2 marks — **2026 (I)** – 30/1/1

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

ANSWER *

$\alpha + \beta = 3,\ \alpha\beta = -1$

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

-3

Q77 Very Short Answer · 2 marks — **2026 (I)** – 30/1/2

Find the zeroes of the quadratic polynomial $x^2 + 7x + 10$, and verify the relationship between the zeroes and its coefficients.

ANSWER *

$x^2 + 7x + 10 = (x+2)(x+5)$; zeroes $-2,\ -5$

Sum $= -7 = -\frac{7}{1}$; Product $= 10 = \frac{10}{1}$

Zeroes -2 and -5

Q78 Very Short Answer · 2 marks — **2026 (I)** – 30/2/1, 30/2/3

If α, β are the zeroes of the quadratic polynomial $px^2 + qx + r$, then find the value of $\alpha^3\beta + \beta^3\alpha$.

ANSWER *

$\alpha + \beta = -\frac{q}{p},\ \alpha\beta = \frac{r}{p}$

$\alpha^3\beta + \beta^3\alpha = \alpha\beta[(\alpha+\beta)^2 - 2\alpha\beta] = \frac{r}{p}\left(\frac{q^2}{p^2} - \frac{2r}{p}\right) = \frac{r(q^2-2pr)}{p^3}$

$\frac{r(q^2-2pr)}{p^3}$

Q79 Very Short Answer · 2 marks — **2026 (I)** – 30/2/2

Find the value of p, for which one zero of the quadratic polynomial $px^2 - 14x + 8$ is 6 times the other.

ANSWER *

Let the zeroes be α and 6α. $7\alpha = \frac{14}{p} \Rightarrow \alpha = \frac{2}{p}$

$6\alpha^2 = \frac{8}{p} \Rightarrow \frac{24}{p^2} = \frac{8}{p} \Rightarrow p = 3$

$\boxed{p = 3}$

Q80 Very Short Answer · 2 marks — **2026 (I)** – 30/4/1, 30/4/3

α and β are the zeroes of the polynomial $5x^2 - 16x - 10$. Find the value of $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$.

ANSWER *

$\alpha + \beta = \frac{16}{5},\ \alpha\beta = -2$

$\frac{(\alpha+\beta)^2 - 2\alpha\beta}{\alpha\beta} = \frac{\frac{256}{25} + 4}{-2} = -\frac{178}{25}$

$\boxed{-\frac{178}{25}}$

Q81 Very Short Answer · 2 marks — **2026 (I)** – 30/4/2

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

ANSWER *

$\alpha + \beta = 2,\ \alpha\beta = -\frac{5}{3}$

$\frac{\alpha^2 + \beta^2}{(\alpha\beta)^2} = \frac{4 + \frac{10}{3}}{\frac{25}{9}} = \frac{22}{3} \times \frac{9}{25} = \frac{66}{25}$

$\boxed{\frac{66}{25}}$

Q82 Short Answer · 3 marks — **2023** – 30(B)

If α and β are the zeroes of the polynomial $3x^2 + 5x + k$ such that $\alpha^2 + \beta^2 + \alpha\beta = \frac{19}{9}$, then find the value of k.

ANSWER *

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

$\alpha^2 + \beta^2 + \alpha\beta = (\alpha+\beta)^2 - \alpha\beta = \frac{25}{9} - \frac{k}{3}$

$\frac{25}{9} - \frac{k}{3} = \frac{19}{9} \Rightarrow \frac{k}{3} = \frac{6}{9} \Rightarrow k = 2$

$\boxed{k = 2}$

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Q83 Short Answer · 3 marks **2024** – 30/S/2

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

ANSWER

$\alpha + \beta = (k+5),\ \alpha\beta = (5k+1)$ ½+½

$\alpha + \beta = \frac{\alpha\beta}{3} \Rightarrow k + 5 = \frac{5k+1}{3}$ 1

$\Rightarrow k = 7$ 1

$\boxed{k = 7}$

Q84 Short Answer · 3 marks **2024** – 30/S/3

If α, β are the zeroes of the polynomial $3x^2 - 13x - 10$, then find the value of $(3\alpha + 1)(3\beta + 1)$.

ANSWER

$\alpha + \beta = \frac{13}{3},\ \alpha\beta = \frac{-10}{3}$ 1

$(3\alpha + 1)(3\beta + 1) = 9\alpha\beta + 3(\alpha + \beta) + 1$ ½

$= -30 + 13 + 1$ 1

$= -16$ ½

$\boxed{-16}$

Q85 Short Answer · 3 marks Internal choice (OR) part **2024** – 30(B)/S, 30(B)

If α and β are the zeroes of the quadratic polynomial $f(x) = 6x^2 + 11x - 10$, find the value of $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$.

ANSWER

$\alpha + \beta = -\frac{11}{6},\ \alpha\beta = -\frac{10}{6}$ 1

$\frac{\alpha}{\beta} + \frac{\beta}{\alpha} = \frac{(\alpha+\beta)^2 - 2\alpha\beta}{\alpha\beta} = \frac{\left(-\frac{11}{6}\right)^2 - 2\left(-\frac{10}{6}\right)}{-\frac{10}{6}}$ 1

$= -\frac{241}{60}$ 1

$\boxed{-\frac{241}{60}}$

Q86 Short Answer · 3 marks Internal choice (OR) part **2024** – 30(B)/S

Find the zeroes of the polynomial $2t^2 - 9t - 45$ and verify the relationship between the zeroes and the

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coefficients of the polynomial.

ANSWER

$2t^2 - 15t + 6t - 45 = (2t - 15)(t + 3)$ — 1

Zeroes are $\frac{15}{2}$ and -3 — 1

$\text{Sum} = \frac{15}{2} + (-3) = \frac{9}{2} = \frac{-(\text{coefficient of } t)}{\text{coefficient of } t^2}$ — ½

$\text{Product} = \frac{15}{2} \times (-3) = -\frac{45}{2} = \frac{\text{constant term}}{\text{coefficient of } t^2}$ — ½

Zeroes $\frac{15}{2}$ and -3

Q87 Short Answer · 3 marks · Internal choice (OR) part · **2024** – 30(B)

Find the zeroes of the polynomial $f(t) = t^2 + 4\sqrt{3}t - 15$ and verify the relationship between the zeroes and the coefficients of the polynomial.

ANSWER *

$t^2 + 5\sqrt{3}t - \sqrt{3}t - 15 = (t + 5\sqrt{3})(t - \sqrt{3})$

Zeroes are $\sqrt{3}$ and $-5\sqrt{3}$

$\text{Sum} = \sqrt{3} - 5\sqrt{3} = -4\sqrt{3} = -\frac{4\sqrt{3}}{1}$; $\text{Product} = \sqrt{3} \times (-5\sqrt{3}) = -15 = \frac{-15}{1}$

Zeroes $\sqrt{3}$ and $-5\sqrt{3}$

Q88 Short Answer · 3 marks · **2024** – 30/3/1, 30/3/2, 30/3/3

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

ANSWER *

$x^2 - 15 = (x - \sqrt{15})(x + \sqrt{15})$; zeroes $\sqrt{15}, \ -\sqrt{15}$

$\text{Sum} = 0 = -\frac{0}{1} = \frac{-(\text{coefficient of } x)}{\text{coefficient of } x^2}$

$\text{Product} = -15 = \frac{-15}{1} = \frac{\text{constant term}}{\text{coefficient of } x^2}$

Zeroes $\sqrt{15}$ and $-\sqrt{15}$

Q89 Short Answer · 3 marks · Internal choice (OR) part · **2024** – 30/4/1, 30/4/2, 30/4/3

Find the zeroes of the polynomial $4x^2 + 4x - 3$ and verify the relationship between zeroes and coefficients of the polynomial.

ANSWER *

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

$\text{Sum} = \frac{1}{2} - \frac{3}{2} = -1 = -\frac{4}{4}$

$\text{Product} = \frac{1}{2} \times \left(-\frac{3}{2}\right) = -\frac{3}{4}$

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

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Q90 Short Answer · 3 marks | Internal choice (OR) part | **2024** – 30/4/1, 30/4/2, 30/4/3

If α and β are the zeroes of the polynomial $x^2 + x - 2$, then find the value of $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$.

ANSWER *

$\alpha + \beta = -1,\ \alpha\beta = -2$

$\frac{\alpha}{\beta} + \frac{\beta}{\alpha} = \frac{(\alpha+\beta)^2 - 2\alpha\beta}{\alpha\beta} = \frac{1+4}{-2}$

$= -\frac{5}{2}$

$\boxed{-\frac{5}{2}}$

Q91 Short Answer · 3 marks | **2025** – 30/S/1

α, β are the zeroes of the quadratic polynomial $p(x) = x^2 - 4x + k$, such that $\alpha - \beta = 8$. Find the value of k .

ANSWER

$\alpha + \beta = 4$ and $\alpha\beta = k$ — 1

$(\alpha - \beta)^2 = (\alpha + \beta)^2 - 4\alpha\beta \Rightarrow (8)^2 = (4)^2 - 4k$ — 1½

$\Rightarrow k = -12$ — ½

$\boxed{k = -12}$

Q92 Short Answer · 3 marks | **2025** – 30/S/2

Zeroes of the quadratic polynomial $p(x) = (a^2 + 10)x^2 - 74x + 7a$ are reciprocal of each other and they are rational. Find the value of 'a'.

ANSWER

Zeroes are reciprocal of each other $\therefore \frac{7a}{a^2 + 10} = 1$ — 1

$\Rightarrow a^2 - 7a + 10 = 0$ — 1

$\Rightarrow (a - 2)(a - 5) = 0$ — ½

$\Rightarrow a = 2, 5$. For $a = 5$, zeroes are rational. — ½

$\boxed{a = 5}$

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03 TOPIC 3 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).

Q93 MCQ · 1 mark | **2023** – 30/1/1, 30/1/3

Which of the following is a quadratic polynomial having zeroes $\frac{-2}{3}$ and $\frac{2}{3}$?

(A) $4x^2 - 9$

(B) $\frac{4}{9}(9x^2 + 4)$

(C) $x^2 + \frac{9}{4}$
(D) $5(9x^2 - 4)$

ANSWER *

Sum $= 0$, product $= -\frac{4}{9}$; $x^2 - \frac{4}{9} = \frac{1}{9}(9x^2 - 4)$, i.e. $k(9x^2 - 4)$

(D) $5(9x^2 - 4)$

Q94 MCQ · 1 mark — **2023** – 30/1/2

Which of the following is a quadratic polynomial with zeroes $\frac{5}{3}$ and 0 ?

(A) $3x(3x - 5)$
(B) $3x(x - 5)$
(C) $x^2 - \frac{5}{3}$
(D) $\frac{5}{3}x^2$

ANSWER *

Sum $= \frac{5}{3}$, product $= 0$: $x^2 - \frac{5}{3}x = \frac{1}{3}x(3x - 5)$, i.e. $k\,x(3x - 5)$

(A) $3x(3x - 5)$

Q95 MCQ · 1 mark — **2023** – 30/5/1, 30/5/3

The number of polynomials having zeroes -3 and 5 is :

(A) only one
(B) infinite
(C) exactly two
(D) at most two

ANSWER *

$k(x^2 - 2x - 15)$ for every non-zero real k

(b) infinite

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Q96 MCQ · 1 mark — **2023** – 30/5/2

The number of polynomials having zeroes -1 and 2 is :

(A) exactly 2
(B) only 1
(C) at most 2
(D) infinite

ANSWER *

$k(x^2 - x - 2)$ for every non-zero real k

(d) infinite

Q97 MCQ · 1 mark — **2023** – 30/6/1, 30/6/2

The number of quadratic polynomials having zeroes -5 and -3 is

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

ANSWER *

$k(x^2 + 8x + 15)$ for every non-zero real k

(D) more than 3

Q98 MCQ · 1 mark **2024** – 30/1/1, 30/1/2

The zeroes of a polynomial $x^2 + px + q$ are twice the zeroes of the polynomial $4x^2 - 5x - 6$. The value of p is :

(A) $-\frac{5}{2}$ (B) $\frac{5}{2}$
(C) -5 (D) 10

ANSWER *
For $4x^2 - 5x - 6$: sum $= \frac{5}{4}$. Zeroes doubled: sum $= \frac{5}{2} = -p \Rightarrow p = -\frac{5}{2}$

(a) $-\frac{5}{2}$

Q99 MCQ · 1 mark **2024** – 30/4/2

A quadratic polynomial, one of whose zeroes is $2 + \sqrt{5}$ and the sum of whose zeroes is 4, is :

(A) $x^2 + 4x - 1$ (B) $x^2 - 4x - 1$
(C) $x^2 - 4x + 1$ (D) $x^2 + 4x + 1$

ANSWER *
Other zero $= 4 - (2 + \sqrt{5}) = 2 - \sqrt{5}$; product $= 4 - 5 = -1$

(B) $x^2 - 4x - 1$

Q100 MCQ · 1 mark **2025** – 30(B)/S

A quadratic polynomial whose one zero is 3 and the product of zeroes is 0, is :

(A) $x^2 - 3$ (B) $x^2 - 9$
(C) $x^2 + 3x$ (D) $x^2 - 3x$

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

Q101 MCQ · 1 mark **2026 (I)** – 30/3/1, 30/3/2

The sum and product of zeroes of a quadratic polynomial $p(x)$ are $\frac{-1}{3}$ and 2 respectively. The polynomial $p(x)$ is :

(A) $3x^2 - x + 6$ (B) $x^2 + \frac{1}{3}x - 2$
(C) $3x^2 - x + 2$ (D) $-3x^2 - x - 6$

ANSWER *
$k\left(x^2 + \frac{1}{3}x + 2\right)$; with $k = -3$: $-3x^2 - x - 6$

(D) $-3x^2 - x - 6$

Q102 MCQ · 1 mark **2026 (I)** – 30/5/1, 30/5/3

If the zeroes of a polynomial $p(x)$ are -3 and 8, then $p(x)$ equals

(A) $x^2 + 5x - 4$ (B) $(x + 3)(-x + 8)$
(C) $a(x^2 + 5x - 24)$ (D) $x^2 - 24$

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ANSWER *

$(x+3)(-x+8)=0 \Rightarrow x=-3,\ 8$

(B) $(x+3)(-x+8)$

Q103 MCQ · 1 mark — **2026 (I)** – 30/5/2

If sum and product of zeroes of a polynomial are (-3) and (-2) respectively, then a polynomial is

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

ANSWER *

$k(x^2+3x-2)$; with $k=-1$: $-x^2-3x+2$

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

Q104 MCQ · 1 mark — **2026 (II)** – 30(B)

The number of polynomials having 3 and -7 as zeroes is :

(A) One
(B) Two
(C) Three
(D) More than three

ANSWER **(D) More than three**

Q105 Very Short Answer · 2 marks — **2025** – 30/2/2

Find a quadratic polynomial whose zeroes are 2 and $-\frac{7}{5}$.

ANSWER *

Sum $= 2-\frac{7}{5}=\frac{3}{5}$, product $=-\frac{14}{5}$

$x^2-\frac{3}{5}x-\frac{14}{5}$, i.e. $k(5x^2-3x-14)$; one such polynomial is $5x^2-3x-14$

$5x^2-3x-14$

Q106 Very Short Answer · 2 marks — **2026 (I)** – 30(B)

Find the quadratic polynomial the sum of whose zeroes is 1 and their product is -12. Hence find the zeroes of the polynomial.

ANSWER *

Polynomial: x^2-x-12

$x^2-4x+3x-12=(x-4)(x+3)$; zeroes are 4 and -3

x^2-x-12; **zeroes 4 and** -3

Q107 Very Short Answer · 2 marks — **2026 (II)** – 30/7/1, 30/7/2, 30/7/3

If α and β are two zeroes of the polynomial $25p^2-15p+2$, find a quadratic polynomial where zeroes are

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$\frac{1}{3\alpha}$ and $\frac{1}{3\beta}$.

ANSWER

$\alpha+\beta=\frac{15}{25},\ \alpha\beta=\frac{2}{25}$ ½

Let the polynomial be x^2-Sx+P. $S=\frac{1}{3\alpha}+\frac{1}{3\beta}=\frac{1}{3}\left(\frac{\alpha+\beta}{\alpha\beta}\right)=\frac{5}{2}$ ½

$P=\frac{1}{3\alpha}\times\frac{1}{3\beta}=\frac{1}{9}\left(\frac{1}{\alpha\beta}\right)=\frac{25}{18}$ ½

Required polynomial is $x^2-\frac{5}{2}x+\frac{25}{18}$ or $18x^2-45x+25$ ½

$x^2-\frac{5}{2}x+\frac{25}{18}$ **or** $18x^2-45x+25$

Q108 Short Answer · 3 marks **2024** – 30/S/1

Find a quadratic polynomial whose sum of the zeroes is 8 and difference of the zeroes is 2.

ANSWER

Let the zeroes be α and β; $\alpha+\beta=8$ and $\alpha-\beta=2$ 1

Solving, $\alpha=5$ and $\beta=3$ 1

So, the quadratic polynomial is $x^2-8x+15$ 1

$x^2-8x+15$

Q109 Short Answer · 3 marks **2025** – 30/S/3

If α,β are the zeroes of the polynomial $p(x)=x^2-2x-3$, then find a polynomial where zeroes are $(2\alpha+3\beta)$ and $(3\alpha+2\beta)$.

ANSWER

$\alpha+\beta=2,\ \alpha\beta=-3$. Let the polynomial be x^2-Sx+P ½

$S=(2\alpha+3\beta)+(3\alpha+2\beta)=5(\alpha+\beta)=10$ ½

$P=(2\alpha+3\beta)(3\alpha+2\beta)=6(\alpha^2+\beta^2)+13\alpha\beta=6(\alpha+\beta)^2+\alpha\beta=6(2)^2+(-3)=21$ 1½

Required polynomial is $x^2-10x+21$ ½

$x^2-10x+21$

Q110 Short Answer · 3 marks **2025** – 30/4/1

α and β are zeroes of a quadratic polynomial px^2+qx+1. Form a quadratic polynomial whose zeroes are $\frac{2}{\alpha}$ and $\frac{2}{\beta}$.

ANSWER *

$\alpha+\beta=-\frac{q}{p},\ \alpha\beta=\frac{1}{p}$

Sum $=\frac{2}{\alpha}+\frac{2}{\beta}=\frac{2(\alpha+\beta)}{\alpha\beta}=-2q$; Product $=\frac{4}{\alpha\beta}=4p$

Required polynomial: $x^2+2qx+4p$

$x^2+2qx+4p$

Q111 Short Answer · 3 marks **2025** – 30/4/2

α and β are zeroes of a quadratic polynomial $x^2 - ax - b$. Obtain a quadratic polynomial whose zeroes are $3\alpha + 1$ and $3\beta + 1$.

ANSWER *

$\alpha + \beta = a,\ \alpha\beta = -b$

Sum $= 3(\alpha + \beta) + 2 = 3a + 2$

Product $= 9\alpha\beta + 3(\alpha + \beta) + 1 = -9b + 3a + 1$

Required polynomial: $x^2 - (3a + 2)x + (3a - 9b + 1)$

$x^2 - (3a + 2)x + (3a - 9b + 1)$

Q112 Short Answer · 3 marks **2025** – 30/4/3

If α and β are the zeroes of the polynomial $ax^2 - x + c$. Obtain a polynomial whose zeroes are $\alpha - 3$ and $\beta - 3$.

ANSWER *

$\alpha + \beta = \dfrac{1}{a},\ \alpha\beta = \dfrac{c}{a}$

Sum $= (\alpha + \beta) - 6 = \dfrac{1 - 6a}{a}$

Product $= \alpha\beta - 3(\alpha + \beta) + 9 = \dfrac{c - 3 + 9a}{a}$

Required polynomial: $ax^2 - (1 - 6a)x + (9a - 3 + c)$, i.e. $ax^2 + (6a - 1)x + (9a + c - 3)$

$ax^2 + (6a - 1)x + (9a - 3 + c)$

Q113 Short Answer · 3 marks **2025** – 30/5/1

Obtain the zeroes of the polynomial $7x^2 + 18x - 9$. Hence, write a polynomial each of whose zeroes is twice the zeroes of given polynomial.

ANSWER *

$7x^2 + 21x - 3x - 9 = (7x - 3)(x + 3)$; zeroes $\dfrac{3}{7},\ -3$

New zeroes $\dfrac{6}{7},\ -6$: sum $= -\dfrac{36}{7}$, product $= -\dfrac{36}{7}$

Required polynomial: $x^2 + \dfrac{36}{7}x - \dfrac{36}{7}$, i.e. $7x^2 + 36x - 36$

Zeroes $\dfrac{3}{7},\ -3$; polynomial $7x^2 + 36x - 36$

Q114 Short Answer · 3 marks **2025** – 30/5/2

Obtain the zeroes of the polynomial $p(x) = 2x^2 - 5x - 3$. Hence, obtain a polynomial each of whose zeroes

is one less than each of the zero of $p(x)$.

ANSWER *

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

New zeroes $2,\ -\frac{3}{2}$: sum $= \frac{1}{2}$, product $= -3$

Required polynomial: $x^2 - \frac{1}{2}x - 3$, i.e. $2x^2 - x - 6$

Zeroes $3,\ -\frac{1}{2}$; polynomial $2x^2 - x - 6$

Q115 Short Answer · 3 marks **2025** – 30/5/3

Find the zeroes of the polynomial $p(x) = 6x^2 - 5x - 1$. Hence, obtain a polynomial each of whose zeroes is three times the zeroes of $p(x)$.

ANSWER *

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

New zeroes $3,\ -\frac{1}{2}$: sum $= \frac{5}{2}$, product $= -\frac{3}{2}$

Required polynomial: $x^2 - \frac{5}{2}x - \frac{3}{2}$, i.e. $2x^2 - 5x - 3$

Zeroes $1,\ -\frac{1}{6}$; polynomial $2x^2 - 5x - 3$

Q116 Short Answer · 3 marks **2025** – 30/6/1

Find the zeroes of the polynomial $p(x) = 3x^2 - 4x - 4$. Hence, write a polynomial whose each of the zeroes is 2 more than zeroes of $p(x)$.

ANSWER *

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

New zeroes $4,\ \frac{4}{3}$: sum $= \frac{16}{3}$, product $= \frac{16}{3}$

Required polynomial: $x^2 - \frac{16}{3}x + \frac{16}{3}$, i.e. $3x^2 - 16x + 16$

Zeroes $2,\ -\frac{2}{3}$; polynomial $3x^2 - 16x + 16$

Q117 Short Answer · 3 marks **2025** – 30/6/2

Find the zeroes of the polynomial $q(x) = 8x^2 - 2x - 3$. Hence, find a polynomial whose zeroes are 2 less than the zeroes of $q(x)$.

ANSWER *

$8x^2 - 6x + 4x - 3 = (4x-3)(2x+1)$; zeroes $\frac{3}{4},\ -\frac{1}{2}$

New zeroes $-\frac{5}{4},\ -\frac{5}{2}$: sum $= -\frac{15}{4}$, product $= \frac{25}{8}$

Required polynomial: $x^2 + \frac{15}{4}x + \frac{25}{8}$, i.e. $8x^2 + 30x + 25$

Zeroes $\frac{3}{4},\ -\frac{1}{2}$; polynomial $8x^2 + 30x + 25$

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Q118 Short Answer · 3 marks **2025** – 30/6/3

Find the zeroes of the polynomial $r(x) = 4x^2 + 3x - 1$. Hence, write a polynomial whose zeroes are reciprocal of the zeroes of polynomial $r(x)$.

ANSWER *

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

Reciprocals $4,\ -1$: sum $= 3$, product $= -4$

Required polynomial: $x^2 - 3x - 4$

Zeroes $\frac{1}{4},\ -1$; polynomial $x^2 - 3x - 4$

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