



MATHS

BOOKS - PATHFINDER MATHS (BENGALI ENGLISH)

QUADRATIC EQUATION AND EXPRESSION

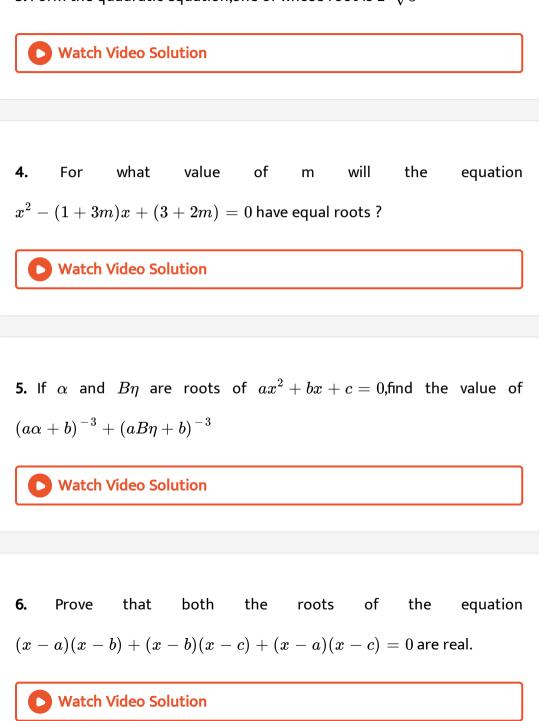
Question Bank

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

Watch Video Solution

2. Solve
$$x^2+x+rac{1}{\sqrt{2}}=0$$

3. Form the quadratic equation,one of whose root is 2+ $\sqrt{3}$



7. Prove that the roots of $ax^2+2bx+c=0$

will be real and distinct if and only if the roots of (a+c) $\left(ax^2+2bx+c
ight)$ =2 $\left(ac-b^2
ight)\left(x^2+1
ight)$ are imaginary

Watch Video Solution

8. Find all roots of equation $x^4 + 2x^3 - 16x^2 - 22x + 7 = 0$ if one root

is $2+\sqrt{3}$

Watch Video Solution

9. Solve for x:
$$4^x + 9^x = 2(6^x)$$

Watch Video Solution

10. Solve for x: $\log_a x + \log_x a = 2$



11. Solve
$$x^{-2} + 2x^{-1} - 3 = 0$$

Watch Video Solution

12. Let $f(x) = Ax^2 + Bx + c$, where A, B, C are real numbers. Prove that if f(x) is an integer whenever x is an integer, then the numbers 2A, A + B, and C are all integer. Conversely, prove that if the number 2A, A + B, and C are all integers, then f(x) is an integer whenever x is integer.

Watch Video Solution

13. If f(x) is a quadratic expression such that $f(x) > 0 \forall x \in R$, if g(x) is defined as g(x)=f(x)+f'(x)+f''(x), then prove g(x) $> 0 \forall x \in R$.



14. If (c>0) and $2ax^2+3bx+5c$ =0 does not have any real roots, then prove that 2a-3b+5c>0.

Watch Video Solution

15. If $2x^3 + ax^2 + bx + 4 = 0$ (a and b are positive real numbers) has 3 real roots, then prove that $a+b \ge 6\left(2^{rac{1}{3}}+4^{rac{1}{3}}
ight).$

Watch Video Solution

16. If $P(x) = ax^2 + bx + c$, and $Q(x) = -ax^2 + dx + c, ac
eq$ 0, then

prove that P(x).Q(x) = 0 has at least two real roots.

Watch Video Solution

17. If lpha,eta,gaama are the roots of the cubic $x^3+qx+r=0$, find the

equation whose roots are

$$(lpha-eta)^2, (eta-\gamma)^2, (\gamma-lpha)^2.$$

Watch Video Solution

18. f(x)= $x^2 - (m-3)x + m$ =0 is a quadratic equation, find values of m

for which

both roots are positive

Watch Video Solution

19. f(x)= $x^2 - (m-3)x + m$ =0 is a quadratic equation, find values of m

for which

both roots are negative

Watch Video Solution

20. $f(x) = x^2 - (m-3)x + m$ =0 is a quadratic equation, find values of

m for which



21.
$$f(x) = x^2 - (m-3)x + m$$
=0 is a quadratic equation, find values of

m for which

one root is smaller than 2, other root is greater than 2

Watch Video Solution

22.
$$f(x) = x^2 - (m-3)x + m$$
=0 is a quadratic equation, find values of

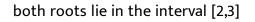
m for which

exactly one root lies in the interval [2,3]

Watch Video Solution

23. $f(x) = x^2 - (m-3)x + m = 0$ is a quadratic equation, find values

of m for which





24. If, α be the root of equation $ax^2 + bx + c = 0$ and β be root of $-ax^2 + bx + c = 0$ then prove that there will be a root of the equation $ax^2 + 2bx + 2c = 0$ lying between α and β , where a and c are non zero.

Watch Video Solution

25. Find the values of 'm' for which the equation $x^4 - (m-3)x^2 + m$ =0

has

Four real roots



26. Find the values of 'm' for which the equation $x^4 - (m-3)x^2 + m$ =0

has

Four real roots Watch Video Solution 27. Find the values of 'm' for which the equation $x^4-(m-3)x^2+m$ =0 has No real roots Watch Video Solution 28. For what value of 'm' $\in R$, both roots of the equation

$$x^2-6mx+9m^2-2m+2$$
=0 exceed 3?

Watch Video Solution

29. Find the value(s) of 'a' for which the inequality $an^2 x + (a+1) an x - (a-3) < 0$, is true for at least one $x \in \Big(0, rac{\pi}{2}\Big).$

30. Find the common root of $x^2 - 3x + 2$ =0 and $x^2 + x - 2$ =0



31. Find the condition if equations $ax^2 + bx + c$ =0 and $x^2 + 2x + 3$ =0 have a common root. $(a, b, c \in R)$

Watch Video Solution

32. If $x^2 + ax + bc$ =0 and $x^2 + bx + ac$ =0 have a common root, show

their other root satisfies the equation $x^2 + cx + ab$ =0

Watch Video Solution

33. If α, β are the roots $x^2 + px + q$ =0 and γ, δ are the roots of $x^2 + rx + s$ =0, evaluate $(\alpha - \gamma)(\alpha - \delta)(\beta - \gamma)(\beta - \delta)$ in terms of p,q,r

and s. Deduce the condition that the equation may have a common root.



34. Find condition if
$$ax^3 + bx^2 + cx + d$$
=0, has exactly one real root, $(a, b, c, d \in R)$

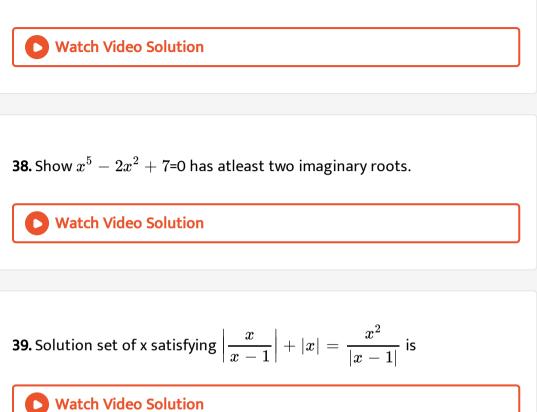
Watch Video Solution

35. Let
$$P(x)$$

$$= \frac{(x-a)(x-b)}{(c-a)(c-b)} \cdot c^2 + \frac{(x-b)(x-c)}{(a-b)(a-c)} \cdot a^2 + \frac{(x-c)(x-a)}{(b-c)(b-a)} \cdot b^2$$
Prove that P(x) has the properly that P(y) =y² for all y \in R.
Watch Video Solution

36. Solve the equation
$$\left(x^2-6x
ight)^2=81+2{\left(x-3
ight)}^2$$

37. Show f(x)= $x^3 + px + q$ =0 has a repeated root if $4p^3 + 27q^2$ =0



40. Solve the equation

$$|x - |4 - x|| - 2x = 4$$

41. If α , β roots of $ax^2 + bx + c$ =0. Find the quadratic equation whose

roots are :

 $2\alpha, 2\beta$

42. If α , β roots of $ax^2 + bx + c$ =0. Find the quadratic equation whose

roots are :

lpha+3,eta+3

Watch Video Solution

43. If α, β roots of $ax^2 + bx + c$ =0. Find the quadratic equation whose

roots are :

 $\frac{\alpha}{4}, \frac{\beta}{4}$

44. If α , β roots of $ax^2 + bx + c$ =0. Find the guadratic equation whose roots are : $\frac{1}{\alpha}, \frac{1}{\beta}$ Watch Video Solution 45. Find two negative integers whose difference is 3 and sum of their squares is 89. Watch Video Solution **46.** If α and β are roots of $ax^2 + bx + c$ =0 then prove that $\left(\frac{\alpha}{\beta} + \frac{\beta}{\alpha}\right) = \left(\frac{b^2 - 2ac}{ac}\right)$ Watch Video Solution **47.** If $(p^2+2)x^2+2p^2x+(P^2-4)$ =0 has root of opposite sign,then

find the range of 'p'.



48. Find the condition such that the quadratic equations $ax^2 + bx + c$ =0

and $rac{x^2}{a} + rac{x}{b} + rac{1}{c}$ =0 have exactly one root in common.

Watch Video Solution

49. If (x-1) is the factors fo polynomial $x^3 - px + q$, then prove that p-q=1

Watch Video Solution

50. Two roots of the equation, $x^3 + qx^2 + 11x - p$ =0 are 2 and 3, find (p-

q)

51. Find the values of K for which the inequality (x-3k)(x-k-3) < 0 is satisfied for all x such that $1 \le x \le 3$.



52. Let α and β be the roots of the equation $ax^2 + 2bx + c$ =0 and $\alpha + \gamma$ and $\beta + \gamma$ be the roots of $Ax^2 + 2Bx + C$ =0. Then prove that $A^2(b^2 - ac) = a^2(B^2 - AC).$

Watch Video Solution

53. If $\sin \theta$, $\cos \theta$ are the roots of the equation $ax^2 + bx + c$ =0 then find

the value of
$$rac{\left(a+c
ight)^2}{b^2+c^2}$$

54. If the roots α and β of the quadratic equation $ax^2 + bx + c$ =0 are real and of opposite sign.then show that roots of the equation $\alpha(x - \beta)^2 + \beta(x - \alpha)^2$ =0 are also real and of opposite sign.

Watch Video Solution

55. If $x^2 - px + 4 > 0$ for all real 'x' then find 'p'

Watch Video Solution

56. For ${\sf x}\in{\sf R},$ Prove that the given expression $\displaystyle rac{x^2+34x-71}{x^2+2x-7}$ can not lie

between 5 and 9.



57. If a,b,c \in R : a eq 0 and the quadratic equation $ax^2 + bx + c$ =0 has no

real root, then show that (a+b+c)c > 0



58. Find the values of the parameter a for which the roots of the quadratic equation $x^2 + 2(a-1)x + a + 5 = 0$ are

such that one root in greater than 3, and the other is smaller than 3

Watch Video Solution

59. Let a,b,c be real. If $ax^2 + bx + c = 0$ has two real roots lpha, eta where

 $lpha < \ -1$ and eta > 1 ,then show that $1 + rac{c}{a} + \left|rac{b}{a}
ight| < 0.$

Watch Video Solution

60. Find the value of a which the equation $4x^2 - 2x + a$ =0 has two roots

lying in the interval (-1,1)

61. Find the set of all x for which :

$$\frac{2x}{2x^2 + 5x + 2} \ge \frac{1}{x + 1}$$
Solve the following inequalities :

$$\frac{x - 1}{x^2 - 4x + 3} < 1$$
Solve the following inequalities :

$$\frac{x^2 - 2x - 1}{x + 1} < x$$
Solve the following inequalities :

$$\frac{x^2 - 2x - 1}{x + 1} < x$$
Solve the following inequalities :

$$\frac{x - 1}{x + 1} < x$$
Solve the following inequalities :

$$x - 1 = x + 1$$

$$\frac{x-1}{x}-\frac{x+1}{x-1}<2$$

65. Solve the equation $\left(x^2 - 6x
ight)^2 = 81 + 2(x-3)^2$



66. Solve
$$\log_{rac{1}{3}} \left(x^2 - 3x + 5
ight) < -1$$

Watch Video Solution

67. If $lpha,eta,\gamma$ are the roots of x^3+ax+b =0, then the value of $lpha^3+eta^3+\gamma^3$

Watch Video Solution

68. Find the number of redered pairs (x,y) satisfying $x^2 + 1 = y$ and $y^2 + 1 = x$

69. The roots of the quadratic equation $2x^2 + 3x + 1$ =0 are

A. Irrational

B. Rational

C. Imaginary

D. none of these

Answer: B

Watch Video Solution

70. The number of values of 'a' for which

$$ig(a^2-3a+2ig)x^2+ig(a^2-5a+6ig)x+a^2-4$$
=0 is an identity is

A. 0

B. 2

C. 1

Answer: C



71. If a and b are integers and $2-\sqrt{3}$ is a root of the equation $3x^2+ax+b$ =0, then value of b is

Watch Video Solution

72. If the sum of the roots of $ax^2 + bx + c$ =0 is equal to the sum of their

squares, then

A. a² + b²=c²

B. $a^2 + b^2 = a + b$

C. 2ac= ab+b^2

D. 2c+b=0

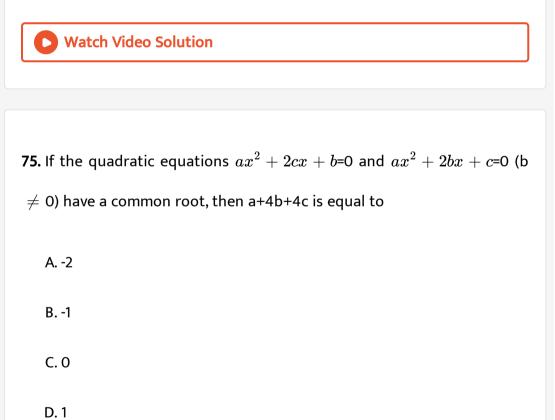
Answer: D
Vatch Video Solution
73. If x is real number, then the minimum value of $x^2 + x + 1$ is
A. 44289
B. 1
C. 3
D. None of these
Answer: A
Watch Video Solution

74. If lpha and eta are the roots of ax^2+bx+c =0, then the equation $ax^2-bx(x-1)+c(x-1)^2$ =0 has roots

A.
$$\frac{\alpha}{1-\alpha}, \frac{\beta}{1-\beta}$$

B. $\frac{1-\alpha}{\alpha}, \frac{1-\beta}{\beta}$
C. $\frac{\alpha}{1+\alpha}, \frac{\beta}{1+\beta}$
D. $\frac{\alpha+1}{\alpha}, \frac{\beta+1}{\beta}$

Answer: C



Answer: C

76. The value of 'a' for which the equation $x^3 + ax + 1$ =0 and $x^4 + ax^2 + 1$ =0, we have a common root is

A. a=2

B. a=-2

C. a=0

D. None of these

Answer: B

Watch Video Solution

77. The coefficient of 'x' in the quadratic equation $ax^2 + bx + c = 0$ was wrongly taken as 17 in place of 13 and its roots were found to be -2 and -15, the actual roots of the equation are A. -2 and 15

B. -3 and -10

C. -4 and -9

D. -5 and -6

Answer: B

Watch Video Solution

78. If p and q are the roots of the equation $x^2 + px + q$ =0, then

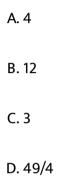
- A. p=1,q=-2
- B. p=0,q=1

C. p=-2,q=0

D. p=-2,q=1

Answer: A

79. If one root of the equation $x^2 + px + 12 = 0$ is 4, while the equation $x^2 + px + q$ =0 has equal roots, then the value of q is



Answer: D



80. If
$$\alpha$$
, β be the roots of $x^2 - a(x-1) + b$ =0,then the value of
 $\frac{1}{\alpha^2 - a\alpha} + \frac{1}{\beta^2 - a\beta} + \frac{2}{a+b}$ is
A. 4/a+b
B. 1/a+b

C. 0

D. -1

Answer: C

Watch Video Solution

81. If one root of the equation $x^2 + (1-3i)x - 2(1+i) = 0$ is -1+i, then

the other root is

A. -1-i

B. (-1-i)

C. i

D. 2i

Answer: D

82. If α, β roots of $ax^2 + bx + c$ =0. Find the quadratic equation whose

roots are :

 $\frac{lpha}{2}, \frac{eta}{2}$

Watch Video Solution

83. If α,β be the two roots of the equation $x^2 + x + 1$ =0, then the equation whose roots are $\frac{\alpha}{\beta}$ and $\frac{\beta}{\alpha}$ is

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

B.
$$x^2 - x + 1 = 0$$

 $\mathsf{C}.\,x^2-x-1=0$

 $\mathsf{D}.\,x^2+x-1=0$

Answer: A

84. The harmonic mean of the roots of the equation [Math Processing

Error] is`

A. 2 B. 4 C. 6 D. 8

Answer: B

View Text Solution

85. The equation $x^3 + 5x^2 + px + q$ =0 and $x^3 + 7x^2 + px + r$ =0 have two roots in common. If their third roots be γ_1 and γ_2 respectively, then the ordered pair (γ_1, γ_2) is

A. (5,7)

B. (-5,-7)

C. (-5,7)

D. (5,-7)

Answer: B

Watch Video Solution

86. If the roots of $x^2 + bx + c$ =0 are both real and greater than unity, then (b+c+1)

A. may be less than zero

B. may be equal to zero

C. must be greater than zero

D. must be less than zero

Answer: C

87. Value of p, so that 6 lies between roots of the equation $x^2+2(p-3)x+9$ =0

A.
$$(-\infty, +\infty)$$

B. $\left(-\infty, -\frac{3}{4}\right)$
C. $(-\infty, 0) \cup (6, \infty)$

D. none of these

Answer: B

Watch Video Solution

88. If $x^2 - (a-3)x + a$ =0 has at least one positive root,then

A.
$$a\in(\,-\infty,0)\cup[7,9]$$

$$\texttt{B.}\,a\in(\,-\infty,0)\cup[7,9)$$

 $\mathsf{C}.\,a\in(\,-\infty,0)\cup[9,\infty]$

D. none of these

Answer: C



89. If the roots of the equation $x^2 - 2ax + a^2 + a - 3$ =0 are less than 3

then

A. a < 2B. $2 \leq a \leq 3$ C. $3 < a \leq 4$ D. a > 4

Answer: A



90. The number of solutions of

 $\log_2(x-1)=2\log_2(x-3)$ is

A. 2		
B. 1		
C. 6		
D. 7		

Answer: B

Watch Video Solution

91. If x=
$$(\sqrt{13} + 2\sqrt{3})$$
, then x+1/x is equal to ?

Watch Video Solution

92. The sum of all real roots of the equation $|x-2|^2+|x-2|-2$ =0 is

A. 7

B. 4

C. 1

Answer: B



93. If lpha is a root of $4x^2 + 2x - 1$ =0, then the other root is

A. $4lpha^3-3lpha$

B. $3\alpha^3 - 4\alpha$

 $\mathsf{C.}\,3\alpha^3+4\alpha$

D. $4 \alpha^3 + 3 \alpha$

Answer: B

Watch Video Solution

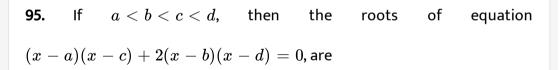
94. If $e^{\cos x} - e^{-\cos x} = 4$, then the value of the $\cos x$ is

A. $\log(2+\sqrt{5})$ B. $-\log(2+\sqrt{5})$ C. $\log(-2+\sqrt{5})$

D. none of these

Answer: D





A. Non-real complex

B. Real and distinct

C. Real and equal

D. Data insufficient

Answer: B

96. If lpha and eta(lpha<eta) are the roots of the equation x^2+bx+c =0,where (c<0<b), then

A. 0 < lpha < eta

B. $\alpha < 0 < \beta < |\alpha|$

 $C. \alpha < \beta < 0$

D. lpha < 0 < |lpha| < eta

Answer: B

Watch Video Solution

97. If \tan of angles A,B,C are the solutions of the equations $\tan^3 x + 3k \tan^2 x - 3 \tan x + k = 0$, then the triangle ABC is

A. an isosceles triangle

B. an equilateral triangle

C. a right angled triangle

D. none of these

Answer: D

Watch Video Solution

98. The number of solutions of the equation $\sin(e^x) = 5^x + 5^{-x}$ is

A. 0

B. 1

C. 2

D. infinitely many

Answer: A

99.	If	p(x)	be	а	polynomial	satisfying	the	identity
$pig(x^2ig)+2x^2+10x=2xp(x+1)+3$, then p(x) is given by								
A	. 2x+3	}						
-								
В	. 2x-3							
C	. 3x+2	2						
D	. 3x-2							

Answer: A

Watch Video Solution

100. If b > a, then the equation (x-a)(x-b)-1=0, has

A. Both the root in [a,b]

- B. Both root in $(-\infty,a)$
- C. Both roots in (b,∞)

D. one root in $(\,-\infty,a)$ and other in (b,∞)

Answer: D



101. The value of lpha and eta such that equation $x^2+2x+2+e^a-\sineta$ =0 having real roots.

A.
$$lpha,eta\in R$$

B. $lpha\in(0,1),eta\in\left(rac{\pi}{2},2\pi
ight)$
C. $lpha\in(0,\infty)$ and $eta\in\left(rac{\pi}{2},\pi
ight)$

D. none of these

Answer: D



102. The values of 'a' for which

 $x^2+ax+\sin^{-1}ig(x^2-4x+5ig)+\cos^{-1}ig(x^2-4x+5ig)$ =0, has at least

one solution, is

A.
$$\left(-\infty, -\sqrt{2}\pi\right) \cup \left(\sqrt{2}\pi, \infty\right)$$

B. $-2 + \pi$
C. $\left(-\infty, -\sqrt{2}\pi\right] \cup \left[\sqrt{2}\pi, \infty\right)$
D. $-2 - \frac{\pi}{4}$

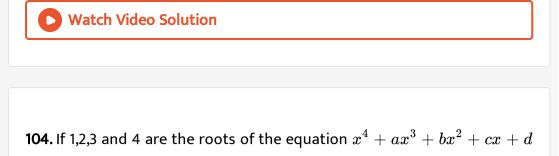
Answer: D

Watch Video Solution

103. The number of real solution to the equation $-x^2+x-1=\sin^2 x$

A. 0 B. 2 C. 3 D. 4

Answer: A



=0 then a+2b+c=

Watch Video Solution

105. The smallest positive x satisfying $\log_{\sin x} \cos x + \log_{\cos x} (\sin x) = 2$,

when
$$x \in \left(0, rac{\pi}{2}
ight)$$
, is
A. $rac{\pi}{4}$
B. $rac{\pi}{3}$
C. $rac{\pi}{6}$
D. . $rac{\pi}{2}$

Answer: A

106.	The	set	of	values	of	'a'	for	which
$x^2 - a$	$ax + \sin^{-1}$	$(\sin 4)$	$> 0 \forall :$	$x\in R$ is				
A. F	8							
В. (-2,2)							
C . q	Ь							
D. r	none of th	iese						

Answer: C

Watch Video Solution

107. If

$$\frac{a^3(x-b)(x-c)(x-d)}{(a-b)(a-c)(a-d)} + \frac{b^3(x-c)(x-d)(x-a)}{(b-c)(b-d)(b-a)} + \frac{c^3(x-d)(x-a)}{(c-d)(c-a)(a-d)}$$

=x^3`,then the equation having

A. no solution

B. one real and two imaginary roots

C. three real roots

D. infinitely many roots

Answer: D



108. Let
$$f(x)=x^3+3x^2+6x+2\sin x$$
, then the equation $rac{1}{x-f(1)}+rac{2}{x-f(2)}+rac{3}{x-f(3)}=0$,has

A. a) 2 real roots

B. b) 1 real root

C. c) 3 real root

D. d) none of these

Answer: C

109. Integral value of x for, which $\left(5x-1
ight) < \left(x+1
ight)^2 < 7x-3$

A. {1,2,3,4}

B. {3}

C. {2}

D. {4}

Answer: B

Watch Video Solution

110. If $\exp\{(\sin^2 x + \sin^4 x + \sin^6 x + ...)In2\}$ satisfies the quadratic equation $x^2 - 9x + 8$ =0 then the value of `(cosx)/(cosx+sinx)(0ltxltpi/2)

A.
$$rac{1}{\sqrt{3}+1}$$

B. $rac{1-\sqrt{3}}{2}$
C. $\left(1+\sqrt{3}
ight)+2$

D. none of these

Answer: B



111. The number of values of the triple (a,b,c) for which a $\cos s2x + b \sin^2 x + c$ =0 is satisfied by all real x, is

A. 0

B. 2

C. 3

D. infinite

Answer: D



112. The sum of the real roots of the equation $\left|x
ight|^2+\left|x
ight|-6$ =0 is

A. 4

B. 0

C. -1

D. none of these

Answer: B

Watch Video Solution

113. If b<0, then the roots x_1 and x_2 of the equation $2x^2+6x+b$ =0, satisfy the condition $\left(rac{x_1}{x_2}
ight)+\left(rac{x_2}{x_1}
ight)< k$ where k is equal to

A. -3

B. -5

C. -6

D. -2

Answer: D

114. If
$$\left(2x^2-3x+1
ight)\left(2x^2+5x+1
ight)=9x^2$$
 ,then equation has

A. four real roots

B. two real and two imaginary roots

C. all imaginary

D. none of the above

Answer: A

Watch Video Solution

115. If α , β are the roots of $x^2 + px + q$ =0 and also of $x^{2n} + p^n x^n + q^n = 0$ and if $\frac{\alpha}{\beta}$, $\frac{\beta}{\alpha}$ are root of $x^n + 1 + (x+1)^n$ =0, then n is

A. an integer

B. an odd integer

C. an even integer

D. none of the above

Answer: C

Watch Video Solution

116. If $3^x \cdot 8^{\frac{x}{x+2}}$ = 6, then x equals.

- A. 1, $-\log_3 36$
- B. 2, $-\log_5 65$
- $C. 3, -\log_7 49$

D. none of the above

Answer: A

117. Value (s) of 'a' for which $ax^2 + (a-3)x + 1 < 0$ for at least one positive x.

A. R

 $\mathsf{B.}\,R^{\,+}$

 $\mathsf{C}.\left(0,\infty
ight)$

D. $(-\infty,1)$

Answer: D

Watch Video Solution

118. Number of solution of $\left|x^2+4x+3
ight|+2x+5=0$ is/are

A. `x=-4,-1+-sqrt3

B. `x=-4,-1-sqrt3

C. `x=-4,-1+sqrt3

D. none of the above

Answer: B



119. If roots of $x^2-(a-3)x+a$ =0 are such that both of them is greater

than 2, then

A. $a \in [7,9]$

B. $a\in [7,\infty)$

 $\mathsf{C}.\,a\in[9,\,10)$

 $\mathsf{D}.\,a\in[7,9)$

Answer: C



120. solve the inequality
$$rac{\left(16
ight)^{1/x}}{\left(2^{x+3}
ight)}>1$$

121. Let α, β be the roots of the equation (x-a)(x-b)=c, c \neq 0. Then the

roots of the equation (x-lpha)(x-eta)+c=0 are :

Watch Video Solution

122. If p and q are odd integers,then the equation $x^2 + 2px + 2q$ =0

A. has no integral root

B. has no rational root

C. has no irrational root

D. has no imaginary root

Answer: A::B

123. If $x^2 + mx + 1$ =0 and (b-c) $x^2 + (c-a)x + (a-b)$ =0 have both

roots common,then

A. m=-2

B. m=-1

C. a,b,c are in AP

D. a,b,c are HP

Answer: A::C

Watch Video Solution

124. Solution set of x satisfying $|x-1|+|x-2|+|x-3|\geq 6$ is

A.
$$0 \leq x \leq 4$$

 $\mathsf{B.}\,x \leq \ -\,2\mathsf{or}\,x \geq 4$

 $\mathsf{C}.\, x < 0 \mathsf{or}\, x > 4$

D. none of these

Answer: C



125. The equation
$$\left(rac{x}{x+1}
ight)^2 + \left(rac{x}{x-1}
ight)^2$$
=a(a-1) has

A. four real roots if a >2

- B. two real roots if 1 < a < 2
- C. no real root if a > -1
- D. four real roots if a > -1

Answer: A::B::D

Watch Video Solution

126. If α and β are roots of the equation $ax^2 + bx + c$ =0 and, if $px^2 + qx + r$ =0 has roots $\frac{1-\alpha}{\alpha}$ and $\frac{1-\beta}{\beta}$, then r is equal is

A. a+2b

B. a+b+c

C. ab+bc+ca

D. abc

Answer: B

Watch Video Solution

127. If $ax^2 - bx + c$ =0 has two distinct roots lying in the interval (0,1),a,b,c

 \in N. Then

A. $\log_5 abc = 1$

 $\mathsf{B.}\log_6 abc = 2$

 ${\sf C}.\log_5 abc=3$

 $D.\log_6 abc = 4$

Answer: B::C::D

128. If ax^2+bx+c =0 and cx^2+bx+a =0 $(a,b,c\in R)$ have a common

non-real roots,then

A. $\left|b\right|>\left|a
ight|$

 $\mathsf{B.}\left|b\right|>\left|c\right|$

C. a=+-c

D. a=c

Answer: A::B::D

Watch Video Solution

129. Let P(x)=0 be the polynomial equation of least possible degree with rational coefficients having $3\sqrt{7} + 3\sqrt{49}$ as a root. Then the product of all the roots of P(x)=0 is

ŀ	١.	56

B.42

C. 343

D. 7

Answer: A

Watch Video Solution

130. If 2a+3b+6c=0 $(a, b, c \in R)$, then the quadratic equation $ax^2 + bx + c$ =0 has

A. at least one root in [0,1]

B. at least one root in (-1,1]

C. at least one root in [0,2]

D. none of the above

Answer: A::B::C

131. If $(\alpha, \beta) \in \mathbb{R}$ are two of an quadratic equations, then the equation will be given as $x^2 - (\alpha + \beta)x + \alpha\beta$ =0 If for a quadratic equation, the roots α, β satisfy $\alpha^2 + \beta^2$ =5, $3(\alpha^5 + \beta^5) = 11(\alpha^3 + \beta^3)$, then the equations will be A. $x^2 \pm 3x + 2$ =0 B. $x^2 - 3x \pm 2$ =0

D.
$$\pm x^2 + 3x + 2$$
=0

C. $x^2 - 3x - 2=0$

Answer: A



132. If a, $b \in R$ are two of an quadratic equations,then the equation will be

given as
$$x^2-(lpha+eta)x+lphaeta$$
=0

If $\alpha\beta$ =-10/3 (α, β related as above) then

A. D>0

 $\operatorname{B.} D < 0$

C. D=0

D. none of the above

Answer: D

Watch Video Solution

133. Letf(x)= $x^2 + b_1x + c_1$,g(x)= $x^2 + b_2x + c_2$. Real roots fo f(x)=0 be α , β and real roots ofg(x)=0 be $\alpha + \delta$, $\beta + \delta$.Least value of f(x) be -1/4. Least value of g(x) occurs at x=7/2 The least value of g(x) is

A. -1

B. -1/2

C. -1/4

D. -1/3

Answer: C

Watch Video Solution

134. Letf(x)= $x^2 + b_1x + c_1$,g(x)= $x^2 + b_2x + c_2$. Real roots fo f(x)=0 be α , β and real roots ofg(x)=0 be $\alpha + \delta$, $\beta + \delta$.Least value of f(x) be -1/4. Least value of g(x) occurs at x=7/2 The least value of g(x) is

A. 6

B. -7

C. 8

D. 0

Answer: B

135. match list i with list ii

	<u>List - I</u>		<u>List-II</u>
(1)	If the equation	(P)	2 < k < 4
	$x^{2} + 2(k + 1)x + (9k - 5)$		
	= 0 has only negative		
	roots, then		
(2)	If the inequality	(0)	4 . 6
(2)	If the inequality	(Q)	k ≥ 6
	x ² – 2(4k – 1)x + 15k ² – 2k		
	– 7 > 0 is valid for all x, then		
(3)	$lf x^2 - 2(k - 1)x + (2k + 1) = 0$	(R)	k < 1 or
	has both roots positive, then		k > 0
(4)	$ f 2x^2 - 2(2k + 1)x + k(k + 1) = 0$	(S)	k ≥ 4
	have one root less than k and	. ,	
	other roots greater than k, then		
	sale roots greater than A, then		

View Text Solution

136. match the equation on left with the properties on right

	List - I		List - II
(1)	a < b < c < d and equation is $(x - a)$ $(x - c) + \pi(x - b) (x - d) = 0$	(P)	real roots
(2)	a > 0, $a + b + c < 0$ and equation is $ax^2 + bx + c = 0$	(Q)	distinct real roots
(3)	b, c, \in , I and the equation $x^2 + bx + c = 0$ has rational roots	(R)	integral roots
(4)	a, b, c, d \in R are in G.P. and equation is $(a^2 + b^2 + c^2)x^2 +$ 2(ab + bc + ca)x $+ b^2 + c^2 + d^2 = 0$	(S)	discriminant ≥ 0

View Text Solution

137. If the quadratic polynomial, $y = (\cot \alpha)x^2 + 2(\sqrt{\alpha})x + \frac{1}{2}\tan \alpha, \alpha \in [0, , 2\pi]$,can take negative values for all ξnR ,then the value of $\alpha \in \left(\left(5\frac{\pi}{\lambda}\right), \pi\right)$,then the value of λ 138. If α, β be the roots $x^2 + px - q = 0$ and γ, δ be the roots of $x^2 + px + r = 0, p + r\phi$ 0,then $rac{(\alpha - \gamma)(\alpha - \delta)}{(\beta - \gamma)(\beta - \delta)}$ is equal to

Watch Video Solution

139. The smallest value of k, for which both roots of the equation $x^2-8kx+16ig(k^2-k+1ig)$ =0 are real,distinct and have values at least 4, is

Watch Video Solution

140. Let (x,y,z) be points with Integer coordinates satisfying the system of homogeneous equations 3x-y-z=0,-3x+2y+z=0,-3x+z=0.Then the number of such points for which $x^2+y^2+z^2\leq 100$ is

141. If roots of the equation $x^2 - 10cx - 11d$ =0 are a,b and those of $x^2 - 10ax - 11b$ =0 are c,d,then the sum of the digits of a+b+c+d must be equal to (a,b,c and d are distinct numbers)



142. If α, β, γ are such that $\alpha + \beta + \gamma$ =4, $\alpha^2 + \beta^2 + \gamma^2$ =6, $\alpha^3 + \beta^3 + \gamma^3$

=8, then the value of $\left[\alpha^4 + \beta^4 + \gamma^4\right]$ must be equal to (where[.] denotes the greatest integer function)

Watch Video Solution

143. Find the values of the parameter a for which the roots of the quadratic equation $x^2 + 2(a - 1)x + a + 5 = 0$ are real and distinct

144. Find the values of the parameter a for which the roots of the quadratic equation $x^2 + 2(a-1)x + a + 5 = 0$ are equal

145. Find the values of the parameter a for which the roots of the quadratic equation $x^2 + 2(a-1)x + a + 5 = 0$ are

not real

Watch Video Solution

146. Find the values of the parameter a for which the roots of the quadratic equation $x^2+2(a-1)x+a+5=0$ are

opposite in sign

147. Find the values of the parameter a for which the roots of the quadratic equation $x^2+2(a-1)x+a+5=0$ are

equal in magnitude but opposite in sign

148. Find the values of the parameter a for which the roots of the quadratic equation $x^2+2(a-1)x+a+5=0$ are

positive

Watch Video Solution

149. Find the values of the parameter a for which the roots of the quadratic equation $x^2 + 2(a-1)x + a + 5 = 0$ are

negative

150. Find the values of the parameter a for which the roots of the quadratic equation $x^2+2(a-1)x+a+5=0$ are

such that one root in greater than 3, and the other is smaller than 3

Watch Video Solution

151. Find the values of the parameter a for which the roots of the quadratic equation $x^2+2(a-1)x+a+5=0$ are

greater than 3

Watch Video Solution

152. Find the values of the parameter a for which the roots of the quadratic equation $x^2 + 2(a-1)x + a + 5 = 0$ are

smaller than 3

153. Find the values of the parameter a for which the roots of the quadratic equation $x^2+2(a-1)x+a+5=0$ are

such that exactly one root lies in the interval (1,3)

154. Find the values of the parameter a for which the roots of the quadratic equation $x^2 + 2(a-1)x + a + 5 = 0$ are

such that both the root lies in the interval (1,3)

Watch Video Solution

155. Find the values of the parameter a for which the roots of the quadratic equation $x^2+2(a-1)x+a+5=0$ are

such that one root is greater than 3 and the other root is smaller than 1

156. Show that the equation

 $rac{A^2}{x-a}+rac{B^2}{x-b}+rac{C^2}{x-c}+.....+rac{H^2}{x-h}=k$ has no imaginary root,

where A,B,C....H and a,b,c....,and $K \in R$.

Watch Video Solution

157. Solve the equation
$${\left({{x}^{2}-6x} \right)^{2}}=81+2{\left({x-3} \right)^{2}}$$

Watch Video Solution

158.
$$|x^2 - 3x - 4| = 9 - |x^2 - 1|$$

Watch Video Solution

159. Find the values of 'a' which $4^t-(a-4)2^t+rac{9}{4}a<0, \ orall t\in(1,2)$

160. Find values of a for which the quadratic equation $3x^2 + 2(a^2 + 1)x + (a^2 - 3a + 2) = 0$ possesses roots of opposite sign.

Watch Video Solution

161. For what real 'p' do the roots of $x^2-2x-p^2+1=0$ lie between the roots of $x^2-(p+1)x+(p-1)=0$?

Watch Video Solution

162. If $ax^2 - bx + c$ =0 has two distinct roots lying in the interval (0,1),a,b,c

 \in N. Then



163. Find the values of θ in the interval $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$ satisfying the equation, $(1 - \tan \theta)(1 + \tan \theta)\sec^2 \theta + 2^{\tan^2 \theta} = 0$

Watch Video Solution

164. Find the value of λ for which the inequality $3-|x-\lambda|>x^2$ is

satisfied by atleast one negative $x \in R$.

Watch Video Solution

165. The equation x-2/(x-1)=1-2/(x-1) has

A. no root

B. one root

C. two equal roots

D. infinitely many roots

Answer: A

166. Let lpha, eta be the equation $x^2-px+r=0$ and $rac{lpha}{2}, 2eta$ be the roots of the equation $x^2-qx+r=0.$ Then, the value of r is

A. 2/9(p-q)(2q-p)

B. 2/9(q-p)(2p-q)

C. 2/9(q-2p)(2q-p)

D. 2/9(2p-q)(2q-p)

Answer: D

Watch Video Solution

167. If $lpha,eta,\gamma$ are the roots of the equation $x^3+x+1=0$, then the value of $lpha^3+eta^3+\gamma^3$ is.

168. lpha, eta are the roots of the equation $(a-2)x^2 - (5-a)x - 5 = 0$

.Find 'a' if $|lpha-eta|=2\sqrt{6}$



169. If f(x) = $g(x)^3 + xh(x)^3$ is divisible by $x^2 + x + 1$, then

A. Both g(x) and h(x) are divisible by (x-1)

B. g(x) is divisible by (x-1) but not h(x)

C. h(x) is divisible by (x-1) but not g(x)

D. None of these

Answer: A



170. If the roots of the equation

$$a(b-c)x^2+b(c-a)x+c(a-b)=0$$
 are equal,then a,b,c are in

A. A.P.

B. G.P.

C. H.P.

D. None of these

Answer: C

Watch Video Solution

171. If the roots of the equation $6x^3 - 11x^2 + 6x - 1$ =0 are in H.P., then

the roots are

A. 1,1/2,1/3

B. 1/2,1/3,1/4

C. 1/3,1/4,1/5

D. 1/4,1/5,1/6

Answer: A

172. A value of b for which the equations $x^2 + bx - 1$ =0, x²+x+b =0` have one root in common is

A. - $\sqrt{2}$

B. - $i\sqrt{3}$

C. $i\sqrt{5}$

D. $\sqrt{2}$

Answer: B

Watch Video Solution

173. If a,b,c are in G.P., then the equations $ax^2 + 2bx + c = 0$ and $dx^2 + 2ex + f = 0$ have a common root if d/a,e/b,f/c are in

B. G.P.

C. H.P.

D. None of these

Answer: A

Watch Video Solution

174. In what interval 'm' must lie so that the root of the equation

 $x^2-2mx+m^2-1=0$ lie between -2 and 4 ?

A. (0,1)

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

- C. (-1,3)
- D. [-1,3]

Answer: C

175. The necessary and sufficient condition for the equation $(1-a^2)x^2+2ax-1=0$ to have roots lying in the interval (0,1) is

A.
$$a=\phi$$

B. a > 0

 ${\sf C}.\, a < 0 \, \, {
m or} \, \, a > 2$

D. none of these

Answer: C

Watch Video Solution

176. For all 'x', $x^2+2ax+(10-3a)>0$, then the interval .In which 'a'

lies is

A. a < -5

 $\mathsf{B.}-5 < a < 2$

 $\mathsf{C.}\,a>\,-5$

 ${\rm D.}\,2 < a < 5$

Answer: B

D Watch Video Solution

177. The maximum value of $2 - 3x - 4x^2$

A. 2

B. 41/16

C. 44340

D. 9/64

Answer: B

178. Number of solution of equation $\sin^{-1}x + \cos^{-1} (x^2) = rac{\pi}{2}$

A. No value

B. greater than or equal to 1

C. less than or equal to 1

D. equal to 2

Answer: D

Watch Video Solution

179. The equation $\sqrt{x+1}-\sqrt{x-1}=\sqrt{4x-1}$ has

A. no solution

B. one solution

C. two solution

D. more than two solutions

Answer: A



180. Solve
$$x^{\left[rac{3}{4}\left(\log_2 x
ight)^2+\log_2 x-rac{5}{4}
ight]}=\sqrt{2}$$

A. at least one real solution

B. exactly three real solutions

C. exaxtly one irrational solution

D. All the above

Answer: D

Watch Video Solution

181. x.[x],{x} are in G.P. then x equals

A.
$$rac{\sqrt{5}-1}{2}$$

B.
$$\frac{\sqrt{5}+1}{2}$$

C. $\frac{\sqrt{5}\pm1}{2}$

D. none of these

Answer: B

Watch Video Solution

182. The roots of the equation $x^{\sqrt{x}}=\sqrt{x^x}$ are

A. 0 and 4

B. 0 and 1

C. 0,1 and 4

D. 1 and 4

Answer: D

183. The number of real solution of the equation $e^x = x$ is

A. 1

B. 2

C. 0

D. infinite

Answer: C

Watch Video Solution

184. Let f(x) = $x^2 + bx + c$, where b,c \in R. If f(x) is a factor of both $x^4 + 6x^2 + 25$ and $3x^4 + 4x^2 + 28x + 5$, then the least value of f(x) is

A. 2

B. 3

C. 44232

D. 4

Answer: D

Watch Video Solution

185. Find the remainder when the polynomial is divided by (x-1)(x-2), if it leaves the remainder 2 when divided by (x-1) and 1 when divided by (x-2)

A. 3-x

B. x-3

C. 0

D. None of these

Answer: A



186. If f(x)= $x - [x], x(\phi 0) \in R$, where [x] is greatest integer less than or

equal to x, then the number of solution of f(x)+f(1/x)=1 are

A. 0

B. 1

C. infinite

D. 2

Answer: C

Watch Video Solution

187. The inequation

 $3^{72}igg(rac{1}{3}igg)^xigg(rac{1}{3}igg)^{\sqrt{x}}>1$ for all x belongs to

A. [0,64)

B. (0,64]

 $\mathsf{C}.(81,\infty)$

D. none of these

Answer: A

188. If f(x) = $x^2 + 2bx + 2c^2$, $g(x) = -x^2 - 2cx + b^2$, such that min $f(x)gyt \max g(x)$,then

A. no real b and c

 $\mathsf{B.0} < c < b\sqrt{2}$

C. $|c| > \sqrt{2}|b|$

 $\mathsf{D}.\left|c\right|<2|b|$

Answer: C

Watch Video Solution

189. Let $f(x) = ax^2 + bx + c, b, c \in R, a\phi$ 0, satisfying f(1)+f(2)

A. no real roots

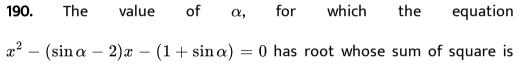
B.1 and 2 as real roots

C. two equal roots

D. two distinct real roots

Answer: D





least, is

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

B. $\frac{\pi}{4}$
C. $\frac{\pi}{2}$
D. $\frac{\pi}{6}$

Answer: C

191. The equation $|x+1||x-1|=a^2-2a-3$ can have real solutions for x if 'a' belongs to

A.
$$(-\infty, -1) \cup [3, \infty)$$

B. $\left[1 - \sqrt{5}, 1 + \sqrt{5}\right]$
C. $\left[1 - \sqrt{5}, -1\right] \cup \left[3, 1 + \sqrt{5}\right]$

D. both (1) and (3)

Answer: A

Watch Video Solution

192. Solution set of x satisfying $x^2 - |x+2| + x > 0$ is

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

$$\mathsf{B.} \left(\, -\infty, \; -\sqrt{2} \right) \cup \left(\sqrt{2}, \infty \right)$$

 $\mathsf{C}.\,(\,-\infty,\,-1)\cup(1,\infty)$

D.
$$\left(\sqrt{2},\infty\right)$$

Answer: B

Watch Video Solution

193. Let a,b,c be the sides fo a triangle where a
eq b
eq c and $\lambda\in R$,if roots of the equation $x^2+2(a+b+c)x+3\lambda(ab+bc+ca)=0$ are real, then

$$egin{aligned} \mathsf{A}.\,\lambda &< rac{4}{3}\ \mathsf{B}.\,\lambda &> rac{5}{3}\ \mathsf{C}.\,\lambda &\in \left(rac{1}{3},rac{5}{3}
ight)\ \mathsf{D}.\,\lambda &\in \left(rac{4}{3},rac{5}{3}
ight) \end{aligned}$$

Answer: A

194. Let α, β, γ be the roots of f(x)=0, where $f(x) = x^3 + x^2 - 5x - 1$. Then $[\alpha] + [\beta] + [\gamma]$ is, where [.] is greatest integer function

A. 1

B. -2

C. 4

D. -3

Answer: D

Watch Video Solution

195. The entire graphs of the equation $y = x^2 + kx - x + 9$ is strictly

above the x-axis if and only if

A. k < 7

 $\mathsf{B.}-5 < k < 7$

 $\mathsf{C}.\,k>\,-5$

D. None of these

Answer: B



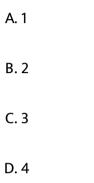
196. The largest interval for which $x^{12} - x^9 + x^4 - x + 1 > 0$ is

- A. $-4 < x \leq 0$
- B. 0 < x < 1
- C. -100 < x < 100
- D. $-\infty < x < \infty$

Answer: D

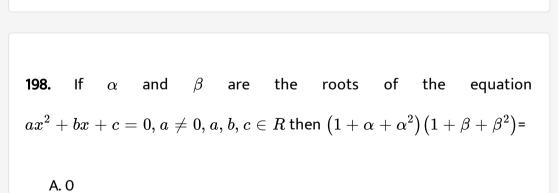


197. The quadratic equations $x^2 - 6x + a = 0$ and $x^2 - cx + 6 = 0$ have one root in common. Other two roots of the equations are integers and they are in the ration 4:3. Then the common root is



Watch Video Solution

Answer: B



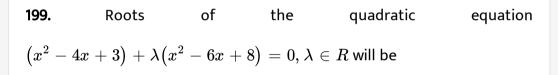
B. positive

C. negative

D. None of these

Answer: D





A. always real

- B. real only when λ is positive
- C. real only when λ is negative

D. always imaginary

Answer: A

200. The number of real solution of the equation $|x|^2 - 4|x| + 3 = 0$ is

A. 4	
B. 2	
C. 1	
D. 3	

Answer: A



201. For what values of
$$K\in R$$
 the expression $2x^2+Kxy+3y^2-5y-2$ can be expressed as $(a_1x+b_1y+c_1).~(a_2x+b_2y+c_2)$

A. -3,-4

B. 2,3

C. 3,4

D. 7,-7

Answer: D



202. How many real solutions does the equation

 $x^7 + 14x^5 + 16x^3 + 30x - 560 = 0$ have ?

- A. 1
- B. 3
- C. 5
- D. 7

Answer: A

203. Set of value of $k(k \in R)$ for which equation $x^2 - 4|x| + 3 - |k - 1| = 0$ will have exactly four roots is A. (-2,4) B. (-4,4) C. (-4,2) D. (-1,0)

Answer: A

Watch Video Solution

204. It is given that equation $4x^3 - 3x - p = 0$ has a unique root in the interval [1/2.1], where $-1 \le p \le 1$. The value of this root is

A. 44257

B.
$$\sin\left(\frac{1}{3}\sin^{-1}p\right)$$

C. $\cos\left(\frac{1}{3}\cos^{-1}p\right)$

D. none of these

Answer: C



205. If $3^{x+2} - 9^{-1/x} > 0$, then the interval of x can be

A. $x\in(0,\infty)$

 $\texttt{B}.\,x\in(0,\,250)$

 $\mathsf{C}.\,x \in R$

D. $x \in (-250, 250)$

Answer: A::B

206. The roots of the equation

$$ig(a+\sqrt{b}ig)^{x^2-15}$$
+ $ig(a-\sqrt{b}ig)^{x^2-15}$ =2a where $ig(a^2-big)=1$ are

A. +-3

 ${\rm B.}\pm4$

C. $\pm\sqrt{14}$ and ±4

D. $\pm\sqrt{5}$

Answer: B::C

Watch Video Solution

207. For what real value of 'a' do the roots of $x^2-2x-\left(a^2-1
ight)=0$ lie

between the-root $x^2-2(a+1)x+a(a-1)=0$

208. The real solutions of the equation

 $\sqrt[4]{97-x}+\sqrt[4]{x}=5$

A. 9,81

B. 16,18

C. 16,81

D. 61,81

Answer: C

Watch Video Solution

209. Consider the equation

$$x^2+x-a=0, a\in N$$

If equation has integral roots, then

A. a=2

B. a=6

C. a=12

D. a=20

Answer: A::B::C::D



210. A function $f\colon R o R$ where R is the set of real numbers,is defined by

$$f(x)=rac{lpha x^2+6x-8}{lpha+6x-8x^2}$$

value of α for which f is onto.

A. (2,14)

- B. [2,4]
- C. (-2,2)
- D. [-4,4]

Answer: A::B

211. If $b^2 \geq 4ac$ for the equations $ax^4 + bx^2 + c = 0$ then all the roots of the equation will be real if

A.
$$b > 0, a < 0, c > 0$$

B. $b < 0, a > 0, c > 0$
C. $b > 0, a > 0, c > 0$
D. $b > 0, a < 0, c < 0$

Answer: B::D

Watch Video Solution

212. The real roots of the equation

$$\sqrt{x+2\sqrt{x+2\sqrt{x+2\sqrt{x+...+2\sqrt{x+2\sqrt{3x}}}}}} = x$$

B. 1,3

C. 1,2

D. none of these

Answer: A

Watch Video Solution

213.
$$\log_{x^2+6x+8}\log_{2x^2+2x+3}ig(x^2-2xig)=0$$
 holds for

A. x={1}

- $\texttt{B}.\,x\in(0,1)$
- C. x={-1,-3}
- D. x={-1}

Answer: D

214. The values of 'a' for which the equation $4^x - a2^x - a + 3 = 0$ has at

least one solution.

A. $a\in [2,\infty)$

 $\texttt{B.}\,a\in(\,-\infty,\,-6]$

 $\mathsf{C}.\,a \in R$

D. none of these

Answer: A

Watch Video Solution

215. Let the roots of $f(x)=xbe \alpha$ and β where f(x) is quadratic polynomial $ax^2 + bx + c$. α and β are also the roots of f(f(x))=x. Let the other two roots of f(f(x))=x be γ and λ Statement I : if α and β are real unequal then γ and λ are also real. Statement II : if α and β are imaginary then γ and λ are also imaginary.

The correct statement are

A. I only`

B. II only

C. both I and II

D. neither I nor II

Answer: B

Watch Video Solution

216. Let the roots of f(x)=xbe α and β where f(x) is quadratic polynomial $ax^2 + bx + c$. α and β are also the roots of f(f(x))=x. Let the other two roots of f(f(x))=x be γ and λ Statement I : if α and β are real unequal then γ and λ are also real. Statement II : if α and β are imaginary then γ and λ are also imaginary. The correct statement are

A. I and II

B. III and IV

C. II and III

D. I and IV

Answer: B

Watch Video Solution

217. Let x_1, x_2, x_3, x_4 ,be the roots (real or complex) of the equation $x^4 + ax^3 + bx^2 + cx + d = 0.$

If $x_1+x_2=x_3+x_4$ and a,b,c,d \in R, then

If a=2, then the value of b-c is

A. -1

B. 1

C. -2

D. 2

Answer: B





218. Let x_1, x_2, x_3, x_4 ,be the roots (real or complex) of the equation $x^4 + ax^3 + bx^2 + cx + d = 0.$

If $x_1+x_2=x_3+x_4$ and a,b,c,d \in R, then

If b < 0, then how many different values of 'a' we many have

A. 3

B. 4

C. 1

D. 0

Answer: C

Match List - I with List - II

$$List - I$$
(1) α , β are the roots of $x^2 - 3x$
(P) -1
+ $a = 0$, $a \in \mathbb{R}$ and $\alpha < 1 < \beta$,
then a can be
(2) The equation $cx^2 + 2bx - 3a$
(Q) 2
= 0 has non-real roots and
 $\frac{3a}{4} < (b+c)$, then a can be

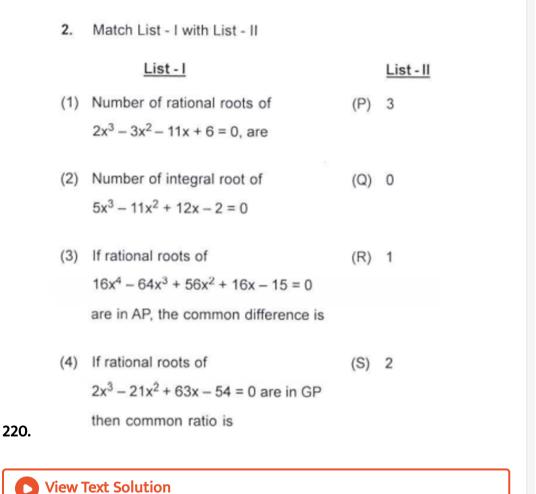
(4) If
$$\frac{ax^2 + 3x + 4}{x^2 + 2x + 2} < 5$$
, $\forall x \in \mathbb{R}$, (S) $\frac{5}{2}$

۲

then a can be

219. '

View Text Solution



221. Number of solutions for $x^2 - 2 - 2[x] = 0$, (where[.] denotes greatest integer function is

222. The even root of the equation greater than 2 of $\left(x-2
ight)^6+\left(x-4
ight)^6=64$ is

223. If
$$\alpha$$
 and β are the distinct roots of the equation
 $x^2 - p(x+1) - b = 0$, then
 $E = \frac{\alpha^2 + 2\alpha + 1}{\alpha^2 + 2\alpha + b} + (beta^2 + 2beta + 1)/(beta^2 + 2beta + b)^{=} ---$
Watch Video Solution

224. The number of non-zero solutions of the equation,
$$x^2 - 5x - (sgn)6 = 0$$
 is Watch Video Solution

225. If the equation $x^2 + 2(k+1)x + 9k - 5$ =0 has only negative roots,

then the value of k is



226. If $P(x) = ax^2 + bx + c$, and $Q(x) = -ax^2 + dx + c$, $ac \neq 0$,

then prove that P(x).Q(x) = 0 has at least two real roots.

Watch Video Solution

227. If,lpha be the root of equation $ax^2 + bx + c = 0$ and eta be root of

 $-ax^2 + bx + c = 0$ then prove that there will be a root of the equation

 $ax^2 + 2bx + 2c = 0$ lying between lpha and eta, where a and c are non zero.

228. Let x,y,z be real variable satisfying the equations x+y+z=6 and xy+yz+zx=7. Then find the range in which the variable can lie.



229. If one root of the quadratic equation $ax^2 + bx + c = 0$ is equal to the n^th power of the other root then show that, $(ac^n)^{\frac{1}{n+1}} + (a^nc)^{\frac{1}{n+1}} + b$ =0

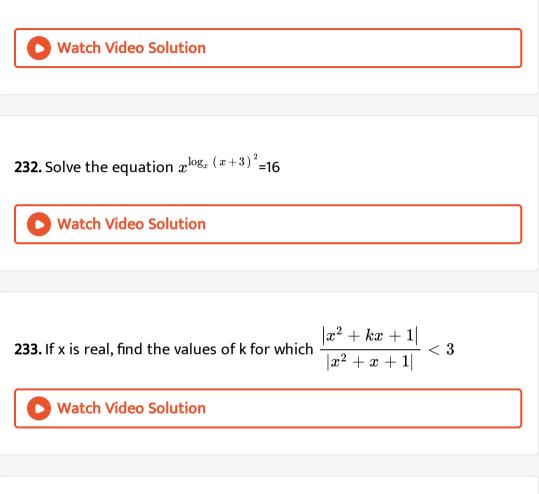
Watch Video Solution

230. Find all real values of a for which the equation

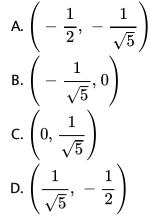
$$x^4 + (a-1)x^3 + x^2 + (a-1)x + 1 = 0$$

possesses at least two distinct positive roots.

231. Solve the equation $(x+2)(x+3)(x+8)(x+12)=4x^2$



234. Let S be the set of all non-zero real numbers α such that the quadratic equation $\alpha x^2 - x + \alpha = 0$ has two distinct real roots x_1 and x_2 satisfying the inequality $|x_1 - x_2| < 1$. Which of the following intervals is (are) a subset(s) of S?



Answer: A::D



235. Let lpha and eta be the roots of the equation $x^2-6x-2=0$. If $a_n=lpha^n-eta^n$, for $n\ge 1$, then the value of $\dfrac{a_{10}-2a_8}{2a_9}$ is equal to

A. -6

B. 3

C. -3

D. 6

Answer: B

236. If lpha,eta are the roots of $x^2-px+1=0$ and γ is a root of $x^2+px+1=0,$ then $(lpha+\gamma)(eta+\gamma)$ is

A. 0

B. 1

C. -1

D. p

Answer: A

Watch Video Solution

237. The quadratic expression $\left(2x+1
ight)^2-px+q
eq 0$ for any real x if

A.
$$p^2-16p-8q<0$$

B.
$$p^2 - 8p - 16q < 0$$

C.
$$p^2-8p-16q<0$$

D.
$$p^2-16p-8q<0$$

Answer: C

Watch Video Solution

238. Given that x is a real number satisfying $rac{5x^2-26x+5}{3x^2-10x+3} < 0$, then

A.
$$x < \frac{1}{5}$$

B. $\frac{1}{5} < x < 3$
C. $x > 5$
D. $\frac{1}{5} < x < \frac{1}{3}$ or $3 < x < 5$

Answer: D

239. Let f : R to R be defined as $f(x) = \frac{x^2 - x + 4}{x^2 + x + 4}$. Then the range of the function f(x) is

A. [3/5,5/3]

B. (3/5,-5/3)

$$\mathsf{C}.\left(-\infty,rac{3}{5}
ight)\cup\left(rac{5}{3},\infty
ight)$$

Answer: A

Watch Video Solution

240. If 2 + i and $\sqrt{5} - 2i$ are the roots of the equation $(x^2 + ax + b)(x^2 + cx + d) = 0$, where a,b,c,d are real constants, then product of all roots of the equation is

A. 40

B. $9\sqrt{5}$

C. 45

D. 35

Answer: C

Watch Video Solution

241. Which of the following is/are always false ?

A. A quadratic equation with rational coefficients has zero or two

irrational roots

B. A quadratic equation with rational coefficients has zero or two non-

real roots

- C. A quadratic equation with rational coefficients has zero or two rational roots
- D. A quadratic equation with rational coefficients has zero or two

irrational roots

Answer: C



242. The quadratic equations p(x) = 0 with real coefficients has purely imaginary roots. Then the equation p(p(x))=0 has

Watch Video Solution

243. If $a \in R$ and the equation $-3(x - [x]^2) + 2(x - [x]) + a^2 = 0$ (where [x] denotes the greatest integer $\leq x$) has no integral solution, then all possible values of a lie in the interval :

A. (-2,-1)

 $\mathsf{B}.\,(\infty,\ -2)\cup(2,\infty)$

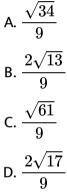
 ${\sf C}.\,(\,-1,0)\cup(0,1)$

D. (1,2)

Answer: C



244. Let α and β be the roots of equation $px^2 + qx + r = 0, p \neq 0$. If p, q, r are in A.P. and $\frac{1}{\alpha} + \frac{1}{\beta}$ =4, then the value of $|\alpha - \beta|$ is :



Answer: B



245. In a Δ ABC, an A and an B are roots of $\mathsf{pq}ig(x^2+1ig)=r^2x.$ Then Δ

ABC is

A. a right angled triangle

- B. an acute angled triangle
- C. an obtuse angled triangle

D. an equilateral triangle

Answer: A

Watch Video Solution

246. If α, β are the roots of the quadratic equation $x^2 + px + q = 0$, then the values of $\alpha^3 + \beta^3$ and $\alpha^4 + \alpha^2 \beta^2 + \beta^4$ are respectively

A.
$$3pq-p^3$$
 and $p^4-3p^2q+3q^2$
B. $-p(3q-p^2)$ and $(p^2-q)(p^2+3q)$
C. pq-4 and p^4-q^4
D. $3pq-p^3$ and $(p^2-q)(p^2-3q)$

Answer: D

247. Let p,q be real numbers. If α is the root of $x^2 + 3p^2x + 5q^2 = 0$, β is a root of $x^2 + 9p^2x + 15q^2 = 0$ and $0 < \alpha < \beta$, then the equation $x^2 + 6p^2x + 10q^2 = 0$ has a root γ that always satisfies.

- A. $\gamma = rac{lpha}{4} + eta$ B. $eta < \gamma$
- $\mathsf{C}.\,\gamma=\frac{\alpha}{2}+\beta$
- D. $lpha < \gamma < eta$

Answer: D

Watch Video Solution

248. Let lpha,eta be the roots of $x^2-x-1=0$ and $S_n=lpha^n+eta^n$, for all

integers $n \geq 1$. Then for every integer $n \geq 2$,

A. S_n+S_(n+1)=S_(n+1)`

 $\mathsf{C.}\,S_{n-1}=S_{n+1}$

D. S_n+S_(n-1)=2S_(n+1)`

Answer: A

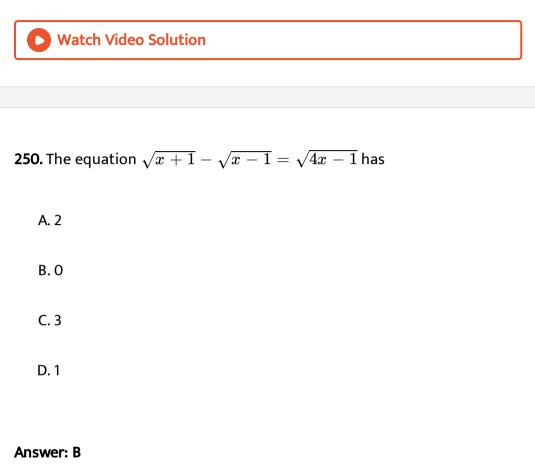
Watch Video Solution

249. If α , β are the roots fo $ax^2 + bx + c = 0 (a \neq 0)$ and $\alpha + h$, $\beta + h$ are the roots of $px^2 + qx + r = 0 (p \neq 0)$ then the ration of the squares of their discriminants is

A. $a^2 : p^2$ B. $a : p^2$ C. $a^2 : p$

D. a:2p

Answer: A



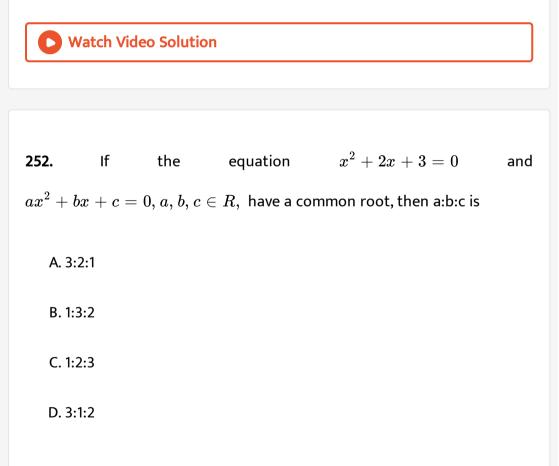


251. If a, b and c are positive numbers in a G.P., then the roots of the quadratic equation $(\log_e a)x^2 - (2\log_e b)x$. $+ (\log_e c) = 0$ are

A.
$$-1$$
 and $\frac{\log_e c}{\log_e a}$
B. 1 and $-\frac{\log_e c}{\log_e a}$

- C.1 and $\log_a c$
- D. -1 and $\log_c a$

Answer: C



Answer: C

253. If lpha and eta are the roots of $x^2-x+1=0$,then the value of $lpha^{2013}+eta^{2013}$ is equal to

A. 2

В. -2

C. -1

D. 1

Answer: B

Watch Video Solution

254. If α, β are the roots of the quadratic equation $x^2 + ax + b = 0$, $(b \neq 0)$, then the quadratic equation whose roots are $\alpha - \frac{1}{\beta}, \beta - \frac{1}{\alpha}$ is

A.
$$ax^2 + a(b-1)x + (a-1)^2 = 0$$

B.
$$bx^2 + a(b-1)x + (b-1)^2 = 0$$

C. $x^2 + ax + b = 0$
D. $abx^2 + bx + a = 0$

Answer: B

Watch Video Solution

255. Let p(x) be a quadratic polynomial with constant term 1. Suppose p(x) when divided by x-1 leaves remainder 2 and when divided by x+1 leaves remainder 4. Then the sum of the roots of p(x)=0 is

A. -1

B. 1

C. 1/2

D. 4

Answer: D



256. If lpha,eta are the roots of the quadratic equation $ax^2+bx+c=0$ and $3b^2=16ac$ then

A.
$$lpha=4eta$$
or $eta=4lpha$

B. lpha = -4etaoreta = -4lpha

C.
$$lpha = -3eta$$
or $eta = -3lpha$

D. lpha=-3etaoreta=-3lpha

Answer: C

Watch Video Solution

257. Let $\sin \alpha$, $\cos \alpha$, be the roots of the equation $x^2 - bx + c = 0$. Then which of the following statements is/are correct ?

A.
$$c \leq rac{1}{2}$$

B. $b \leq \sqrt{2}$ C. $c > rac{1}{2}$ D. $b > \sqrt{2}$

Answer: A::B

Watch Video Solution

258. What is the calorific value of 80 gms of carbohydrate, 15 gms of protein and 10.4 gms of fat in a breakfast? What is physiological fuel value of food?

Watch Video Solution

259. The equation $e^{\sin x} - e^{-\sin x} - 4 = 0$ has

A. infinite number of real roots

B. no real root

C. exactly one real root

D. exactly four real roots

Answer: B

Watch Video Solution

260. The equations $x^2 + x + a = 0$ and $x^2 + ax + 1 = 0$ have a common real root

A. for no value of a

B. for exactly one value of a

C. for exactly two value of a

D. for exactly three value of a

Answer: B

261. If $(\alpha + \sqrt{\beta})$ and $(\alpha - \sqrt{\beta})$ are the roots of the equation $x^2 + px + q = 0$ where α, β, p and q are real, then the roots of the equation $(p^2 - 4q)(p^2x^2 + 4px) - 16q = 0$ are

A.
$$\left(\frac{1}{\alpha} + \frac{1}{\sqrt{\beta}}\right)$$
 and $\left(\frac{1}{\alpha} - \frac{1}{\sqrt{\beta}}\right)$
B. $\left(\frac{1}{\sqrt{\alpha}} + \frac{1}{\beta}\right)$ and $\left(\frac{1}{\sqrt{\alpha}} - \frac{1}{\beta}\right)$
C. $\left(\frac{1}{\sqrt{\alpha}} + \frac{1}{\sqrt{\beta}}\right)$ and $\left(\frac{1}{\sqrt{\alpha}} - \frac{1}{\sqrt{\beta}}\right)$
D. $\left(\sqrt{\alpha} + \sqrt{\beta}\right)$ and $\left(\sqrt{\alpha} - \sqrt{\beta}\right)$

Answer: A

Watch Video Solution

262. If a, b, c are in arithmetic progression, then the roots of the equation

 $ax^2-2bx+c=0$ are

A. 1 and c/a

B. -1/a and -c

C. -1 and -c/a

D. -2 and -c/2a

Answer: A

Watch Video Solution

263. The quadratic equation $2x^2 - (a^3 + 8a - 1)x + a^2 - 4a = 0$ possesses roots of opposite sign. Then

A. $a \leq 0$ B. 0 < a < 4

 $\mathsf{C.4} \leq a < 8$

 $\mathsf{D.}\,a\geq 8$

Answer: B

264. A value of b for which the equations $x^2 + bx - 1$ =0, x^2+x+b =0`

have one root in common is

A. $-\sqrt{2}$ B. $-i\sqrt{3}$ C. $i\sqrt{5}$

D. $\sqrt{2}$

Answer: B

Watch Video Solution

265. Let α and β be the roots of the equation $x^2 - 6x - 2 = 0$. If $a_n = \alpha^n - \beta^n$, for $n \ge 1$, then the value of $\frac{a_{10} - 2a_8}{2a_9}$ is equal to

A. 1

B. 2

C. 3

Answer: C



266. Let α, β be real and z be a complex number. If $z^2 + \alpha z + \beta = 0$ has two distinct roots on the line Re z = 1, then it is necessary that

A. $eta \in (\,-1,\,0)$ B. |eta|=1C. $eta \in [1,\infty)$ D. $eta \in (0,1)$

Answer: B

267. If $\sin \theta$ and $\cos \theta$ are the roots of the equation $ax^2 - bx + c = 0$,

then a, b and c satisfy the relation

A.
$$a^2 + b^2 + 2abc = 0$$

B. $a^2 - b^2 + 2ac = 0$
C. $a^2 + c^2 + 2abc = 0$

$$\mathsf{D}.\,a^2-b^2-2abc=0$$

Answer: C

Watch Video Solution

268. Let a, b, c be three number such that a+2b+4c=0. Then the equation

 $ax^2 + bx + c = 0$

A. has both the roots complex

B. has its roots lying within -1 < x < 0

C. has one of roots equal to 1/2

D. has its roots lying within 2 < x < 6

Answer: C



269. If the ratio of the roots of the equation $px^2 + qx + r$ is a:b,

then $a \frac{b}{(a+b)^2}$ = A. $\frac{p^2}{qr}$ B. $\frac{pr}{q^2}$ C. $\frac{q^2}{pr}$ D. $\frac{pq}{r^2}$

Answer: B

270. If lpha and eta are the roots of the equation $x^2+x+1=0$, then the

equation whose roots are $lpha^{19}$ and eta^7 is