MATHS

BOOKS - CHHAYA PUBLICATION MATHS (BENGALI ENGLISH)

QUADRATIC EQUATIONS

Examples

1. IF α and β be the roots of the equation $ax^2 + bx + c = 0$, find the values of

$\alpha^2 + \beta^2$

Watch Video Solution

2. IF α and β be the roots of the equation $ax^2 + bx + c = 0$, find the values of $\frac{1}{\alpha^3} + \frac{1}{\beta^3}$

Watch Video Solution

3. IF the roots of the equation $k^2 + x^2 + (kx + 1)(x + k) + 1 = 0 (k \neq 0, k \neq -1)$ are α and β, find the value of $\alpha^2 + \beta^2 + (\alpha\beta + 1)(\alpha + \beta) + 1.$

Watch Video Solution

4. IF α, β be the roots of the equation $ax^2 + bx + c = 0$ find the value of $\frac{a\alpha^2}{b\alpha + c} - \frac{a\beta^2}{b\beta + c}$

Watch Video Solution

5. IF α, β be the roots of the equation $px^2 + qx + r = 0$,find the value of $\frac{1}{(p\alpha + q)^3} + \frac{1}{(p\beta + q)^3}$.

Watch Video Solution

6. IF α, β and γ, δ be the roots of the equation $x^2 + px - r = 0$ and $x^2 + px + r = 0$ respectively, prove that $(\alpha - \gamma)(\alpha - \delta) = (\beta - \gamma)(\beta - \delta)$

Watch Video Solution

7. IF the ratio of the roots of equation $x^2 + px + q = 0$ be $a : b$ prove that, $p^2ab = q(a + b)^2$ Hence, find the condition of equal roots of the given equation.

Watch Video Solution

8. IF one root of the equation $x^2 - rx - s = 0$ is square of the other, prove that , $r^3 - s^2 + 3sr + s = 0.$

Watch Video Solution

9. IF $b^3 + a^2c + ac^2 = 3abc$,find the relation between the roots of the equation $ax^2 + bx + c = 0.$

Watch Video Solution

10. Let a,b,c be real numbers with $a \neq 0$ and let α, β be the roots of the equation $ax^2 + bx + c = 0.$

Express the roots of $a^2cx^2 + (b^3 - 3abc)x + ac^2 = 0$ in terms of α, β.

Watch Video Solution

11. IF α and β be the roots of the equation $x^2 + 3x + 4 = 0$, find the equation whose roots are $(\alpha + \beta)^2 \text{and} (\alpha + \beta)^2$

Watch Video Solution

12. $-\frac{\alpha^2}{\beta} \text{and} -\frac{\beta^2}{\alpha}$ are the roots of the equation $3x^2 - 18x + 2 = 0$. Find the equation whose roots

are α and β (α, β real).

Watch Video Solution

13. IF α and β be the roots of $x^2 + x + 1 = 0$, form the equation whose roots are α^2 and β^2. Account for the identify of the equation thus obtained with the original equation.

Watch Video Solution

14. IF $a^2 = 5a - 3$ and $b^2 = 5b - 3$, $(a \neq b)$, find the quadratic equation whose roots are $\frac{a}{b}$ and $\frac{b}{a}$.

Watch Video Solution

15. Find the quadratic equation with real coefficients which has 2+i as a root $(i = \sqrt{-1})$.

Watch Video Solution

16. Form a quadratic equation with rational coefficients whose one root is $3 - \sqrt{5}$.

Watch Video Solution

17. IF one root of the quadratic equation $x^2 - x - 1 = 0$ is α, prove that its other root is $\alpha^3 - 3\alpha$.

Watch Video Solution

18. If the ratio of the roots of equation $ax^2 + bx + c = 0$ be equal to that of the roots of $px^2 + qx + r = 0$, Prove that ,$rpb^2 = caq^2$.

Watch Video Solution

19. In the equation $x^2 + px + q = 0$, if the coeffficient of x be taken as 17 instead of 13, the roots are obtained as (-2) and (-15). Find the roots of the original equation.

Watch Video Solution

20. IF α be a root of the equation $3x^2 - 4x + 5 = 0$, prove that $2\alpha^2$ is a root of the equation $9x^2 + 28x + 100 = 0$.

Watch Video Solution

21. Dicuss the nature of the roots of the following equations:

$3x^2 - 7x + 3 = 0$

Watch Video Solution

22. Dicuss the nature of the roots of the following equations:

$x^2 - 18x + 81 = 0$

Watch Video Solution

23. Find the nature of the roots of the equation $2x^2 - \sqrt{3}x + 2 = 0.$

Watch Video Solution

24. Dicuss the nature of the roots of the following equations:

$x^2 - 2\sqrt{7}x - 2 = 0$

Watch Video Solution

25. Dicuss the nature of the roots of the following equations:

$2x^2 - 3x + 5 = 0$

Watch Video Solution

26. For what value of m the roots of the equation $x^2 - 2(5 + 2m)x + 3(7 + 10m) = 0$ are equal

Watch Video Solution

27. For what value of m the roots of the equation $x^2 - 2(5 + 2m)x + 3(7 + 10m) = 0$ are reciprocal to one another

Watch Video Solution

28. For what value of m the roots of the equation $x^2 - 2(5 + 2m)x + 3(7 + 10m) = 0$ are equal in magnitude and opposite in signs?

Watch Video Solution

29. IF a,b,c are rational and a+b+c=0, show that the roots of the equation $ax^2 + bx + c = 0$ are rational.

Watch Video Solution

30. IF the roots of the equation $px^2 - 2qx + p = 0$ are real and unequal, show that the roots of the equation $qx^2 - 2px + q = 0$ are imaginary (both p and q are real).

Watch Video Solution

31. Show that the roots of the equation $a(b-c)x^2 + b(c-a)x + c(a-b) = 0$ are equal if a,b,c are in H.P.

Watch Video Solution

32. IF a,b,c are real, prove that the roots of the equation $\frac{1}{x-a}+\frac{1}{x-b}+\frac{1}{x-c}=0$ are always real and cannot be equal unless a=b=c.

Watch Video Solution

33. Find the condition for which the roots of the quadratic equation $ax^2+bx+c=0(a\neq 0)$ are both positive

Watch Video Solution

34. Find the condition for which the roots of the quadratic equation $ax^2 + bx + c = 0 (a \neq 0)$ are both negative

Watch Video Solution

35. Find the condition for which the roots of the quadratic equation $ax^2 + bx + c = 0 (a \neq 0)$ are one positive and the other negative

Watch Video Solution

36. Find the condition for which the roots of the quadratic equation $ax^2 + bx + c = 0 (a \neq 0)$ are equal in magnitude and opposite in signs

Watch Video Solution

37. Find the condition for which the roots of the quadratic equation $ax^2 + bx + c = 0 (a \neq 0)$ are reciprocal to one another

Watch Video Solution

38. Find the condition for which the roots of the quadratic equation $ax^2 + bx + c = 0 (a \neq 0)$ are one root is zero

Watch Video Solution

39. Find the condition for which the roots of the quadratic equation $ax^2 + bx + c = 0 (a \neq 0)$ are both roots are zero.

Watch Video Solution

40. IF a,b,c are real determine the nature of the roots of the equation $ax^2 + bx + c = 0$ under following conditions:

$b^2 > 4ac, ab < 0, ac > 0$

Watch Video Solution

41. IF a,b,c are real determine the nature of the roots of the equation $ax^2 + bx + c = 0$ under following conditions:

$b^2 > 4ac, ab > 0, ac > 0$

Watch Video Solution

42. Find the condition so that the two equations $a_1x^2 + b_1x + c_1 = 0$ and $a_2x^2 + b_2x + c_2 = 0$ will have a common root.

Watch Video Solution

43. Find the value of the common root.

Watch Video Solution

44. Find the values of the other roots of the two equations.

View Text Solution

View Text Solution

45. Also find the condition of having two common roots.

View Text Solution

46. Find those values of k for which the equations $x^2 - kx - 21 = 0$ and $x^2 - 3kx - 35 = 0$ have a common root.

Watch Video Solution

47. Prove that, if the equations $x^2 + px + qr = 0$ and $x^2 + qx + pr = 0 [p \neq q, r \neq 0]$ have a common root , then p+q+r=0.

Watch Video Solution

48. Prove that , if the equations $x^2 + bx + ca = 0$ and $x^2 + cx + ab = 0$ have only non-zero common root then their other roots satisfy the equation $t^2 + at + bc = 0.$

Watch Video Solution

49. If the roots of the equation $x^2 - 2px + q = 0$ are equal and $y < 0$ and $p \neq 1$, show that the roots of the equation $(1 + y)x^2 - 2(p + y)x + q + y = 0$ are real and unequal.

Watch Video Solution

50. If $b > a$, then prove that the equation $(x - a)(x - b) - 1 = 0$ has one root in $(-\infty, a)$ and the other in $(b, +\infty)$.

Watch Video Solution

51. Given that a,c are the roots of the equation $px^2 - 3x + 2 = 0$ and b,d are the roots of the equation $qx^2 - 4x + 2 = 0$, find the values of p and q such that $\frac{1}{a}, \frac{1}{b}, \frac{1}{c}$ and $\frac{1}{d}$ are in A.P.

Watch Video Solution

52. IF one root of the equation $px^2 + qx + r = 0$ is the cube of the other, prove that , $rp(r + p)^2 = (q^2 - 2rp)^2$.

Watch Video Solution

53. Let α, β be the roots of the equation $x^2 - 4x + A = 0$ and γ, δ be the roots of the equation $x^2 - 36x + B = 0$. If α, β, γ and δ are In G.P. having positive common ratio, find the value of A and B.

Watch Video Solution

54. If x be real then prove that (x-1)(x-2)+1 is always positive.

Watch Video Solution

55. IF x is real, find the least value of $2x^2 - 3x + 5$ and the value of x for which the expression is minimum.

Watch Video Solution

56. Find for what $value/values$ of x the value of $8x - x^2 - 15$ is the greatest

Watch Video Solution

57. Find for what $value/values$ of x the value of $8x - x^2 - 15$ is

negative.

Watch Video Solution

58. For what real values of k, $3x^2 + kx + 39 - k^2$

cannot be negative for any real values of x?

Watch Video Solution

59. IF x,a,b be real , show that

$4(a - x)\left(x - a + \sqrt{a^2 + b^2}\right) \not\geq a^2 + b^2.$

Watch Video Solution

60. If x be real , show that the value of $\frac{2x^2 - 2x + 4}{x^2 - 4x + 3}$ cannot lie between (-7) and 1.

Watch Video Solution

61. IF x is real, find the greatest and the least value of $\frac{6x^2 - 22x - 21}{5x^2 - 18x + 17}$, also find the corresponding values of x.

Watch Video Solution

62. IF x is real and $0 < m < 1$, show that the expression $\frac{x^2 + 2x + m}{x^2 + 4x + 3m}$ is capable of assuming all real values.

Watch Video Solution

63. IF x is real , find the real values of a which make $x^2 - ax + 1 - 2a^2$ always positive.

Watch Video Solution

64. Find the value of m for which the expressions $6x^2 - 7xy + 2y^2 - 9x + 7y + m$ can be resolved

into two linear factors .

Watch Video Solution

65. IF $ax^2 + by^2 + cz^2 + 2ayz + 2bzx + 2cxy$ is resolvable into two linear factors, prove that either a+b+c=0 or, a=b=c.

Watch Video Solution

66. Solve by expressing the quadratic as the difference of two squares:

$9x^2 + 25 = 0$

Watch Video Solution

67. Solve by expressing the quadratic as the difference of two squares:

$x^2 - 6x + 25 = 0$

Watch Video Solution

68. Solve by expressing the quadratic as the difference of two squares:

$16x^2 + 24x + 13 = 0$

Watch Video Solution

69. Show that the roots of the equation $9x^2 - 24x + 25 = 0$ are complex numbers, solving the equation show that the complex roots are conjugate complex numbers.

Watch Video Solution

70. Solve the following quadratic equations using Sridhar Acharya's formula:

$2x^2 + 3 = 0$

Watch Video Solution

71. Solve the following quadratic equations using Sridhar Acharya's formula:

$4x^2 + 4x + 7 = 0$

Watch Video Solution

72. Solve the following quadratic equations using Sridhar Acharya's formula:

$\sqrt{3}x^2 - 4x + 2\sqrt{3} = 0$

Watch Video Solution

73. Solve by factorization:

$x^2 - ix + 12 = 0$

Watch Video Solution

74. Solve by factorization:

$4x^2 + 4xi - 1 = 0$

Watch Video Solution

75. Solve by factorization:

$x^2 + 2\sqrt{2}xi + 6 = 0$

Watch Video Solution

Watch Video Solution

76. Solve each of the following quadratic equations by comparing its roots with the roots of the general quadratic equation:

$$x^2 - \left(3i - 2\sqrt{3}\right)x - 6\sqrt{3}i = 0$$

Watch Video Solution

77. Solve each of the following quadratic quadratic equations by comparing its roots with the roots of the general quadratic equation:

$$2x^2 - 7ix + 4 = 0$$

Watch Video Solution

Watch Video Solution

78. Solve each of the following quadratic quadratic equations by comparing its roots with the roots of the general quadratic equation:

$3x^2 - (2 - i)x + 10 - 4i = 0$

Watch Video Solution

79. Solve each of the following quadratic quadratic equations by comparing its roots with the roots of the general quadratic equation:

$x^2 + (2 + i)x - 2(1 + 7i) = 0$

Watch Video Solution

Watch Video Solution

80. Solve the following equation in the complex plane C:

$6x^2 - (18 - 5i)x + 18 + i = 0$

Watch Video Solution

81. One root of the equation $(2 + 3i)x^2 - bx + (3 + i) = 0$ is 2-i. Find the other root and the value of b.

Watch Video Solution

Exercise 5 A Multiple Choice Type Question

1. One root of the equation $ax^2 + bx + c = 0(a \neq 0)$ is zero when-

A. a=0

B. b=0

C. c=0

D. x=0

Answer: C

Watch Video Solution

2. The roots of the equation $ax^2 + bx + c = 0$ are reciprocal to one another when-

A. a=c

B. a=b

C. b=c

D. a=0

Answer: A

Watch Video Solution

3. IF the signs of a and c are opposite to that of b then both roots of the equation $ax^2 + bx + c = 0$ are-

A. zero

B. positive

C. negative

D. fraction

Answer: B

Watch Video Solution

4. The roots of the equation $ax^2 + bx + c = 0(a \neq 0)$ are equal in magnitude and opposite in signs when-

A. a=0

B. b=0

C. c=0

D. a=c

Answer: B

Watch Video Solution

5. IF b=c=0 then both roots of the equation $ax^2 + bx + c = 0(a \neq 0)$ are-

A. zero

B. positive

C. negative

D. imaginary

Answer: A

Watch Video Solution

6. The maximum number of distinct roots in a quadratic equation is -

A. 1

B. 2

C. 3

D. infinite

Answer: B

Watch Video Solution

7. IF a=0,$b \neq 0$ and c is real and rational then one root of the equation $ax^2 + bx + c = 0$ is real and rational and the other root is -

A. zero

B. real and rational

C. imaginary

D. not defined

Answer: D

Watch Video Solution

8. IF a=0 and b=0 then both roots of the equation $ax^2 + bx + c = 0$ are-

A. zero

B. real and rational

C. imaginary

D. not defined

Answer: D

Watch Video Solution

9. The roots of the equation $ax^2 + bx + c = 0$ are equal when-

A. $b^2 - 4ac < 0$

B. $b^2 - 4ac > 0$

C. $b^2 - 4ac \geq 0$

D. $b^2 - 4ac = 0$

Answer: D

Watch Video Solution

10. IF a,b,c are rational numbers and $b^2 - 4ac$ is positive but not a perfect square then both roots of the equation $ax^2 + bx + c = 0$ are-

A. real

B. rational

C. irrational

D. imaginary

Answer: C

Watch Video Solution

11. The minimum value of $9x^2 - 6x + 1$ is-

A. 0

B. 1

C. 2

D. 3

Answer: A

Watch Video Solution

12. The maximum value of $4x - x^2 - 2$ is-

A. 0

B. 1

C. 2

D. 3

Answer: C

Watch Video Solution

13. If 4 is a root of the equation $x^2 + ax - 12 = 0$, then which of the following is its other root?

A. -4

B. -2

C. 3

D. -3

Answer: D

Watch Video Solution

14. State which of the following is the sum of the roots of the equation $3x^2 - 5x + 7 = 0$?

A. 5

B. $-\frac{5}{3}$

C. -5

D. $\frac{5}{3}$

Answer: D

Watch Video Solution

15. State which of the following is the product of the roots of the equation $2x^2 - 3x + 7 = 0$?

A. $\frac{3}{2}$

B. $\frac{7}{2}$

C. $-\frac{7}{2}$

D. 7

Answer: B

Watch Video Solution

16. State which of the following equation has the roots 2 and (-3)?

A. $x^2 - x - 6 = 0$

B. $x^2 + x - 6 = 0$

C. $x^2 - x + 6 = 0$

D. $x^2 - x - 6 = 0$

Answer: B

Watch Video Solution

17. If the roots of the equation $5x^2 - 7x - k = 0$ are reciprocal to one another, then which of the following is the value of k?

A. -5

B. $-\frac{1}{5}$

C. 5

D. $\frac{1}{5}$

Answer: A

Watch Video Solution

18. If the sum of the roots of the equation $2x^2 + ax + 6 = 0$ be 5, then which of the following is the value of a ?

A. -10

B. 10

C. $\frac{5}{2}$

D. $-\frac{5}{2}$

Answer: A

Watch Video Solution

19. If the product of the roots of the equation $2x^2 - 7x + b = 0$ be (-3), then which of the following is the value of b?

A. $-\frac{3}{2}$

B. $\frac{3}{2}$

C. -6

D. 6

Answer: C

Watch Video Solution

20. The roots of the equation $3x^2 - 5x + p = 0$are equal, state which of the following is the value of p?

A. $\frac{25}{6}$

B. $\frac{25}{12}$

C. $-\frac{25}{6}$

D. $-\frac{25}{12}$

Answer: B

Watch Video Solution

Exercise 5 A Very Short Answer Type Question

1. Find the condition for which the roots of the equation $ax^2 - (a+1)x + 1 = 0$ are always real.

Watch Video Solution

2. One root of the equation $3x^2 - 5x + c = 0$ is 2, find its other root.

Watch Video Solution

3. The product of the roots of the equationn $3x^2 + mx - (2m + 3) = 0$ is 5, find m.

Watch Video Solution

4. If one root of the equation $2x^2 - 5x + k = 0$ be twice the other, find the value of k.

Watch Video Solution

5. Find the condition so that the roots of the equation $lx^2 + mx + n = 0$ are

equal is magnitude and opposite in signs

Watch Video Solution

6. Find the condition so that the roots of the equation $lx^2 + mx + n = 0$ are reciprocal to one another

Watch Video Solution

7. If the ratio of the roots of the equation $x^2 - px + q = 0$ be $1:2$, find the relation between p and q.

Watch Video Solution

8. If the roots of the equation $qx^2 + px + q = 0$ be imaginary, where p,$q > 0$, then show that , $0 < p < 2q$.

Watch Video Solution

9. Find the condition for which the quadratic equation $ax^2 + bx + c = 0$ has exactly one zero root.

Watch Video Solution

10. IF the equation $4x^2 + 2bx + c = 0, b = 0,$ find the relation between the roots of the equation.

Watch Video Solution

11. IF α be a root of the equation $ax^2 + bx + c = 0,$ show that $k\alpha$ $(k \neq 0)$ is a root of the equation $ax^2 + bkx + ck^2 = 0.$

Watch Video Solution

12. Find the quadratic equation with real coefficients which has 2±3i as a root $(i = \sqrt{-1})$

Watch Video Solution

13. Form a quadratic equation with rational coefficients whose one root is $4 + \sqrt{7}$.

Watch Video Solution

14. IF α and β are the roots of the equation x(x-3)=4, find the value of $\alpha^2 + \beta^2$.

Watch Video Solution

15. IF a,b,c are in G.P prove that the roots of the equation $ax^2 + 2bx + c = 0$ are equal.

Watch Video Solution

16. Find m, given that the difference of the roots of the equation $2x^2 - 12x + m + 2 = 0$ is 2.

Watch Video Solution

17. If α and β be the roots of the equation (x-a)(x-b)=c $(c \neq 0)$,prove that a and b are the roots of the equation $(x - \alpha)(x - \beta) + c = 0$.

Watch Video Solution

18. IF $2+\sqrt{3}i$ is a root of the equation $x^2+px+q=0$ where p and q are real, find p and q.

Watch Video Solution

19. Find the value of p so that the roots of the equation $3x^2-2(7+9p)x+(8-5p)=0$ are reciprocal to one another.

Watch Video Solution

20. IF x is real , find the signs of the each of the following expressions:

$3x^2 - 2x + 1$

Watch Video Solution

21. IF x is real , find the signs of the each of the following expressions:

$3x - 2x^2 - 2$

Watch Video Solution

22. IF x is real , find the signs of the each of the following expressions:

$5x^2 - 14x + 10$

Watch Video Solution

23. IF x is real , find the signs of the each of the following expressions:

$10x - 3x^2 - 9$

Watch Video Solution

24. If x be real , find the maximum value of each of the following expressions and the corresponding values of x:

$1 - 2x - x^2$

Watch Video Solution

25. If x be real , find the maximum value of each of the following expressions and the corresponding values of x:

$3 - 20x - 25x^2$

Watch Video Solution

26. If x be real , find the maximum value of each of the following expressions and the corresponding values of x:

$3 + 2x - x^2$

Watch Video Solution

27. If x be real , find the least values of each of the following expressions and the corresponding values of x:

$4x^2 - 4x + 1$

Watch Video Solution

28. If x be real , find the least values of each of the following expressions and the corresponding values of x:

$3x^2 - 6x + 8$

Watch Video Solution

29. If x be real , find the least values of each of the following expressions and the corresponding values of x:

$3x^2 + 6x + 7$

Watch Video Solution

30. For what real values of x the expressions $x^2 - 2x + 3$ is negative?

Watch Video Solution

Exercise 5 A Short Answer Type Question

1. IF α and β are the roots of the equation x(2x-1)=1, find the value of $\alpha^2 - \beta^2$ and form the equation whose roots are $2\alpha - 1$ and $2\beta - 1$

Watch Video Solution

2. IF α and β be the roots of the equation $5x^2 + 7x + 3 = 0$, find the value of $\frac{\alpha^3 + \beta^3}{\alpha^{-1} + \beta^{-1}}$.

Watch Video Solution

3. IF p and q are the roots of the equation $ax^2 + bx + c = 0$ find the value of $\frac{1}{(ap^2 + c)^2} + \frac{1}{(aq^2 + c)^2}$.

Watch Video Solution

4. IF α, β and γ, δ are the roots of the equations $x^2 - bx + c = 0$ and $x^2 - px + q = 0$ respectively,

show that ,

$(\alpha - \gamma)(\beta - \delta) - \alpha.\gamma - \beta.\delta = (c + q) - bp.$

Watch Video Solution

5. If the roots of the equation $ax^2 - bx + a = 0$ be α and β, show that the equation with roots $\alpha^2 + 1$ and $\beta^2 + 1$ will be $a^2x^2 - b^2x + b^2 = 0$

Watch Video Solution

6. IF α and β be the roots of the equation $2x^2 + x + 1 = 0$ find the equation whose roots are

$\frac{\alpha^2}{\beta}$ and $\frac{\beta^2}{\alpha}$

Watch Video Solution

7. IF α and β are the roots of the equation $x^2 + \alpha x + \beta = 0$ then find the numerical values of α and β. [Here ,$\alpha \neq \beta, \alpha \neq 0, \beta \neq 0$]

Watch Video Solution

8. If the roots of the equation $ax^2 + bx + c = 0$ be α and β, find the equation whose roots are $\alpha + \frac{\alpha^2}{\beta}$ and $\beta + \frac{\beta^2}{\alpha}$

Watch Video Solution

9. IF α, β be the roots of the equation $x^2 + px + q = 0$, show that $\frac{1}{\alpha + \beta}$ and $\frac{1}{\alpha} + \frac{1}{\beta}$ are the roots of $pqx^2 + \left(p^2 + q\right)x + p = 0$

Watch Video Solution

10. IF the roots of the equation $ax^2 + bx + c = 0$ be α and β, find the equation whose equals are $\frac{1}{\alpha} + 1$ and $\frac{1}{\beta} + 1$.

Watch Video Solution

11. Form the quadratic equation whose roots α and β satisfy the relations $\alpha\beta = 768$and $\alpha^2 + \beta^2 = 1600.$

Watch Video Solution

12. Form the quadratic equation whose roots are the squares of the roots of $x^2 + 3x + 2 = 0.$

Watch Video Solution

13. Form the quadratic equation whose roots are reciprocals of the roots of $x^2 + 3x + 4 = 0.$

Watch Video Solution

Watch Video Solution

14. IF $3a^2 = 4a - 5$and $3b^2 = 4b - 5$ where a $\neq$ b, find the value of $a^2 + b^2$.

Watch Video Solution

15. IF $3p^2 = 5p + 2$and $3q^2 = 5q + 2$ where p $\neq$ q , obtain the equation whose roots are (3p-2q)and (3q-2p).

Watch Video Solution

16. IF α and β be the roots of the equation $x^2 - 4x + 10 = 0$, find the equation whose roots are $\frac{\alpha}{1+\beta}$ and $\frac{\beta}{1+\alpha}$.

Watch Video Solution

17. If p and q are the roots of the equation $3x^2 + 6x + 2 = 0$, show that the equation whose roots are $\left(-\frac{p^2}{q}\right)$ and $\left(-\frac{q^2}{p}\right)$ is $3x^2 - 18x + 2 = 0$.

Watch Video Solution

18. If the sum of the roots of a quadratic equation is 2 and the sum of their cubes is 27, find the equation.

Watch Video Solution

19. If the sum of the roots of the equation $x^2 - px + q = 0$ be three times their difference show that, $2p^2 = 9q$.

Watch Video Solution

20. If the roots of the equation $ax^2 + bx + c = 0$ are in the ratio $3:4$ show that $12b^2 = 49ac$.

Watch Video Solution

21. If one root of the equation $x^2 + (5a + 2)x + 5a + 2 = 0$ is five times the other root , then find the numerical value of a .

Watch Video Solution

22. Find the quadratic equation whose roots are the cubes of the roots of $x^2 - 4x + 3 = 0$.

Watch Video Solution

23. The ratio of the roots of the equation $ax^2 + bx + c = 0$is $r : 1$ Prove that, $b^2 r = ac(r + 1)^2$ and hence find the condition so that the two roots may be equal to each other.

Watch Video Solution

24. If the roots of the equation $px^2 + rx + r = 0$ are in the ratio $a : b$, prove that ,$p(a + b)^2 = rab$.

Watch Video Solution

25. In a quadratic equation of the form $x^2 + mx + n = 0$ the constant term is misprinted 56 to 54 and the roots are, therefore, obtained as 7 and 8. Find the roots of the equation correctly printed.

Watch Video Solution

26. For what value of m the roots of the equation $(m+1)x^2 + 2(m+3)x + m + 8 = 0$ are equal?

Watch Video Solution

27. If one root of the equation $x^2 + bx + 8 = 0$ be 4 and the roots of the equation $x^2 + bx + c = 0$ are equal , find the value of c.

Watch Video Solution

28. For what value of m the roots of the equation $\frac{3}{x+3+m} + \frac{5}{x+5+m} = 1$ are equal in a magnitude and opposite in signs?

Watch Video Solution

29. Find the condition so that the roots of the equation $\frac{a}{x-a}+\frac{b}{x-b}=5$ may be equal in magnitude but oppsite in signs.

Watch Video Solution

30. Show that the roots of each of the following equations are rational(a,b,c are rational):

$(b+c)x^2-(a+b+c)x+a=0$

Watch Video Solution

31. Show that the roots of each of the following equations are rational(a,b,c are rational):

$(a-b+c)x^2+2cx+(b+c-a)=0$

Watch Video Solution

32. Show that the roots of the equation $\left(a^2-bc\right)x^2+2\left(b^2-ca\right)x+c^2-ab=0$ are equal if either b=0 or , $a^3+b^3+c^3-3abc=0$

Watch Video Solution

33. If one root of the equation $qx^2 + px + q = 0$ (p,q are real) be imaginary, show that the roots of the equation $x^2 - 4qx + p^2 = 0$ are real and unequal.

Watch Video Solution

34. If the roots of the equation $qx^2 + 2px + 2q = 0$ are real and unequal, prove that the roots of the equation $(p+q)x^2 + 2qx + (p-q) = 0$ are imaginary.

Watch Video Solution

35. If the roots of the equation $x^2 - 2(a+b)x + a(a+2b+c) = 0$ be equal , prove that a,b, c are in G.P,

Watch Video Solution

36. If the equation $x^2 + px + q = 0$and $x^2 + p'x + q' = 0$ have a common root , prove that , it is either $\frac{pq' - p'q}{q' - q}$or,$\frac{q' - q}{p' - p}$.

Watch Video Solution

37. Prove that if the equations $x^2 + px + r = 0$ and $x^2 + rx + p = 0$ have a common root then either p=r or , 1+p+r=0.

Watch Video Solution

38. IF x is real and the expressions $3x^2 - 17x + 20$ is always positive, show that, x cannot lie between $\frac{5}{3}$ and 4.

Watch Video Solution

39. Find the limits of real value of x so that the expressions $5x^2 + 6x - 8$ is non-negative.

Watch Video Solution

40. For any real positive value of x, show that $3 - x \not> \frac{7}{x+2}$.

Watch Video Solution

41. If x is real can the value of $3 + 2x - x^2$ be greater than 4,

Watch Video Solution

Watch Video Solution

42. If x is real can that of $x^2 + 3x + 1$ less than $\left(-\frac{5}{4}\right)$?

Watch Video Solution

43. Show that if x is real and $x^2 + 5 < 6x$, then x must lie between 1 and 5.

Watch Video Solution

44. If x is real, find the real values of p which make $4x^2 + px + 1$ always positive.

Watch Video Solution

45. IF x is real, find the real values of m which make the expressions $mx - x^2 - 1$ always negative.

Watch Video Solution

46. If $\frac{(x-5)(x^2-2x+1)}{(x-7)(x^2+2x+3)}$ is positive for all real values of x, show that x has no value between 5 and

7.

Watch Video Solution

47. If the equation $y^2 + x^2 - 10x + 21 = 0$ is satisfied by real values of x and y, prove that x lies between 3 and 7 and y lies between (-2) and 2.

Watch Video Solution

48. If x is real , show that (x-2)(x-3)(x-4)(x-5)+2 is always positive.

Watch Video Solution

Exercise 5 A Long Answer Type Question

1. IF $\alpha \pm \sqrt{\beta}$ be the roots of the equation $x^2 + px + q = 0$, prove that $\frac{1}{\alpha} \pm \frac{1}{\sqrt{\beta}}$ will be the roots of the equation $\left(p^2 - 4q\right)\left(p^2x^2 + 4px\right) - 16q = 0.$

Watch Video Solution

2. IF $\alpha, \beta$and γ, δ be the roots of the equation $x^2 - bx + c = 0$ and $x^2 - cx + b = 0$ respectively,

form the equation whose roots are $\left(\frac{1}{\alpha\gamma}+\frac{1}{\beta\delta}\right)$ and $\left(\frac{1}{\alpha\delta}+\frac{1}{\beta\gamma}\right)$.

Watch Video Solution

3. IF α, β be the roots of the equation $x^2+x+1=0$, form the equation whose roots are $\frac{\alpha}{\beta}$ and $\frac{\beta}{\alpha}$. Explain why you get the same equation as the given one.

Watch Video Solution

4. IF α, β be the roots of the quadratic equation $x^2 - px + q = 0$, find the equation whose roots are $\frac{q}{p-\alpha}$ and $\frac{q}{p-\beta}$ .Accound for the identity of the equation obtained with the given equation.

Watch Video Solution

5. IF $\frac{p^2}{q}$ and $\frac{q^2}{p}$ are the roots of the equation $2x^2 + 7x - 4 = 0$, find the equation whose roots are p and q (p+q real).

Watch Video Solution

6. IF α, β be the roots of the equation $x^2 + 2px + 2q^2 = 0$ where p,q are rational $p^2 + q^2$ is not a perfect square, form the quadratic equation whose one root is $\alpha + \beta + \sqrt{\alpha^2 + \beta^2}$.

Watch Video Solution

7. IF α, β be the roots of the equation $cx^2 + 2bx + 2c = 0$ where b,c are real and $c^2 > b^2$, find the quadratic equation whose one root is $\alpha + \beta + \sqrt{\alpha^2 + \beta^2}$.

Watch Video Solution

8. Express the roots of the equation $q^2x^2 - (p^2 - 2q)x + 1 = 0$ in terms of those of $x^2 + px + q = 0$.

Watch Video Solution

9. If the roots of the quadratics $x^2 + 2px + q = 0$ and $x^2 + 2qx + p = 0 (p \neq q)$ differ by a constant, show that p+q+1=0.

Watch Video Solution

10. If one root of the equation $ax^2 + bx + c = 0$ is the square of the other, prove that , $b^3 + ac^2 + a^2c = 3abc.$

Watch Video Solution

11. If one root of the equation $ax^2 + bx + c = 0$ is the cube of the other, prove that , $\left(b^2 - 2ca\right)^2 = ca(c + a)^2$

Watch Video Solution

12. If the roots of the equation $ax^2 + bx + c = 0$ are two consecutive integers then prove that, $b^2 - a^2 = 4ac.$

Watch Video Solution

13. IF α and β be the roots of $ax^2 + 2bx + c = 0$ and $\alpha + \delta, \beta + \delta$ be those of $Ax^2 + 2Bx + C = 0$, prove that , $\frac{b^2 - ac}{a^2} = \frac{B^2 - AC}{A^2}$

Watch Video Solution

14. If the ratio of the roots of the equation $x^2 - 2px + q^2 = 0$ be equal to the ratio of the roots of the equation $x^2 - 2rx + s^2 = 0$, Prove that, $p^2s^2 = q^2r^2$.

Watch Video Solution

15. IF α and β be the roots of the equation $x^2 + px + q = 0$ show that $\frac{\alpha}{\beta}$ is a root of the equation $qx^2 - \left(p^2 - 2q\right)x + q = 0$.

Watch Video Solution

16. IF $p^3 - q(3p-1) + q^2 = 0$, find the relation between the roots of the equation $x^2 + px + q = 0$.

Watch Video Solution

17. Let a,b,c be real numbers with $a \neq 0$ and let α, β be the roots of the equation $ax^2 + bx + c = 0$. Express the roots of $a^3x^2 + abcx + c^3 = 0$ in terms of α, β.

Watch Video Solution

18. IF α be a root of the quadratic equation $4x^2 + 2x - 1 = 0$, Let prove that $4\alpha^3 - 3\alpha$ is the other root.

Watch Video Solution

19. Letα, β be the roots of the equation $x^2 - 3x + a = 0$ and γ, δ the roots of the equation $x^2 - 12x + b = 0$. If α, β, γ and δ are in G.P. having positive common ratio, then find the values of a and b.

Watch Video Solution

20. IF a,b,c are real, show that the roots of each of the following equations are real:

$(x-a)(x-b)=b^2$

Watch Video Solution

21. IF a,b,c are real, show that the roots of each of the following equations are real:

$(b-c)x^2+2(c-a)x+a-b=0$

Watch Video Solution

22. IF a,b, are real, show that the roots of each of the following equations are real:

$$\frac{1}{x-a}+\frac{1}{x-b}=\frac{1}{a^2}$$

Watch Video Solution

23. IF a,b,c are real, show that the roots of each of the following equations are real:

$$\frac{1}{x-a}+\frac{1}{x-b}+\frac{1}{x-c}=0$$

Watch Video Solution

24. If the roots of the equation $p(q-r)x^2+q(r-p)x+r(p-q)=0$ be equal, show that $\frac{1}{p}+\frac{1}{r}=\frac{2}{q}$.

Watch Video Solution

25. Find the condition that the roots of the quadratic equation $x^2+px+q=0$ should be both postitive

Watch Video Solution

26. Find the condition that the roots of the quadratic equation $x^2+px+q=0$ should be both negative

Watch Video Solution

27. Find the condition that the roots of the quadratic equation $x^2 + px + q = 0$ should be one is positive and the other negative

Watch Video Solution

28. Find the condition that the roots of the quadratic equation $x^2 + px + q = 0$ should be equal in magnitude and opposite in signs

Watch Video Solution

29. Find the condition that the roots of the quadratic equation $x^2 + px + q = 0$ should be reciprocal to one another.

Watch Video Solution

30. If the roots of the equation $x^2 + x + a = 0$ be real and unequal, then prove that the roots of the equation $2x^2 - 4(1 + a)x + 2a^2 + 3 = 0$ are imaginary (a is real).

Watch Video Solution

31. Prove that, if the roots of the equation $(a^2+b^2)x^2+2(bc+ad)x+(c^2+d^2)=0$ be real, then they are equal.

Watch Video Solution

32. Show that the roots of the equation $(a^4+b^4)x^2+4abcdx+(c^4+d^4)=0$ cannot be different, if real.

Watch Video Solution

33. For what values of m the equations $3x^2 + 4mx + 2 = 0$ and $2x^2 + 3x - 2 = 0$ will have a common root?

Watch Video Solution

34. Show that the equations $px^2 + qx + r = 0$ and $qx^2 + px + r = 0$ will have a common root if p+q+r=0 or, p=q=r.

Watch Video Solution

35. If the two equations $x^2 + ax + b = 0$ and $x^2 + bx + a = 0\,(a \neq b)$ have a common root, show that the other roots are the roots of the equation $x^2 + x + ab = 0$.

Watch Video Solution

36. IF c is real, show that the roots of the quadratic equation $cx^2 + (c-1)x + 1 - 2c = 0$ are real. If the sum of the roots of the equation be equal to three times their difference, then find c.

Watch Video Solution

37. IF α is a root of the equation $ax^2 + bx + c = 0$ then show that $m\alpha^2(m \neq 0)$ is a root of the equation $a^2x^2 + (2ac - b^2)mx + m^2c^2 = 0.$

Watch Video Solution

38. If the quadratic equations $x^2 + ax + b = 0$ and $x^2 + bx + a = 0(a \neq b)$ have a common root , find the numerical value of (a+b).

Watch Video Solution

39. If the roots of the equation $x^2 - px + q = 0$ be α, β and the roots of the equation $x^2 - ax + b = 0$ be $\alpha, \frac{1}{\beta}$ then prove that, $bq(a-p)^2 = (q-b)^2$.

Watch Video Solution

40. If α and β be the roots of the equation $5x^2 + bx + c = 0$ Show that $5x^2 + bx + c = 5(x-\alpha)(x-\beta)$

Show also that for all real values of x the expression $5x^2 + bx + c$ cannot be negative if α and β are real and equal

Watch Video Solution

41. If α and β be the roots of the equation $5x^2 + bx + c = 0$ Show that $5x^2 + bx + c = 5(x - \alpha)(x - \beta)$

Show also that for all real values of x the expression $5x^2 + bx + c$ cannot be negative if α and β are conjugate complex.

Watch Video Solution

42. IF x is real , find the greatest and the least value of :

$$\frac{x^2 + 14x + 9}{x^2 + 2x + 3}$$

Watch Video Solution

43. IF x is real , find the greatest and the least value of :

$$\frac{x^2 - 2x + 2}{x^2 + 3x + 9}$$

Watch Video Solution

44. Show that for all real values of x the value of $\frac{x^2 - 3x + 4}{x^2 + 3x + 4}$ always lie between $\frac{1}{7}$ and 7.

Watch Video Solution

45. If x is real, show that the value of $\frac{x}{x^2 - 5x + 9}$ always lie between 1 and $\left(-\frac{1}{11}\right)$

Watch Video Solution

46. If x is real show that the expressions $\frac{x^2 + 34x - 71}{x^2 + 2x - 7}$ has no value between 5 and 9.

Watch Video Solution

47. If x is real show that the expressions $\frac{(x-1)(x+3)}{(x-2)(x+4)}$ has no value between $\frac{4}{9}$ and 1.

Watch Video Solution

48. If x is real then the expressions $\frac{x^2+2x-11}{x-3}$ assumes those values which do not lie between a and b , find a and b.

Watch Video Solution

49. If x is real , show that the expressions $\frac{x^2-ab}{2x-a-b}$ has no real value between a and b.

Watch Video Solution

50. If x is real show that the expressions $\frac{3x-5}{x^2-1}$ has no value between $\frac{1}{2}$ and $\frac{9}{2}$.

Watch Video Solution

51. IF x is real , find the maximum and minimum values of $\frac{x^2-x+1}{x^2+x+1}$ also find the corresponding values of x.

Watch Video Solution

52. If x be real , find the greatest value of $\frac{x+2}{2x^2+3x+6}$.

Watch Video Solution

53. If x is real , show that each of the following expressions is capable of assuming all real values:

$$\frac{2x^2+4x+1}{x^2+4x+2}$$

Watch Video Solution

54. If x is real , show that each of the following expressions is capable of assuming all real values:

$$\frac{2x^2+5x+2}{x^2+6x+7}$$

Watch Video Solution

55. If x is real , show that each of the following expressions is capable of assuming all real values:

$$\frac{p^2}{1-x} - \frac{q^2}{1+x}$$

Watch Video Solution

56. IF $3x^2 + 2(p+q+r)x + pq + qr + rp$ be a perfect square , prove that p=q=r.

Watch Video Solution

Exercise 5 B Multiple Choice Type Question

1. The least value of m which makes the roots of the equation $x^2 + 5x + m = 0$ imginary is-

A. 4

B. 5

C. 6

D. 7

Answer: C

Watch Video Solution

2. The equation of the smallest degree with real coefficients having 1+i as one of the roots is-

A. $x^2 + x + 1 = 0$

B. $x^2 - 2x + 2 = 0$

C. $x^2 + 2x + 2 = 0$

D. $x^2 + 2x - 2 = 0$

Answer: B

Watch Video Solution

3. If the discriminant of a quadratic equation is less than zero then the roots of this equation are-

A. both real

B. both imaginary

C. one real and another imaginary

D. none of these

Answer: B

4. If 2+3i be a root of a quadratic equation , then the equation will be-

A. $x^2 + 4x + 13 = 0$

B. $x^2 - 4x + 13 = 0$

C. $x^2 + 4x - 13 = 0$

D. $x^2 - 4x - 13 = 0$

Answer: B

Watch Video Solution

5. IF -iy-x be a root of the equation $ap^2 + bp + c = 0$ then its another root will be-

A. iy+x

B. $-it + x$

C. $iy - x$

D. none of these

Answer: C

Watch Video Solution

Exercise 5 B Very Short Answer Type Question

1. Express each of the following quadratic equations as the difference of two squares and solve

$x^2 + 1 = 0$

Watch Video Solution

2. Express each of the following quadratic equations as the difference of two squares and solve

$9x^2 + 16 = 0$

Watch Video Solution

3. Express each of the following quadratic equations as the difference of two squares and solve

$x^2 + x + 1 = 0$

Watch Video Solution

4. Express each of the following quadratic equations as the difference of two squares and solve

$2x^2 + 2x + 5 = 0$

Watch Video Solution

5. Express each of the following quadratic equations as the difference of two squares and solve

$3x^2 - 2x + 2 = 0$

Watch Video Solution

6. Express each of the following quadratic equations as the difference of two squares and solve

$8x^2 + 4x + 13 = 0$

Watch Video Solution

7. Express each of the following quadratic equations as the difference of two squares and solve

$9x^2 + 12x + 10 = 0$

Watch Video Solution

8. Express each of the following quadratic equations as the difference of two squares and solve

$5x^2 - 6x + 5 = 0$

Watch Video Solution

9. Express each of the following quadratic equation as two squares and solve

$a^2x^2 - 2ax + 10 = 0 (a \neq 0)$

Watch Video Solution

10. Express each of the following quadratic equations as two squares and solve

$4x^2 - 12xp + 25p^2 = 0$

Watch Video Solution

11. State the fundamental theorem of algebra.

Watch Video Solution

Exercise 5 B Short Answer Type Question

1. Show that the roots of each of the following quadratic equations are complex numbers. Find the solutions in each case.

$x^2 + 2x + 2 = 0$

Watch Video Solution

2. Show that the roots of each of the following quadratic equations are complex numbers. Find the solutions in each case.

$x^2 + 4x + 8 = 0$

Watch Video Solution

3. Show that the roots of each of the following quadratic equations are complex numbers. Find the solutions in each case.

$2x^2 - 3x + 4 = 0$

Watch Video Solution

4. Show that the roots of each of the following quadratic equations are complex numbers. Find the solutions in each case.

$3x^2 - 7x + 5 = 0$

Watch Video Solution

5. Show that the roots of each of the following quadratic equations are complex numbers. Find the solutions in each case.

$$\frac{2x-1}{x-2}=\frac{x}{x-1}$$

Watch Video Solution

6. Show that the roots of each of the following quadratic equations are complex numbers. Find the solutions in each case.

$$\sqrt{3}x^2+x+\sqrt{3}=0$$

Watch Video Solution

7. Show that the roots of each of the following equations are conjugate complex numbers:

$3x^2 - 4x + 3 = 0$

Watch Video Solution

8. Show that the roots of each of the following equations are conjugate complex numbers:

$\frac{1}{x-3} + \frac{x}{5} = 0$

Watch Video Solution

9. Show that the roots of each of the following equations are conjugate complex numbers:

$$\frac{1}{x-1}+\frac{1}{x-2}=\frac{2}{2x-3}$$

Watch Video Solution

10. Solve by factorization:

$$3x^2+8ix+3=0$$

Watch Video Solution

11. Solve by factorization:

$$ix^2+x+6i=0$$

Watch Video Solution

12. Solve by factorization:

$x^2 + \left(i - 3\sqrt{2}\right)x - 3\sqrt{2}i = 0$

Watch Video Solution

13. Solve by factorization:

$2x^2 - ix + 6 = 0$

Watch Video Solution

14. Solve by factorization:

$x^2 + 3\sqrt{2}xi + 8 = 0$

Watch Video Solution

15. Solve by factorization:

$12ix^2 - x + 6i = 0$

Watch Video Solution

16. Solving the equation $x^2 + (i - 7)x - (i - 18) = 0$, prove that the roots of the equation are not complex conjugate numbers.

Watch Video Solution

17. Solve the following quadratic equations using Sridhar Acharya's formula:

$2x^2 + (4i - 5)x + 8 + i = 0$

Watch Video Solution

18. Solve the following quadratic equations using Sridhar Acharya's formula:

$y^2 - (1 - 2i)y + 1 + 5i = 0$

Watch Video Solution

19. Solve the following quadratic equations using Sridhar Acharya's formula:

$2y^2 + 3y + 8 - 6i = 0$

Watch Video Solution

20. Solve the following quadratic equations using Sridhar Acharya's formula:

$6x^2 - (5 + 3i)x + 11i - 3 = 0$

Watch Video Solution

21. Solve the following quadratic equations using Sridhar Acharya's formula:

$ix^2 - 6x - 9i = 0$

Watch Video Solution

22. Solve the following quadratic equations using Sridhar Acharya's formula:

$3x^2 + (11i - 2)x + 4 - 8i = 0$

Watch Video Solution

23. Solve:

$$(2+i)x^2+(i+5)x-2(i-1)=0$$

Watch Video Solution

24. Solve:

$$2x^2-(3+7i)x-3+9i=0$$

Watch Video Solution

Sample Question For Competitive Exams Multiple Correct Answer Type

1. If $x^2 - kx + k + 2 = 0$ has equal roots, then the value of k will be -

A. $2 + \sqrt{20}$

B. $2 - \sqrt{20}$

C. $2 + \sqrt{12}$

D. $2 - \sqrt{12}$

Answer: C::D

Watch Video Solution

2. Let the quadratic equation $ax^2 + bx + c = 0$ has two purely complex roots. IF ap=b and aq=c, then-

A. p is purely imaginary and q is purely real

B. $\left|\frac{1-p}{1+p}\right| = 1$

C. $\left|q + \sqrt{q^2+1}\right| = \left|q - \sqrt{q^2+1}\right|$

D. $|q + \bar{p}| = |\bar{q} + p|$

Answer: B::C

View Text Solution

3. The roots of $2(1+i)x^2 - 4(2-i)x - 5 - 3i = 0$

are-

A. $\frac{3-5i}{2}$

B. $\frac{3+5i}{2}$

C. $\frac{-1+i}{2}$

D. $\frac{-1-i}{2}$

Answer: A::D

Watch Video Solution

4. The values of x satisfying the equation $|x-2|^2 + |x-2| - 6 = 0$, are-

A. 4

B. 2

C. 3

D. 0

Answer: A::D

Watch Video Solution

5. If the equaiton $ax^2 + bx + c = 0$ where a,b,c $\in$ R have non-real roots then-

A. $c(a - b + c) > 0$

B. $c(a + b + c) > 0$

C. $c(4a - 2b + c) > 0$

D. $b^2 - 4ac = 0$

Answer: A::B::C

Watch Video Solution

Sample Question For Competitive Exams Integer Answer Type

1. If the equation

$\left(K^2-5K+6\right)x^2+\left(K^2-3k+2\right)x+\left(K^2-4\right)=0$

has more than two roots, then the value of K is-

Watch Video Solution

2. If the equation

$x^2+x+1+2K\left(x^2-x-1\right)=0$ be expressed as

a perfect square, then the value of K will be-

Watch Video Solution

3. If the roots of $x^2 - bx + c = 0$ be two consecutive integers, then the value of $b^2 - 4c$ will be-

Watch Video Solution

4. IF x be real, then the maximum value of $5 + 4x - 4x^2$ will be-

Watch Video Solution

5. IF $-2 + i\sqrt{3}$ be a root of $x^2 + px + q = 0$, then the value of p+q will be-

Watch Video Solution

Watch Video Solution

Sample Question For Competitive Exams Comprehension Type

1. Let $f(x) = x^2 + b_1 x + c_1$ and $g(x) = x^2 + b_2 x + c_2$. When f(x)=0 then the real roots of f(x) are α, β and when g(x)=0 then the real roots of g(x) are $\alpha + h, \beta + h$. Minimum value of f(x) is $-\frac{1}{4}$ and when x=$\frac{7}{2}$ then value of g(x) will be minimum.

Minimum value of g(x) is-

A. $-\frac{1}{4}$

B. -1

C. $-\frac{1}{3}$

D. $-\frac{1}{2}$

Answer: A

Watch Video Solution

2. Let $f(x) = x^2 + b_1 x + c_1$ and $g(x) = x^2 + b_2 x + c_2$. When f(x)=0 then the real roots of f(x) are α, β and when g(x)=0 then the real roots of g(x) are $\alpha + h, \beta + h$. Minimum value of f(x) is $\frac{1}{4}$ and when x=$\frac{7}{2}$ then value of g(x) will be

minimum.

Value of b_2 is-

A. -5

B. 9

C. -8

D. -7

Answer: D

Watch Video Solution

3. Let $f(x) = x^2 + b_1x + c_1$ and $g(x) = x^2 + b_2x + c_2$. When f(x)=0 then the real

roots of f(x) are α, β and when g(x)=0 then the real roots of g(x) are $\alpha + h, \beta + h$. Minimum value of f(x) is $-\frac{1}{4}$ and when x=$\frac{7}{2}$ then value of g(x) will be minimum.

Roots of g(x)=0 are-

A. 3,-4

B. $-3, 4$

C. 3,4

D. $-3, -4$

Answer: C

Watch Video Solution

4. Consider an unknown polynomial which when divided by (x-3) and (x-4) leaves 2 and 1 as remainders, respectively, Let R(x) be the remainder when the polynomial is divided by (x-3) (x-4).

If the equation R(x)=$x^2 + ax + 1$ has two distinct real roots then values of 'a' are-

A. (-2,2)

B. $(-\infty, -2) \cup (2, \infty)$

C. $(-2, \infty)$

D. all real numbers

Answer: D

Watch Video Solution

5. Consider an unknown polynomial which when divided by (x-3) and (x-4) leaves 2 and 1 as remainders, respectively, Let R(x) be the remainder when the polynomial is divided by (x-3) (x-4).

If R(x)=$px^2 + (q-1)x + 6$ has no distinct real roots and $p > 0$, then least value of 3p+q is-

A. -2

B. $\frac{2}{3}$

C. $-\frac{1}{3}$

D. $-\frac{4}{3}$

Answer: C

View Text Solution

6. Consider an unknown polynomial which when divided by (x-3) and (x-4) leaves 2 and 1 as remainders, respectively, Let R(x) be the remainder when the polynomial is divided by (x-3) (x-4).

Range of f(x) = $= \frac{[R(x)]}{x^2 - 3x + 2}$ is-

A. [-2,2]

B. $\left[-\infty - 2\sqrt{3} \right] \cup \left[-2 + \sqrt{3}, \infty \right]$

C. $\left[-\infty - 7 - 4\sqrt{3} \right] \cup \left[-7 + 4\sqrt{3}, \infty \right]$

D. none of these

Answer: C

Watch Video Solution

Sample Question For Competitive Exams Assertion Reason Type

1. Let $ax^2 + bx + c = 0, a \neq 0$ (a,b,c $\in$ R) has no real roots and a+b+2c=2

Statement-I: $ax^2 + bx + c > 0 \forall x \in R$

Statement II: a+b is positive.

A. Statement-I is true, Statement-II is true and Statement -II is a correct explanation for Statement -I.

B. Statement-I is true, Statement -II is true but Statement-Ii is not a correct explanation of Statement-I.

C. Statement-I is true, Statement-II is false

D. Statement-I is false, Statement-II Is true.

Answer: C

Watch Video Solution

2. Statement I: If $a > 0$ and $b^2 - ac < 0$, then domain of the function f(x)= $\sqrt{ax^2 + 2bx + c}$ is R.

Statement II: If $b^2 - ac < 0$ then $ax^2 + 2bx + c = 0$ has imaginary roots.

A. Statement-I is true, Statement-II is true and Statement -II is a correct explanation for Statement -I.

B. Statement-I is true, Statement -II is true but Statement-Ii is not a correct explanation of Statement-I.

C. Statement-I is true, Statement-II is false

D. Statement-I is false, Statement-II Is true.

Answer: B

Watch Video Solution