



MATHS

BOOKS - R G PUBLICATION

QUADRATIC EQUATIONS

Example

1. Is the given equation a quadratic one? (i) $x^2 - 5x + 6 = 0$

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2. Which of the following are Q.E (ii) $x + \frac{x}{3} = x^2$

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3. Which of the following are Q.E (iii) $(x - 2)^2 + 1 = 2x - 3$

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4. Which of the following are Q.E (iv) $x(2x + 3) = x^2 + 1$

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5. solve for x: $4\sqrt{3}x^2 + 5x - 2\sqrt{3} = 0$

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6. Solve the equation by the method of completing square

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

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7. Solve the Q.E by Quadratic formula $2x^2 - 6x + 3 = 0$



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Exercise

1. Check whether the following are quadratic equations:(i)

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



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2. Check whether the following are quadratic equations:(ii)

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



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3. Check whether the following are quadratic equations: (iii) $(x-2)(x+1)=(x-1)(x+3)$



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4. Check whether the following are quadratic equations: (iv) $(x-3)(2x+1)=x(x+5)$



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5. Check whether the following are quadratic equations: (v) $(2x-1)(x-3)=(x+5)(x-1)$



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6. Check whether the following are quadratic equations: (vi) $x^2 + 3x + 1 = (x - 2)^2$



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7. Check whether the following are quadratic equations:(vii)

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

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8. Check whether the following are quadratic equations:(viii)

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

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9. Represent the following situations in the form of quadratic equations:

(i)The area of a rectangular plot is $528m^2$.The length of the plot(in meters) is one more than twice its breadth.We need to find length and breadth of the plot.

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10. Represent the following situations in the form of quadratic equations:

(ii) The product of two consecutive positive integers is 306. We need to find the integers.



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11. Represent the following situations in the form of quadratic equations:

(i) The area of a rectangular plot is $528m^2$. The length of the plot (in meters) is one more than twice its breadth. We need to find length and breadth of the plot.



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12. Represent the following situations in the form of quadratic equations:

(iv) A train travels a distance of 480 km at a uniform speed. If the speed had been 8 km/h less, then it would have taken 3 hours more to cover the same distance. We need to find the speed of the train.



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13. Find the root of the following quadratic equations by factorisation:(i)

$$x^2 - 3x - 10 = 0$$



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14. Find the root of the following quadratic equations by factorisation:(ii)

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



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15. Find the root of the following quadratic equations by factorisation:(iii)

$$\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$$



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16. Find the root of the following quadratic equations by factorisation:(iv)

$$2x^2 - x + \frac{1}{8} = 0$$

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17. Find the root of the following quadratic equations by factorisation:(v)

$$100x^2 - 20x + 1 = 0$$

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18. Solve the problems given in Example 1.(i) $x^2 - 45x + 324 = 0$

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19. Solve the problems given in Example (ii) $x^2 - 55x + 750 = 0$

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20. Find the numbers whose sum is 27 and product is 182.

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21. Find two consecutive positive integers, sum of whose squares is 365.

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22. The altitude of a right triangle is 7 cm less than its base. If the hypotenuse is 13 cm, find the other two sides.

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23. A cottage industry produces a certain number of pottery articles in a day. It was observed on a particular day that the cost of production of each article (in rupees) was 3 more than twice the number of articles

produced on that day.If the total cost of production on that day was Rs.90,find the number of articles produced and the cost of each articles.

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24. Find the roots of the following quadratic equations,if they exist,by the method of completing the square:(i) $2x^2 - 7x + 3 = 0$

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25. Find the roots of the following quadratic equations,if they exist,by the method of completing the square:(ii) $2x^2 + x - 4 = 0$

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26. Find the roots of the following quadratic equations,if they exist,by the method of completing the square:(iii) $4x^2 + 4\sqrt{3}x + 3 = 0$

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27. Find the roots of the following quadratic equations, if they exist, by the method of completing the square: (iv) $2x^2 + x + 4 = 0$

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28. Find the roots of the quadratic equations given in Q-1 above by applying the quadratic formula. (i) $2x^2 - 7x + 3 = 0$

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29. Find the roots of the quadratic equations applying the quadratic formula. (ii) $2x^2 + x - 4 = 0$

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30. Find the roots of the quadratic equations by applying the quadratic formula.(iii) $4x^2 + 4\sqrt{3}x + 3 = 0$

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31. Find the roots of the quadratic equations by applying the quadratic formula.(iv) $2x^2 + x + 4 = 0$

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32. Find the roots of the following equations:(i) $x - \frac{1}{x} = 3, x \neq 0$

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33. Find the roots of the following equations:(ii) $\frac{1}{x+4} - \frac{1}{x-7} = \frac{11}{30}, x \neq -4, 7$

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34. The sum of the reciprocals of Rehman's ages,(in years) 3 years ago and 5 years from now is $\frac{1}{3}$. Find his present age.

A. 7

B. 10

C. 6

D. 5

Answer: A



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35. In a class test, the sum of Shefail marks in Mathematics and English is 30. Had she got 2 marks more in Mathematics and 3 marks less in English, the product of their mark would have been 210. Find her marks in the two subjects.



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36. The diagonal of a rectangular field is 60 meters more than the shorter side. If the longer side is 30 meters more than the shorter side, find the sides of the field.

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37. The difference of squares of two numbers is 180. The square of the smaller number is 8 times the larger number. Find the two numbers.

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38. A train travels 360 km at a uniform speed. If it had been 5 km/h more, it would have taken 1 hour less for the same journey. Find the speed of the train.

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39. Two water taps together can fill a tank in $9\left(\frac{3}{8}\right)$ hours. The tap of larger diameter takes 10 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.

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40. An express train takes 1 hour less than a passenger train to travel 132 km between Mysore and Bangalore (without taking into consideration the time they stop at intermediate stations). If the average speed of the express train is 11 km/h more than that of the passenger train, find the average speed of the two trains.

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41. Sum of the areas of two squares is $468m^2$. If the difference of their perimeters is 24 m, find the side length of the two squares.

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42. Find the nature of the roots of the following quadratic equations. If the real roots exist, find them: (i) $2x^2 - 3x + 5 = 0$

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43. Find the nature of the roots of the following quadratic equations. If the real roots exist, find them: (ii) $3x^2 - 4\sqrt{3}x + 4 = 0$

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44. Find the nature of the roots of the following quadratic equations. If the real roots exist, find them: (iii) $2x^2 - 6x + 3 = 0$

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45. Find the values of k for each of the following quadratic equations, so that they have two equal roots. (i) $2x^2 + kx + 3 = 0$

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46. Find the values of k for each of the following quadratic equations, so that they have two equal roots. ii) $kx(x-2)+6=0$

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47. Is it possible to design a rectangular mango grove whose length is twice its breadth, and the area is $800m^2$? If so, find its length and breadth.

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48. Is the following situation possible? If so, determine their present ages. The sum of the ages of two friends is 20 years. Four years ago, the product of their ages in years was 48.

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49. Is it possible to design a rectangular park of perimeter 80 m and area $400m^2$? If so, find its length and breadth.

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50. Solve the following quadratic equation by the method of factorisation: (i) $x^2 + 3x - 18 = 0$

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51. Solve the following quadratic equation by the method of factorisation: (ii) $2x^2 - 11x + 12 = 0$

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52. Solve the following quadratic equation by the method of factorisation: (iii) $6x^2 - x - 2 = 0$

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53. Solve the following quadratic equation by the method of factorisation:(iv) $8x^2 - 22x - 21 = 0$

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54. Solve the following quadratic equation by the method of factorisation:(v) $x^2 - x - 110 = 0$

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55. Solve the following quadratic equation by the method of factorisation:(vi) $48x^2 - 13x - 1 = 0$

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56. Solve the following quadratic equation by the method of factorisation:(vii) $18x^2 + 3 = 29x$

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57. Solve the following quadratic equation by the method of factorisation:(viii) $4 - 11x = 3x^2$

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58. Solve the following quadratic equation by the method of factorisation:(ix) $6x^2 + 40 = 31x$

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59. Solve the following quadratic equation by the method of factorisation:(x) $4x^2 - 9x = 100$



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60. Solve the following quadratic equation by the method of factorisation:(xi) $5x^2 - \frac{17}{2}x + \frac{3}{2}$

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61. Solve the following quadratic equation by the method of factorisation:(xii) $x^2 - \frac{1}{12}x - \frac{1}{12} = 0$

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62. Solve the following quadratic equation by the method of factorisation:(xiv) $\sqrt{3}x^2 + 10x + 7\sqrt{3} = 0$

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63. Solve the following quadratic equation by the method of factorisation: $(xv)x^2 + 2\sqrt{2}x - 6 = 0$

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64. Solve the following quadratic equation by the method of factorisation: $(xvi)\sqrt{3}x^2 + 11x + 6\sqrt{3} = 0$

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65. Solve the following quadratic equation by the method of factorisation: $(xvii)x^2 - 2ax + a^2 - b^2 = 0$

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66. Solve the following quadratic equation by the method of factorisation: $(xviii)4x^2 - 2(a^2 + b^2)x + a^2b^2 = 0$



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67. Solve the following quadratic equation by the method of factorisation: (xix) $a^2b^2x^2 + b^2x - a^2x - 1 = 0$

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68. Solve the following quadratic equation by the method of factorisation: (xx) $\frac{1}{a + b + x} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}, a + b \neq 0$

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69. Solve the following quadratic equation by the method of factorisation: (xxi) $\frac{2x}{x - 3} + \frac{1}{2x + 3} + \frac{3x + 9}{(x - 3)(2x + 3)} = 0$

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70. Solve the following quadratic equation by the method of

factorisation:(xxii) $\frac{x}{x+1} + \frac{x+1}{x} = \frac{34}{15}, x \neq 0, x \neq -1$

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71. Solve the following quadratic equation by the method of

factorisation:(xxiii) $\frac{4}{x} - 3 = \frac{5}{2x+3}, x \neq 0, \frac{-3}{2}$

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72. Solve the following quadratic equation by the method of

factorisation:(xxiv) $\frac{x-1}{x-2} + \frac{x-3}{x-4} = \frac{10}{3}, x \neq 2, 4$

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73. Solve the following quadratic equation by the method of

factorisation:(xxv)

$$\frac{1}{(x-1)(x-2)} + \frac{1}{(x-2)(x-3)} + \frac{1}{(x-3)(x-4)} = \frac{1}{6} \quad (x \neq 1, 2, 3, 4)$$



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74. Solve the following quadratic equation by the method of completing square:
(i) $6y^2 - y - 2 = 0$



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75. Solve the following quadratic equation by the method of completing square:
(ii) $x^2 + 8x + 4 = 0$



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76. Solve the following quadratic equation by the method of completing square:
(iii) $9x^2 + 3x = 2$



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77. Solve the following quadratic equation by the method of completing square:(iv) $x^2 - (a + b)x + ab = 0$

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78. Solve the following quadratic equation by the method of completing square:(v) $a^2x^2 - 3abx + 2b^2 = 0$

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79. Solve the following quadratic equation by the method of completing square:(vi) $2ax^2 + (4 - a^2)x - 2a = 0$

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80. Solve the following quadratic equation by the method of completing square:(vii) $a^2b^2x^2 - 3abx + 2b^2 = 0$



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81. Solve the following quadratic equation by the method of completing square:(viii) $x^2 - (\sqrt{3} + 1)x + \sqrt{3} = 0$

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82. Solve the following the quadratic equation by applying the quadratic formula:(i) $6x^2 + x - 2 = 0$

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83. Solve the following the quadratic equation by applying the quadratic formula(ii) $5x^2 - 8x - 4 = 0$

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84. Solve the following the quadratic equation by applying the quadratic formula(iii) $4x^2 - 20x + 25 = 0$

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85. Solve the following the quadratic equation by applying the quadratic formula(iv) $2x^2 + 5\sqrt{3}x + 6 = 0$

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86. Solve the following the quadratic equation by applying the quadratic formula(v) $35x^2 + 13x - 12 = 0$

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87. Solve the following the quadratic equation by applying the quadratic formula(vi) $x^2 - ax = 6a^2$



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88. Solve the following quadratic equation by applying the quadratic formula(vii) $p^2x^2 + (p^2 - q^2)x - q^2 = 0$

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89. Solve the following the quadratic equation by applying the quadratic formula(viii) $abx^2 + (b^2 - ac)x - bc = 0$

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90. Solve the following the quadratic equation by applying the quadratic formula(ix) $(b + 2c)x^2 + 3(b + c)x + (2b + c) = 0$

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91. For which value of k the quadratic equation $(k + 4)x^2 + (k + 1)x + 1 = 0$ has equal roots find that value

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92. If the roots of the quadratic equation $3x^2 + (6 + 4a)x + 8a = 0$ will be equal then find the value of a .

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93. Sum of two numbers is 15. If the sum of their reciprocal is $\frac{3}{10}$ then find the numbers.

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94. Divide 16 into two parts such that twice the square of the larger part exceeds the square of the smaller part by 164.



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95. One year ago a man's age was 8 times of his son's age. At present his age is square of his son's age. Then find their present age.

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96. The quadratic equation is

a) $x(x + 1) + 8 = (x + 2)(x - 2)$ b) $x^2 + \frac{1}{x^2} = 5$ c) $x^2 - 2x - \sqrt{x} - 5 = 0$ d) $x^2 + 6x - 4 = 0$

A. $x(x+1)+8=(x+2)(x-2)$

B. $x^2 + \frac{1}{x^2} = 5$

C. $x^2 - 2x - \sqrt{x} - 5 = 0$

D. $x^2 + 6x - 4 = 0$

Answer:

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97. The roots of the quadratic equation $x^2 + 6x + 5 = 0$

a)5,-1 b)2,3 c)6,-1 d)-2,-3

A. -5,-1

B. 2,3

C. 6,-1

D. -2,-3

Answer:



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98. If $ax^2 + bx + c = 0$ has equal roots, then, $c =$

a) $\frac{b}{2a}$ b) $-\frac{b}{2a}$ c) $\frac{b^2}{4a}$ d) $-\frac{b^2}{4a}$

A. $\frac{b}{2a}$

B. $-\frac{b}{2a}$

C. $\frac{b^2}{4a}$

D. $-\frac{b^2}{4a}$

Answer:



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99. If $x^2 - 4x + p = 0$ has real roots then

A. $P \geq 5$

B. $P \leq -4$

C. $P \geq 4$

D. $P \leq 4$

Answer:



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100. The roots of the equation $x^2 - \sqrt{3}x - x + \sqrt{3} = 0$ are

A. $\sqrt{3}, -1$

B. $\sqrt{3}, 1$

C. $-\sqrt{3}, 1$

D. $-\sqrt{3}, -1$

Answer:



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101. The roots of the equation $ax^2 + x + b = 0$ are equal if

A. $ab=1/4$

B. $b^2 = 4a$

C. $b^2 < 4a$

D. $b^2 > 4a$

Answer:

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102. If $x=1$ is a common root of equations $ax^2+ax+3=0$ and $x^2 + x + b = 0$ then $ab=$

A. 1

B. 2

C. 3

D. 4

Answer:

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103. The equation $ax^2 + 2x + a = 0$ has two distinct roots, if

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104. If $x^2 + 2(k + 2)x + 9k = 0$ has equal roots then $k =$

a) -1,4 b) 1,-4 c) -1,-4 d) 1,4

A. -1,4

B. 1,-4

C. -1,-4

D. 1,4

Answer:



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105. If 8 is a root of the equation $x^2 - 10x + k = 0$ then the value of k is

a) 16 b) 2 c) 8 d) -8

A. 16

B. 2

C. 8

D. -8

Answer:



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106. If a and b are the roots of the equation $x^2 + ax + b = 0$, then $a+b=$

A. 1

B. -1

C. 2

D. -2

Answer:



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107. If one root of the equation $x^2 + ax + 3 = 0$ is 1, then its other root is

a) 2 b) -2 c) 3 d) -3

A. 2

B. -2

C. 3

D. -3

Answer:



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108. The positive value of k for which the equation $x^2 + kx + 64 = 0$ and $x^2 - 8x + k = 0$ will both have real roots, is

a) 4 b) 8 c) 12 d) 16

A. 4

B. 8

C. 12

D. 16

Answer:



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109. The roots of the equation $\sqrt{2}x^2 + 5x + 2\sqrt{2} = 0$ are

a)Rational b)Irrational c)Complex d)None of these

A. Rational

B. Irrational

C. Complex

D. None of these

Answer:



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110. The value Of $\sqrt{6 + \sqrt{6 + \sqrt{6 + \dots}}}$ is

a)-2 b)3.5 c)3 d)4

A. -2

B. 3.5

C. 3

D. 4

Answer:

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111. For the quadratic equation $x^2 - 2x + 1 = 0$ the value of $x+1/x$ is

a)1 b)-1 c)2 d)-2

A. 1

B. -1

C. 2

D. -2

Answer:



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112. If the equation $(a^2 + b^2)x^2 - 2(ac + bd)x + (c^2 + d^2) = 0$ has equal roots, then

A. $ad=bc$

B. $ab=cd$

C. $ab = \sqrt{bc}$

D. $ab = \sqrt{cd}$

Answer:



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113. If $(a^2 + b^2)x^2 + 2(ac + bd)x + (c^2 + d^2) = 0$ has no real roots then

A. $ac = bd$

B. $ab = cd$

C. $ad \neq bc$

D. $ad = bc$

Answer:



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114. The roots of the equation $ax^2 + bx + c = 0$ will be reciprocal of each other if

a) $a=b$ b) $c=a$ c) $b=c$ d) None of these

A. $a=b$

B. $c=a$

C. $b=c$

D. None of these

Answer:



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115. The roots of the equation $ax^2 + bx + c = 0$ will be equal in magnitude but opposite in sign then $b=$

a) 0 b) c/a c) 1 d) $1/a$

A. 0

B. c/a

C. 1

D. $1/a$

Answer:



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