MATHS

BOOKS - RS AGGARWAL MATHS (HINGLISH)

QUADRATIC EQUATIONS

Solved Examples

1. Which of the following are quadratic equations?

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

(ii) $2x^2 - 3\sqrt{2}x + 6 = 0$

(iii) $3x^2 - 2\sqrt{x} + 8 = 0$

(iv) $2x^2 - 3 = 0$

(v) $x + \frac{1}{x} = x^2$

(vi) $x^2 + \frac{1}{x^2} = 4\frac{1}{4}$

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2. Check whether the following are quadratic equations:

(i)

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

(iii)

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

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3. For the quadratic equation $2x^2-5x-3=0$. show that

(i)$x=3$ is its solution.

(ii) $x=\frac{-1}{2}$ is its solution.

(iii) $x=4$ is not its solution.

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4. What are the roots of the equation $x^2+\sqrt{2}x-4=0$.

A. $\sqrt{2}$ and $-\sqrt{2}$

B. $\sqrt{2}$ and $\sqrt{2}$

C. $\sqrt{2}$ and $2\sqrt{2}$

D. $\sqrt{2}$ and $-2\sqrt{2}$

Answer: D

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5. Solve: $(x+2)(3x-5)=0$.

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6. Solve: $5x^2-8x=0$.

A. $x=0$

B. $x=\frac{8}{5}$

C. $x=0$ and $x=\frac{8}{5}$

D. none of these

Answer: C

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7. Solve: $6x^2 - x - 2 = 0$ by the factorisation method.

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8. Solve: $8x^2 - 22x - 21 = 0$ by the factorisation method.

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9. Solve: $6x^2 + 40 = 31x$.

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

A. $x = \frac{2\sqrt{3}}{3}$ or $x = \frac{-\sqrt{3}}{4}$.

B. $x = \frac{-2\sqrt{3}}{3}$ or $x = \frac{-\sqrt{3}}{4}$.

C. $x = \frac{2\sqrt{3}}{3}$ or $x = \frac{\sqrt{3}}{4}$.

D. $x = \frac{-2\sqrt{3}}{3}$ or $x = \frac{\sqrt{3}}{4}$.

Answer: D

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11. Solve: $4x^2 - 12x + 9 = 0$.

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12. Solve

$4x^2 - 4ax + (a^2 - b^2) = 0.$

A. $\frac{(-a+b)}{2}$ and $\frac{(a-b)}{2}$

B. $\frac{(a+b)}{2}$ and $\frac{(a-b)}{2}$

C. $\frac{(a+b)}{2}$ and $\frac{(-a-b)}{2}$

D. none of these

Answer: B

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13. Solve the following equation by using factorisation method:

$9x^2 - 6b^2x - \left(a^4 - b^4\right) = 0.$

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14. Solve: $\frac{x+3}{x+2} = \frac{3x-7}{2x-3}.$

A. 5, 1

B. 5 , -1

C. 2, -3

D. -2 , 3

Answer: B

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15. Solve: $\frac{14}{x+3}-1=\frac{5}{x+1}, x \neq -3, -1.$

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16. Solve: $\frac{1}{(x+4)}-\frac{1}{(x-7)}=\frac{11}{30}, x \neq -4, 7.$

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17. Solve: $\frac{1}{(a+b+x)}=\frac{1}{a}+\frac{1}{b}+\frac{1}{x}, [x \neq 0, x \neq -(a+b)].$

A. $a, -b$

B. $-a, b$

C. $-a, -b$

D. a, b

Answer: C

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18. Solve: $\frac{x-2}{x-3}+\frac{x-4}{x-5}=3\frac{1}{3}, x \neq 3, 5.$

A. $6, \frac{7}{2}$

B. $5, \frac{5}{2}$

C. $7, \frac{3}{2}$

D. $4, \frac{5}{2}$

Answer: A

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19. Solve: $2\left(\frac{2x-1}{x+3}\right)-3\left(\frac{x+3}{2x-1}\right)=5, x \neq -3, \frac{1}{2}.$

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20. Solve: $\frac{2}{(x+1)}+\frac{3}{2(x-2)}=\frac{23}{5x}, x \neq 0, -1, 2.$

A. $5, -\frac{19}{11}$

B. $6, \frac{14}{11}$

C. $4, -\frac{23}{11}$

D. $5, -\frac{13}{11}$

Answer: C

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21. Solve: $\frac{1}{(x+3)}+\frac{1}{(2x-1)}=\frac{11}{(7x+9)}, x \neq -3, \frac{1}{2}, \frac{-9}{7}.$

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22. Solve: $5^{(x+1)}+5^{(2-x)}=5^3+1.$

A. x = -2 or x = 1

B. x = 2 or x = − 1

C. x = 2 or x = 1

D. x = -2 or x = − 1

Answer: B

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23. Solve the equation $x^2 - 10x - 2 = 0$ by the method of completing the square.

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24. Solve the equation $3x^2 - 5x + 2 = 0$ by the method of completing the square.

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25. Solve the equation $2x^2 + x - 4 = 0$ by the method of completing the square.

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26. By using the method of completing the square, show that the equation $4x^2 + 3x + 5 = 0$ has no real roots.

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27. Solve the equation $10x - \frac{1}{x} = 3$ by the method of completing the square.

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28. Solve the equation $a^2x^2 - 3abx + 2b^2 = 0$ by the method of completing the square.

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

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30. Show that the equation $9x^2 + 7x - 2 = 0$ has roots and solve it.

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31. solve $x^2 + 6x + 6 = 0$

A. $(-3+\sqrt{3})$ and $(-3-\sqrt{3})$

B.

C.

D.

Answer:

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32. In the following, determine whether the given quadratic equations have real roots and if so, find the roots: $2x^2 + 5\sqrt{3}x + 6 = 0$ (ii) $\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$

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33. Solve the x by quadratic formula $p^2x^2 + \left(p^2 - q^2\right)x - q^2 = 0$

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34. Solve for x: $9x^2 - 9(a+b)x + \left(2a^2 + 5ab + 2b^2\right) = 0$

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35. Solve the following quations by using qardratic formula:

$abx^2 + (b^2 - ac)x - bc = 0$

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36. Solve for $x : \frac{1}{x} - \frac{1}{x-2} = 3, \quad x \neq 0, \ 2$

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37. Solve for : $x : \frac{x-1}{x-2} + \frac{x-3}{x-4} = 3\frac{1}{3}, x \neq 2, 4$

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38. Find the nature of roots of the quadratic equation $4x^2 - 5x + 3 = 0.$

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39. Show that the equation $2x^2 - 6x + 3 = 0$ has real roots and find these roots.

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40. Show that the equation $x^2 + ax - 4 = 0$ has real and distinct roots for all real values of a .

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41. Find the nature of the roots of the quadratic equation $3x^2 - 4\sqrt{3}x + 4 = 0$ and hence solve it.

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42. Find the values k for which the quadratic equation $2x^2 + kx + 3 = 0$ has two real equal roots

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43. For what value of k, are the roots of the quadratic equation kx (x-2) +6 = 0 equal ?

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44. Find the value of k for which the quadratic equation $(k+4)x^2+(k+1)x+1=0$

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45. Find the non-zero value of k for which the quadratic equations $kx^2+1-2(k-1)x+x^2=0$ has equal roots. Hence, find the roots of the equation

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46. If -4 is a root of the equation $x^2 + px - 4 = 0$ and the equation $x^2 + px + q = 0$ has coincident roots, find the values of p and q.

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47. If -2 is a root of the equation $3x^2 + 7x + p = 0,$ find the value of k so that the roots of the equation $x^2 + k(4x + k - 1) + p = 0$ are equal.

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

B. $-1, \frac{2}{3}$

C. $-5, \frac{4}{5}$

D. $-3, \frac{7}{5}$

Answer: B

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48. both roots of the equation $(x-a)(x-b)+(x-b)(x-c)+(x-c)(x-a)=0$ are

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49. If the roots of the equation $(b-c)x^2+(c-a)x+(a-b)=0$ are equal, then prove that $2b=a+$ ·

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50. Show that the equation $3x^2+7x+8=0$ is not true for any real value of x.

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51. Show that the equation $2\left(a^2+b^2\right)x^2+2(a+b)x+1=0$ has no real roots when $a \neq b$

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52. If the equation $x^2 + 5kx + 16 = 0$ has no real roots then

A. $k < \frac{8}{5}$

B. $\frac{-8}{5} < k < \frac{8}{5}$

C. $k = \frac{8}{5}$

D. none of these

Answer: B

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53. Find the values of k for which the given equation has real roots:

(i)

$kx^2 - 6x - 2 = 0$ (ii) $3x^2 + 2x + k = 0$ (iii) $2x^2 + kx +$

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54. 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 4 (b) 8 (c) 12 (d) 16

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55. Find two numbers whose sum is 27 and product is 182.

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56. The sum of the squares of two consecutive odd numbers is 394. Find the numbers.

A. $12, 15$

B. $13, 15$

C. $14, 17$

D. $19, 17$

Answer: B

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57. The sum of the squares of two consecutive even numbers is 340. Find the numbers.

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58. The sum of the squares of two consecutive multiples of 7 is 637. Find the multiples.

A. $14, 21$

B. $7, 14$

C. $28, 35$

D. $0, 7$

Answer: A

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59. The sum of two numbers is 9. The sum of their reciprocals is . Find the numbers.

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60. The difference of two numbers is 5 and the difference of their reciprocals is $\frac{1}{10}$ Find the numbers.

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61. 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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62. The numerator of a fraction is 3 less than the denominator. If 2 is added to both the numerator and the denominator, then the sum of the

new fraction and the original fraction is $\frac{29}{20}$. Find the original fraction.

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63. The denominator of a fraction is one more than twice the numerator. If the sum of the fraction and its reciprocal is $2\frac{16}{21}$, find the fraction.

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64. A two-digit number is 5 times the sum of its digits and is also equal to 5 more than twice the product of its digits. Find the number.

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65. A two digit number is such that the product of its digits is 18. When 63 is subtracted from the number, the digits interchange their places. Find the number.

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66. A person on tour has Rs. 4200 for his expenses. If he extends his tour for 3 days, he has to cut down his daily expenses by Rs. 70. Find the original duration of the tour.

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67. A bookseller buys a number of books for Rs. 1760. If he had bought 4 more books for the same amount, each book would have cost Rs. 22 less. How many books did he buy?

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68. Some students planned a picnic. The total budget for hiring a bus was Rs. 1440. Later on, eight of these refused to go and instead paid their total share of money towards the fee of one economically weaker student of their class, and thus, the cost for each member who went for picnic, increased by Rs. 30.

(i) How many students attended the picnic?

(ii) How much money in total was paid towards the fee? Which value is reflected in this question?

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69. The total cost of a certain length of a piece of wire is Rs. 200. If the piece was 5 metres longer and each metre of wire costs Rs. 2 less, the cost of the piece would have remained unchanged. How long is the piece and what is its original rate per metre?

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70. Rs 6500 were divided equally among a certain number of persons. Had there been 15 more persons, each would have got Rs 30 less. Find the original number of persons.

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71. A girl is twice as old as her sister. Four years hence, the product of their ages (in years) will be 160. Find their present ages.

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72. The age of a man is twice the square of the age of his son. Eight years hence, the age of the man will be 4 years more than three times the age of his son. Find their present ages.

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

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74. The sum of the ages of father and his son is 45 years . 5 years ago the products of their ages was 124. Find the present ages .

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75. Seven years ago Varuns age was five times the square of Swatis age. Three years hence Swatis age will be two fifth of Varuns age. Find their present ages.

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76. A bus travels at a certain average speed for a distance of 75 km and then travels a distance of 90 km at an average speed of 10 km//hr more than the first speed. If it takes 3 hours to complete the total journey, find its original speed.

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77. In a flight of 2800km, an aircraft was slowed down due to bad weather. Its average speed is reduced by 100km/h and time increased by 30 minutes. Find the original duration of the flight.

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78. An aeroplane takes off 30 minutes later than the scheduled time and in order to reach its destination 1500 km away in time , it has to increse its speed by 250km/h from its usual speed . Find its usual speed .

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79. If a man walks 1 km/hr faster than his usual speed then he covers a distance of 3 km in 15 minutes less time. Find his usual speed.

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80. A motor boat whose speed is 24 km/hr in still water takes 1 hr more to go 32 km upstream than to return downstream to the same spot. Find the speed of the stream.

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81. A sailor can row a boat 8 km downstream and return back to the starting point in 1 hour 40 minutes. If the speed of the stream is 2 km/hr, find the speed of the boat in still water.

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82. A takes 6 days less than the time taken by B to finish a piece of work. If both A and B together can finish it in 4 days . Find the time taken by B to finish the work.

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83. Two water taps together can fill a tank in $9\frac{3}{8}$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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84. The perimeter of a rectangular field is 82 m and its area is $400m^2$. Find the dimensions of the field.

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85. The diagonal of a rectangular field is 16 m more than the shorter side. If the longer side is 14 m more than the shorter side then find the lengths of the sides of the field.

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86. A rectangular field is 20 m long and 14 m wide. There is a path of equal width all around it, having an area of 111 sq m. Find the width of the path.

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87. Sum of the areas of two squares is $260m^2$. If the difference of their perimeters is 24 m then find the sides of the two squares.

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88. The area of a right angled triangle is $600cm^2$. If the base of the triangle exceeds the altitude by 10cm, find the dimensions of the triangle.

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89. The hypotenuse of a right triangle is 6m more than the twice of the shortest side. If the third side is 2m less than the hypotenuse, find the sides of the triangle.

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Exercise 4 A

1. Which of the following are quadratic equations in x?

$(i) \quad x^2 - x + 3 = 0$ $(ii) \quad 2x^2 + \frac{5}{2}x - \sqrt{3} = 0$

$(iii) \quad \sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$ $(iv) \quad \frac{1}{3}x^2 + \frac{1}{5}x - 2 = 0$

$(v) \quad x^2 - 3x - \sqrt{x} + 4 = 0$ $(vi) x - \frac{6}{x} = 3$

$(vii) \quad x + \frac{2}{x} = x^2$ $(viii) \quad x^2 - \frac{1}{x^2} = 5$

$(ix) \quad (x+2)^3 = x^3 - 8$ $(x) \quad (2x+3)(3x+2) = 6(x-1)(x$

(xi) $\left(x + \frac{1}{x}\right)^2 = 2\left(x + \frac{1}{x}\right) + 3$

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2. Which of the following are the roots of $3x^2 + 2x - 1 = 0$?

(i) -1 $(ii) \quad \frac{1}{3}$ $(iii) \quad -\frac{1}{2}$

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3. (i) Find the value of k for which x=1 is a root of the equation $x^2 + kx + 3 = 0$. Also, find the other root.

(ii) Find the values of a and b for which $x = \frac{3}{4}$ and $x = -2$ are the roots of the equation $ax^2 + bx - 6 = 0$.

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4. Show that $x = -\frac{bc}{ad}$ is a solution of the quadratic equation $ad^2\left(\frac{ax}{b} + \frac{2c}{d}\right)x + bc^2 = 0$

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5. Solve each of the following quadratic equations:

$(2x - 3)(3x + 1) = 0$

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6. Solve each of the following quadratic equations:

$4x^2 + 5x = 0$

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7. Solve each of the following quadratic equations:

$3x^2 - 243 = 0$

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8. Solve each of the following quadratic equations:

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

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9. Solve each of the following quadratic equations:

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

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10. Solve each of the following quadratic equations:

$9x^2 - 3x - 2 = 0$

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11. Solve each of the following quadratic equations:

$x^2 + 12x + 35 = 0$

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12. Solve each of the following quadratic equations:

$x^2 = 18x - 77$

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13. Solve each of the following quadratic equations:

$6x^2 + 11x + 3 = 0$

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14. Solve each of the following quadratic equations:

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

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15. Solve each of the following quadratic equations:

$3x^2 - 2x - 1 = 0$

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16. Solve each of the following quadratic equations:

$4x^2 - 9x = 100$

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17. Solve each of the following quadratic equations:

$15x^2 - 28 = x$

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18. Solve each of the following quadratic equations:

$4 - 11x = 3x^2$

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19. Solve each of the following equatins :

$48x^2 - 13x - 1 = 0$

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20. Solve the following quadratic equations by factorization method.

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

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21. Solve : $\sqrt{3}x^2 + 10x - 8\sqrt{3} = 0.$

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22. Solve each of the following quadratic equations:

$\sqrt{3}x^2 + 11x + 6\sqrt{3} = 0$

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23. Solve each of the following quadratic equations:

$3\sqrt{7}x^2 + 4x - \sqrt{7} = 0$

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24. Solve each of the following quadratic equations:

$\sqrt{7}x^2 - 6x - 13\sqrt{7} = 0$

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25. Solve each of the following quadratic equations:

$4\sqrt{6}x^2 - 13x - 2\sqrt{6} = 0$

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26. Solve each of the following quadratic equations: $3x^2 - 2\sqrt{6}x + 2 = 0$

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27. Write the discriminant of the following quadratic equations:

$\sqrt{3}x^2 + 2\sqrt{2}x - 2\sqrt{3} = 0$ (ii) $x^2 - x + 1 = 0$

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28. Solve each of the following quadratic equations:

$x^2 - 3\sqrt{5}x + 10 = 0$

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29. Solve each of the following quadratic equations:

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

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30. Solve each of the following quadratic equations:

$x^2 + 3\sqrt{3}x - 30 = 0$

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31. Solve each of the following quadratic equations:

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

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32. Find the roots of the quadratic equations by using the quadratic formula in each of the following

$5x^2 + 13x + 8 = 0$

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33. Solve the following quadratic equations

$(1)x^2 - \left(\sqrt{2} + 1\right)x + \sqrt{2} = 0$

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34. Solve each of the following equatins :

$9x^2 + 6x + 1 = 0$

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35. Solve each of the following quadratic equations:

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

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36. Solve each of the following quadratic equations:

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

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37. Solve the following quadratic equation :

$10x - \frac{1}{x} = 3$

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38. Solve each of the following quadratic equations:

$$\frac{2}{x^2} - \frac{5}{x} + 2 = 0$$

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39. Solve each of the following quadratic equations:

$$2x^2 + ax - a^2 = 0$$

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40. Solve the following quadratic equation for $x : 4x^2 + 4bx - \left(a^2 - b^2\right) = 0$

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41. Solve each of the following quadratic equations:

$4x^2 - 4a^2x + \left(a^4 - b^4\right) = 0$

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42. Solve each of the following quadratic equations:

$x^2 + 5x - \left(a^2 + a - 6\right) = 0$

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43. Solve each of the following quadratic equations:

$x^2 - 2ax - \left(4b^2 - a^2\right) = 0$

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44. Solve each of the following quadratic equations:

$x^2 - (2b - 1)x + \left(b^2 - b - 20\right) = 0$

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45. Solve each of the following quadratic equations:

$x^2 + 6x - (a^2 + 2a - 8) = 0$

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46. Solve the following equations by using quadratic formula:

$abx^2 + (b^2 - ac)x - bc = 0$

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47. Solve the following quadratic equation for x.

$x^2 - 4ax - b^2 + 4a^2 = 0$

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48. Solve each of the following quadratic equations:

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

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49. Solve the following quations by using qardratic formula:

$12abx^2 - (9a^2 - 8^2)x - 6ab = 0$

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50. Solve each of the following quadratic equations:

$a^2b^2x^2 + b^2x - a^2x - 1 = 0$

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51. Solve for x: $9x^2 - 9(a + b)x + (2a^2 + 5ab + 2b^2) = 0$

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52. Solve each of the following quadratic equations:

$$\frac{16}{x} - 1 = \frac{15}{x+1}, x \neq 0, -1$$

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53. Solve each of the following quadratic equations:

$$\frac{4}{x} - 3 = \frac{5}{2x+3}, x \neq 0, \frac{-3}{2}$$

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54. Solve each of the following quadratic equations:

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

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55. Solve each of the following quadratic equations:

(i) $\frac{1}{x-1}-\frac{1}{x+5}=\frac{6}{7}, x \neq 1, -5$

(ii) $\frac{1}{2x-3}+\frac{1}{x-5}=1\frac{1}{9}, x \neq \frac{3}{2}, 5$

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56. Solve for: $\frac{1}{2a+b+2x}=\frac{1}{2a}+\frac{1}{b}+\frac{1}{2x}$

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57. Solve each of the following quadratic equations:

$\frac{x+3}{x-2}-\frac{1-x}{x}=4\frac{1}{4}, x \neq 2, 0$

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58. Solve each of the following quadratic equations:

$\frac{3x-4}{7}+\frac{7}{3x-4}=\frac{5}{2}, x \neq \frac{4}{3}$

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59. Solve each of the following quadratic equations:

(i) $\frac{x}{x-1}+\frac{x-1}{x}=4\frac{1}{4}, x \neq 0,1$

(ii) $\frac{x-1}{2x+1}+\frac{2x+1}{x-1}=2, x \neq -\frac{1}{2}, 1$

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60. Solve each of the following quadratic equations:

$\frac{x}{x+1}+\frac{x+1}{x}=2\frac{4}{15}, x \neq .0, -1$

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61. Solve each of the following quadratic equations:

$\frac{x-4}{x-5}+\frac{x-6}{x-7}=3\frac{1}{3}, x \neq 5,7$

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62. Solve each of the following quadratic equations:

$$\frac{x-1}{x-2}+\frac{x-3}{x-4}=3\frac{1}{3}, x \neq 2, 4$$

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63. Solve each of the following quadratic equations:

$$\frac{1}{x-2}+\frac{2}{x-1}=\frac{6}{x}, x \neq 0, 1, 2$$

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64. Solve each of the following quadratic equations:

(i) $\frac{1}{x+1}+\frac{2}{x+2}=\frac{5}{x+4}, x \neq -1, -2, -4$

(ii) $\frac{1}{x+1}+\frac{3}{5x+1}=\frac{5}{x+4}, x \neq -1, -\frac{1}{5}, -4$

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65. $3\left(\frac{3x-1}{2x+3}\right)-2\left(\frac{2x+3}{3x-1}\right)=5, x \neq \frac{1}{3}, -\frac{3}{2}$

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66. $3\left(\frac{7x+1}{5x-3}\right)-4\left(\frac{5x-3}{7x+1}\right)=11; x \neq \frac{3}{5}, -\frac{1}{7}$

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67. Solve each of the following quadratic equations:

$\left(\frac{4x-3}{2x+1}\right)-10\left(\frac{2x+1}{4x-3}\right)=3, x \neq \frac{-1}{2}, \frac{3}{4}$

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68. Solve each of the following quadratic equations:

$\left(\frac{x}{x+1}\right)^2-5\left(\frac{x}{x+1}\right)+6=0, x \neq -1$

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69. Solve each of the following quadratic equations:

$\frac{a}{(x-b)}+\frac{b}{(x-a)}=2, x \neq b, a$

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70. Solve each of the following quadratic equations: $\frac{a}{(ax-1)}+\frac{b}{(bx-1)}=(a+b), x \neq \frac{1}{a}, \frac{1}{b}$

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71. Solve each of the following quadratic equations: $3^{(x+2)}+3^{-x}=10$

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72. Solve each of the following quadratic equations: $4^{(x+1)}+4^{(1-x)}=10$

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73. Solve each of the following quadratic equations: $2^{2x} - 3.2^{(x+2)} + 32 = 0$

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Exercise 4 B

1. Solve each of the following equations by using the method of completing the square: $x^2 - 6x + 3 = 0$

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2. Solve each of the following equations by using the method of completing the square: $x^2 - 4x + 1 = 0$

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3. Solve each of the following equations by using the method of completing the square: $x^2 + 8x - 2 = 0$

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

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5. Solve each of the following equations by using the method of completing the square:

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

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6. Solve each of the following equations by using the method of completing the square:

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

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7. Solve each of the following equations by using the method of completing the square:

$8x^2 - 14x - 15 = 0$

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8. Solve each of the following equations by using the method of completing the square:

$7x^2 + 3x - 4 = 0$

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9. Solve each of the following equations by using the method of completing the square:

$3x^2 - 2x - 1 = 0$

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10. Solve each of the following equations by using the method of completing the square:

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

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11. Solve each of the following equations by using the method of completing the square:

$\frac{2}{x^2} - \frac{5}{x} + 2 = 0$

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12. Find the roots of the following equation $4x^2 + 4bx - \left(a^2 - b^2\right) = 0$ by the method of completing the square.

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13. Solve each of the following equations by using the method of completing the square:

$x^2 - \left(\sqrt{2} + 1\right)x + \sqrt{2} = 0$

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14. Solve each of the following equations by using the method of completing the square:

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

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15. Find the roots of the quadratic equations (if they exist) by the method of completing the square. $\sqrt{3}x^2 + 10x + 7\sqrt{3} = 0$

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16. Solve each of the following equations by using the method of completing the square:

By using the method of completing the square, show that the equation $2x^2 + x + 4 = 0$ has no real roots.

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Exercise 4 C

1. Find the discriminant of each of the following equations:

(i)$2x^2 - 7x + 6 = 0$ (ii) $3x^2 - 2x + 8 = 0$

(iii)

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

(v) $(x-1)(2x-1) = 0$ (vi) $1 - x = 2x^2$

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2. Find the roots of each of the following equations, if they exist, by applying the quadratic formula:

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

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3. Find the roots of each of the following equations, if they exist, by applying the quadratic formula:

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

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

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5. Find the roots of each of the following equations, if they exist, by applying the quadratic formula:

$25x^2 + 30x + 7 = 0$

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6. Find the roots of each of the following equations, if they exist, by applying the quadratic formula:

$16x^2 = 24x + 1$

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7. Solve each of the following quadratic equations:

$15x^2 - 28 = x$

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8. Find the roots of the following quadratic equations, if they exist, using the quadratic formula:(i) $3x^2 - 5x + 2 = 0$ (ii) $x^2 + 4x + 5 = 0$(iii) $2x^2 - 2\sqrt{2}x + 1 = 0$

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9. Solve each of the following quadratic equations:

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

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10. Find the roots of the quadratic equations (if they exist) by the method of completing the square. $\sqrt{3}x^2 + 10x + 7\sqrt{3} = 0$

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11. Find the roots of each of the following equations, if they exist, by applying the quadratic formula:

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

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12. Find the roots of each of the following equations, if they exist, by applying the quadratic formula:

$2x^2 + 6\sqrt{3}x - 60 = 0$

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13. Find the roots of each of the following equations, if they exist, by applying the quadratic formula:

$4\sqrt{3}x^2 + 5x - 2\sqrt{3} = 0$

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14. Find the roots of each of the following equations, if they exist, by applying the quadratic formula:

$3x^2 - 2\sqrt{6}x + 2 = 0$

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15. Find the roots of each of the following equations, if they exist, by applying the quadratic formula:

$2\sqrt{3}x^2 - 5x + \sqrt{3} = 0$

Watch Video Solution

16. Find the roots of each of the following equations, if they exist, by applying the quadratic formula:

$x^2 + x + 2 = 0$

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17. Find the roots of each of the following equations, if they exist, by applying the quadratic formula:

$2x^2 + ax - a^2 = 0$

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18. Solve each of the following quadratic equations:

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

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19. Find the roots of each of the following equations, if they exist, by applying the quadratic formula:

$2x^2 + 5\sqrt{3}x + 6 = 0$

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20. Find the real roots of each of the following equations, if they exist, by applying the quadratic formula:

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

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21. Find the roots of each of the following equations, if they exist, by applying the quadratic formula:

$2\sqrt{3}x^2 - 5x + \sqrt{3} = 0$

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22. Find the roots of each of the following equations, if they exist, by applying the quadratic formula:

$2\sqrt{3}x^2 - 5x + \sqrt{3} = 0$

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23. Find the roots of each of the following equations, if they exist, by applying the quadratic formula:

$2\sqrt{3}x^2 - 5x + \sqrt{3} = 0$

Watch Video Solution

24. Find the roots of each of the following equations, if they exist, by applying the quadratic formula:

$2\sqrt{3}x^2 - 5x + \sqrt{3} = 0$

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25. Find the roots of each of the following equations, if they exist, by applying the quadratic formula:

$2\sqrt{3}x^2 - 5x + \sqrt{3} = 0$

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26. Find the roots of each of the following equations, if they exist, by applying the quadratic formula: $x^2 - 2ax + a^2 - b^2$

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27. Find the roots of each of the following equations, if they exist, by applying the quadratic formula: $x^2 - 2ax + a^2 - 4b^2$

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28. Find the roots of each of the following equations, if they exist, by applying the quadratic formula:$x^2 + 6x - \left(a^2 + 2a - 8\right)$

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29. Find the roots of each of the following equations, if they exist, by applying the quadratic formula: $x^2 - 5x - \left(a^2 + a - 6\right)$

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30. Find the roots of each of the following equations, if they exist, by applying the quadratic formula: $x^2 - 4ax + 4a^2 - b^2$

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31. Solve each of the following quadratic equations:

$4x^2 - 4a^2x + \left(a^4 - b^4\right) = 0$

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32. Find the roots of each of the following equations, if they exist, by applying the quadratic formula: $4x^2 + 4bx - \left(a^2 - b^2\right) = 0$

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33. find the roots of the following equation by applying the quadratic formula $x^2 - (2b - 1)x + \left(b^2 - b - 20\right) = 0$

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34. In the following, determine whether the given quadratic equations have real roots and if so, find the roots: $2x^2 - 2\sqrt{6}x + 3 = 0$ (ii) $3a^2x^2 + 8abx + 4b^2 = 0, \quad a \neq 0$

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35. solve the equation $a^2b^2x^2 - \left(4b^4 - 3a^4\right)x - 12a^2b^2 = 0$

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36. Solve the following quations by using qardratic formula:

$12abx^2 - \left(9a^2 - 8^2\right)x - 6ab = 0$

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Exercise 4 D

1. Find the nature of the roots of the following quadratic equations:

(i)

$2x^2 - 8x + 5 = 0$

(ii) $3x^2 - 2\sqrt{6}x + 2 = 0$

(iii)

$5x^2 - 4x + 1 = 0$

(iv) $5x(x - 2) + 6 = 0$

(v)

$12x^2 - 4\sqrt{15}x + 5 = 0$

(vi) $x^2 - x + 2 = 0$

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2. Show that the equation $2\left(a^2+b^2\right)x^2+2(a+b)x+1=0$ has no real roots when $a \neq b$

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3. Show that the roots of the equation $x^2+px-q^2=0$ are real for all real values of p and q.

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4. For what values of k are the roots of the quadratic equation $3x^2+2kx+27=0$ real and equal?

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5. For what value of k are the roots of the quadratic equation $kx\left(x-2\sqrt{5}\right)+10=0$ real and equal?

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6. Find the value of p for which the quadratic equation $4x^2+px+3=0$ has equal roots

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7. Find the nonzero value of k for which the roots of the quadratic equation $9x^2-3kx+k=0$ are real and equal.

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8. (i) Find the values of k for which the quadratic equation $(3k+1)x^2+2(k+1)x+1=0$ has real and equal roots.

(ii) Find the value of k for which the equation $x^2 + k(2x + k - 1) + 2 = 0$ has real and equal roots.

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9. Find the values of p for whch the equadratic equation $(2p + 1)x^2 - (7p + 2)x + (7p - 3) = 0$

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10. Find the value of p for which the quadratic equation $(p + 1)x^2 + -6(p + 1)x + 3(p + 9) = 0, p \neq -1$ has equal roots. Hence, find the roots of the equation.

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11. If -5 is a root of the quadratic equation $2x^2 + px - 15 = 0$ and the quadratic equation $p(x^2 + x) + k = 0$ has equal roots, find the value of

k.

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12. If 3 is a root of the quadratic equation $x^2 - x + k = 0$ find the value of p so that the roots of the equation $x^2 + k(2x + k + 2) + p = 0$ are equal.

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13. If -4 is a root of the equation $x^2 + 2x + 4p = 0$ then find the value of k for which the equation $x^2 + px(1 + 3k) + 7(3 + 2k) = 0$ has equal roots

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14. If the equation $(1 + m^2)x^2 + 2mcx + (c^2 - a^2) = 0$ has equal roots, prove that $c^2 = a^2(1 + m^2)$.

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15. If the roots of the equation $(c^2 - ab)x^2 - 2(a^2 - bc)x + b^2 - ac = 0$ are equal, prove that either $a = 0$ or $a^3 + b^3 + c^3 = 3ab$.

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16. Find the values of p fro which the qadratic equation $2x^2 + px + 8 = 0$ has real roots.

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17. Find the value of α for which the equation $(\alpha - 12)x^2 + 2(\alpha - 12)x + 2 = 0$ has equal roots.

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18. For what real values of k the equation $9x^2 + 8Kx + 16 = 0$ have real and equal roots ?

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19. Find the values of k for which the given quadratic equation has real and distinct roots:

(i)

$kx^2 + 6x + 1 = 0$

$(ii)\quad x^2 - kx + 9 = 0$

(iii)

$9x^2 + 3kx + 4 = 0$

$(iv)\quad 5x^2 - kx + 1 = 0$

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20. If a and b are real and $a \neq b$ then show that the roots of the equation $(a - b)x^2 + 5(a + b)x - 2(a - b) = 0$ are real and unequal.

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21. If the roots of the equation $(a^2+b^2)x^2-2(ac+bd)x+(c^2+d^2)=0$ are equal, prove that $\frac{a}{b}=\frac{c}{..}$

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22. If the roots of the equation $ax^2+2bx+c=0$ and $-2\sqrt{acx}+b=0$ are simultaneously real, then prove that $b^2=ac$

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Exercise 4 E

1. The sum of a natural number and its square is 156. Find the number.

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2. The sum of a natural number and its positive square root is 132. Find the number.

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3. The sum of two natural number is 28 and their product in 192. Find the numbers.

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

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5. The sum of the squares of two consecutive positive odd numbers is 514. Find the numbers.

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6. The sum of the squares of two consecutive positive even numbers is 452. Find the numbers.

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7. The product of two consecutive positive integers is 306. Form the quadratic equation to find the integers, if x denotes the smaller integer.

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8. Two numbers differ by 3 and their product is 504. Find the number.

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9. Find two consecutive multiples of 3 whose product is 648.

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10. The product of two consecutive odd numbers in 483. Find the numbers.

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11. Find two consecutive positive even integers whose product is 288.

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12. The sum of two natural numbers is 9 and the sum of their reciprocals is $\frac{1}{2}$. Find the numbers.

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13. The sum of two numbers a and b is 15, and the sum of reciprocal of numbers is $\frac{3}{10}$. Find a and b

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14. The difference of two natural numbers is 3 and the difference of their reciprocals is $\frac{3}{28}$. Find the numbers.

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15. The difference of two natural numbers is 5 and the difference of their reciprocals is $\frac{5}{14}$. Find the numbers.

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16. The sum of the squares of two consecutive multiples of 7 is 1225. Find the multiples.

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17. The sum of a natural number and its reciprocal is $\frac{65}{8}$. Find the number.

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18. Divide 57 into two parts whose product is 680.

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19. Divide 27 into two parts such that the sum of their reciprocals is $\frac{3}{20}$

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20. 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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21. Find two natural numbers, the sum of whose squares is 25 times their sum and also equal to 50 times their difference.

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22. The difference of the squares of two numbers is 45. The square of the smaller number is 4 times the larger number. Determine the numbers.

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23. Three consecutive positive integers are such that the sum of the square of the first and the product of other two is 46, fond the integers.

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24. If two digit number is four times the sum of its digits and twice the product of digits. Find the number.

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25. A two digit number is such that the product of the digits is 14. When 45 is added to the number, then the digits are reversed. Find the number.

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26. The denominator of a positive fraction is one more than twice the numerator. If the sum of the fraction and its reciprocal is 2.9, find the fraction,

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27. The numerator of a fraction is 3 less than its denominator.If 11 is added to the denominator,the fraction is decreased by $\frac{1}{15}$ Find the fraction

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28. The sum of a number and its reciprocal is $2\frac{1}{30}$. Find the numbers.

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29. A teacher on attempting to arrange the students for mass drill in the form of a solid square found that 24 students were left. When he increased the size of the square by one student, he found that he was short of 25 students. Find the number of students.

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30. 300 apples are distributed equally among a certain number of students. Had three been 10 more students, each would have received one apple less. Find the number of students.

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31. In a class test, the sum of Kamal's marks in mathematics and English is 40. Had he got 3 marks more in mathematics and 4 marks less in English, the product of the marks would have been 360. Find his marks in two subjects separately.

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32. Some students planned a picnic. The total budget for food was Rs. 2000. But, 5 students failed to attend the picnic and thus the cost for food for each member increased by Rs. 20. How many students attended the picnic and how much did each student pay for the food?

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33. If the price of book is reduced by Rs. 5, a person can buy 4 more books for Rs. 600. Find the original price of the book.

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34. A person on tour has Rs. 10800 for his expencses. If he extends his tour by 4 days, he has to cut down his daily expenses by Rs. 90. Find the original duration of the tour.

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35. In a class test, the sum of the marks obtained by P in mathematics and science is 28. Had he got 3 more marks in mathematics and 4 marks less in science, the product of marks obtained in the two subjects would have been 180. Find the marks obtained by him in the two subjects separately.

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36. A man buys a number of pens for Rs. 180. If he had bought 3 more pens for the same amount, each pen would have cost him Rs. 3 less. How many pens did he buy ?

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37. A dealer sells an article for Rs. 75 and gains as much per cent as the cost price of the article. Find the cost price of the article.

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38. (i) One year ago, a man was 8 time as old as his son. Now, his age is equal to the square of his son's age. Find their present ages.

(ii) A man is $3\frac{1}{2}$ times as old as his son. If the sum of the squares of their ages is 1325, find the ages of the father and the son.

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39. The sum of the reciprocals of Meena's ages (in years) 3 years ago and 5 year hence is $\frac{1}{3}$. Find her present age.

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40. The sum of ages of a boy and his brother is 25 years, and the product of their ages in years is 126. Find their ages.

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41. The product of Tanvy's age (in years) 5 years ago and her age 8 years later is 30. Find her present age.

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42. Two years ago, a man's age was three times the square of his son's age. In three years time, his age will be four times his son's age. Find their present ages.

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43. A truck covers a distance of 150 km at a certain average speed and then covers another 200 km at average speed which is 20 km per hour more than the first speed. If the truck covers the total distance in 5 hours, find the first speed of the truck.

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44. While boarding an aeroplane, a passenger got hurt. The pilot showing promptness and concern, made arrangements to hospitalise the injured and so the plane started late 30 minutes to reach the destination, 1500 km away in time, the pilot increased the speed by 100 km/hr. Find the original speed/hour of the plane.

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45. A train covers a distance of 480 km at a uniform speed. If the speed had been 8 km/hr less then it would have taken 3 hours more to cover the same distance. Find the usual speed of the train.

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46. A train travels at a certain average speed for a distance of 54 km and then travels a distance of 63 km at an average speed of 6 km/h more than the first speed. If it takes 3 hours to complete the total journey, what is its first speed?

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47. A train travels 180 km at a uniform speed. If the speed had been 9 km/hour more, it would have taken 1 hour less for the same journey. Find the speed of the train.

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48. A train travels a distance of 300km at constant speed. If the speed of the train is increased by 5 km/kr, the journey would have taken 2 hours less. Find the original speed of the train.

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49. A passenger train takes 2 hours less for a journey of 300 km if its speed is increased by 5 km/hr from its usual speed. Find the usual speed of the train.

A. 35 km/hr

B. 30 km/hr

C. 25 km/hr

D. 45 km/hr

Answer: C

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50. The distance between Mumbai and Pune is 192 km. Travelling by the Deccan Queen, it takes 48 minutes less than another train. Calculate the

speed of the Deccan Queen if the speeds of the two trains differ by 20 kmph.

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51. A motor boat whose speed is 18 km/h m still water takes 1 hour more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream.

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52. The speed of a boat in still water is 15 km/hr. It can go 30 km upstream and return downstream to the original point in 4 hours 30 minutes. Find the speed of the stream.

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53. A motorboat whose speed is 9 km/hr in still water, goes 15 km downstream and comes back in a total time of 3 hours 45 minutes. Find the speed of the stream.

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54. A takes 10 days less than the time taken by B to finish a piece of work. If both A and B together can finish the work in 12 days, find the time taken by B to finish the work.

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55. Two taps running together can fill a tank in $3\left(\frac{1}{13}\right)$ hours. If one tap takes 3 hours more than the other to fill the tank, then how much time will each tap take to fill the tank ?

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56. Two pipes running together can fill a tank in $11\frac{1}{9}$ minutes. If one pipe takes 5 minutes more than the other to fill the tank separately, find the time in which each pipe would fill the tank separately.

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57. Two water taps together can fill a tank in 6 hours. The tap of larger diameter takes 9 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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58. The length of a rectangle is twice its breadth and its area is 288 cm^2. Find the dimensions of the rectangle.

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59. The length of a rectangular field is three times its breadth. If the area of the field be 147 sq metres, find the length of the field.

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60. The length of a hall is 3 metres more than its breadth. If the area of the hall is 238 sq metres, calculate its length and breadth.

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61. The perimeter of a rectangular plot is 62 m and its area is 228 sq metres. Find the dimensions of the plot.

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62. A rectangular field is 16 m long and 10 m wide. There is a path of uniform width all around it, having an area of $120m^2$. Find the width of

the path.

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63. The sum of the areas of two squares is $640m^2$. If the difference in their perimeters be 64 m, find the sides of the two squares.

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64. The length of a rectangle is thrice as long as the side of a square. The side of the square is 4 cm more than the width of the rectangle. Their areas being equal, find their dimensions.

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65. A farmer prepares a rectangular vegatable garden of area 180 sq metres. With 39 netres of barbed wire, he can fence the three sides of the

garden, leaving one of the longer sides unfenced. Find the dimensions of the garden.

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66. The area of a right angled triangle is $600cm^2$. If the base of the triangle exceeds the altitude by 10cm, find the dimensions of the triangle.

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67. The area of a right-angled triangle is 96 sq metres. If the base is three times the altitude, find the base.

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68. The area of a right angled triangle is $165m^2$. Determine its base and altitude if the latter exceeds the former by 7m.

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69. The hypotenuse of a right-angled triangle is 20 meters. If the difrference between the lengths of the other sides be 4 metres, find the other sides.

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70. The length of a hypotenuse of a right triangle exceeds the length of its base by 2cm and exceed twice the length of the altitude by 1cm .Find the length of each side of the triangle (in cm)

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71. The hypotenuse of a right-angled triangle is 1 metre less than twice the shortest side. If the third side is 1 metre more more than the shortest side, find the sides of the triangle.

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Test Yourself

1. Which of the following is a quadratic equation?

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

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

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

D. $2x^2 - 5x = (x-1)^2$

Answer: D

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2. Which of the following is a quadratic equation ?

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

B. $x^3 - x^2 = (x-1)^3$

C. $2x^2 + 3 = (5 + x)(2x - 3)$

D. None of these

Answer: B

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3. Which of the following is not a quadratic equation?

A. $3x - x^2 = x^2 + 5$

B. $(x + 2)^2 = 2(x^2 - 5)$

C. $\left(\sqrt{2}x + 3\right)^2 = 2x^2 + 6$

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

Answer: C

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4. If x=3 is a solution of the equation $3x^2 + (k - 1)x + 9 = 0$ then k=?

A. 11

B. -11

C. 13

D. -13

Answer: B

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5. If one root of the equation $2x^2 + ax + 6 = 0$ is 2 then a=?

A. 7

B. -7

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

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

Answer: B

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6. The sum of the roots of the equation $x^2 - 6x + 2 = 0$ is

A. 2

B. -2

C. 6

D. -6

Answer: C

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7. If the product of the roots of the equation $x^2 - 3x + k = 10$ is -2 then the value of k is

A. -2

B. -8

C. 8

D. 12

Answer: C

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8. The ratio of the sum and product of the roots of the equation $7x^2 - 12x + 18 = 0$ is

A. $7:12$

B. $7:18$

C. $3:2$

D. $2:3$

Answer: D

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9. If one root of the equation $3x^2 - 10x + 3 = 0$ is $\frac{1}{3}$ then the other root is

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

B. $\frac{1}{3}$

C. -3

D. 3

Answer: D

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10. If one root of $5x^2 + 13x + k = 0$ be the reciprocal of the other root then the value of k is

A. 0

B. 1

C. 2

D. 5

Answer: D

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11. If the sum of the roots of the equation $kx^2 + 2x + 3k = 0$ is equal to their product then the value of k is

A. $\frac{1}{3}$

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

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

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

Answer: D

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12. The roots of a quadratic equation are 5 and -2. Then, the equation is

A. $x^2 - 3x + 10 = 0$

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

C. $x^2 + 3x - 10 = 0$

D. $x^2 + 3x + 10 = 0$

Answer: B

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13. If the sum of the roots of aquadratic equation is 6 and their product is 6, the equation is

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

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

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

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

Answer: A

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14. If α and β are the roots of the equation $3x^2 + 8x + 2 = 0$ then $\left(\frac{1}{\alpha} + \frac{1}{\beta}\right) = ?$

A. $\frac{-3}{8}$

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

C. -4

D. 4

Answer: C

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

A. $a = b$

B. $b = c$

C. $c = a$

D. None of these

Answer: C

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16. If the roots of the equation $ax^2 + bx + c = 0$ are equal then c=?

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

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

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

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

Answer: D

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17. If the equation $9x^2 + 6kx + 4 = 0$ has equal roots then k=?

A. 2 or 0

B. $-2 \quad \text{or} \quad 0$

C. 2 or -2

D. 0 only

Answer: C

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18. If the equation $x^2 + 2(k+2)x + 9k = 0$ has equal roots then k= ?

A. 1 or 4

B. $-1 \quad \text{or} \quad 4$

C. 1 or -4

D. -1 or -4

Answer: A

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19. If the equation $4x^2 - 3kx + 1 = 0$ has equal roots then k=?

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

B. $\pm\frac{1}{3}$

C. $\pm\frac{3}{4}$

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

Answer: D

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20. The roots of $ax^2 + bx + c = 0, a \neq 0$ are real and unequal, if $(b^2 - 4ac)$

A. > 0

B. $= 0$

C. < 0

D. None of these

Answer: A

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21. In the equation $ax^2 + bx + c = 0$, it is given that $D = (b^2 - 4ac) > 0$. Then, the roots of the equation are

A. real and equal

B. real and unequal

C. imaginary

D. None of these

Answer: B

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22. The roots of the equation $2x^2 - 6x + 7 = 0$ are

A. real, unequal and rational

B. real, unequal and irrational

C. real and equal

D. imaginary

Answer: D

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23. The roots of the equation $2x^2 - 6x + 3 = 0$ are

A. real, unequal and rational

B. real, unequal and irrational

C. real and equal

D. imaginary

Answer: B

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24. If the roots of $5x^2 - kx + 1 = 0$ are real and distinct then

A. $-2\sqrt{5} < k < 2\sqrt{5}$

B. $k > 2\sqrt{5}$ only

C. $k < -2\sqrt{5}$ only

D. either $k > 2\sqrt{5}$ or $k < -2\sqrt{5}$

Answer: D

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25. If the equation $x^2 + 5kx + 16 = 0$ has no real roots then

A. $k > \frac{8}{5}$

B. $k < \frac{-8}{5}$

C. $\frac{-8}{5} < k < \frac{8}{5}$

D. None of these

Answer: C

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26. If the equation $x^2 - kx + 1 = 0$ has no real roots then

A. $k < -2$

B. $k > 2$

C. $-2 < k < 2$

D. None of these

Answer: C

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27. For what values of k, the equation $kx^2 - 6x - 2 = 0$ has real roots?

A. $k \leq \frac{-9}{2}$

B. $k \geq \frac{-9}{2}$

C. $k \leq -2$

D. None of these

Answer: B

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28. The sum of a number and its reciprocal is $2\frac{1}{20}$. The number is

A. $\frac{5}{4}$ or $\frac{4}{5}$

B. $\frac{4}{3}$ or $\frac{3}{4}$

C. $\frac{5}{6}$ or $\frac{6}{5}$

D. $\frac{1}{6}$ or 6

Answer: A

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29. The perimeter of a rectangle is 82 m and its area is $400m^2$. The breadth of the rectangle is

A. 25 m

B. 20 m

C. 16 m

D. 9 m

Answer: C

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30. The length of a rectangular field exceeds its breadth by 8 m and the area of the field is $240m^2$, The breadth of the field is

A. 20 m

B. 30 m

C. 12 m

D. 16 m

Answer: C

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31. The roots of the quadratic equation $2x^2 - x - 6 = 0$ are

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

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

C. $-2, \frac{-3}{2}$

D. $2, \frac{3}{2}$

Answer: B

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32. The sum of two natural numbers is 8 and their product is 15. Find the numbers.

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33. Show that x=-3 is sloustion of x^2+6x+9=0A

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34. Show that $x = -2$ is a solution of $3x^2 + 13x + 14 = 0$.

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35. If $x = -\frac{1}{2}$ is a solution of the quadratic equation $3x^2 + 2kx - 3 = 0$, find the velue of k.

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36. The roots of the quadratic equation $2x^2 - x - 6 = 0$ are

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37. Find the discriminant of the quadratic equation $3\sqrt{3}x^2 + 10x + \sqrt{3} = 0$.

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38. If the roots of the quadratic equation $2x^2 + 8x + k = 0$ are equal, find the value of k.

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39. If the quadratic equation $px^2 - 2\sqrt{5}px + 15 = 0$ has two equal roots, then find value of p.

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40. If 1 is a root of the equation $ay^2 + ay + 3 = 0$ and $y^2 + y + b = 0$ then find the value of ab.

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41. If one zero of the polynomial $x^3 - 4x + 1$ is $2 + \sqrt{3}$ write the other zero

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42. If one root of the quadratic equation $3x^2 - 10x + k = 0$ is reciprocal of the other, find the value of k.

A. 1

B. 2

C. 3

D. 4

Answer: C

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43. Find the value of p for which the roots of the equation px (x — 2) + 6 = 0, are equal.

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44. Find the value(s) of k so that, the quadratic equation $x^2 - 4kx + k = 0$ has equal roots.

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45. Find the nonzero value of k for which the roots of the quadratic equation $9x^2 - 3kx + k = 0$ are real and equal.

A. $k = \pm 1$

B. $k = 1$ only

C. $k = 0 \text{ or } k = 1$

D. none

Answer: B

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46. Solve: $x^2 - \left(\sqrt{3} + 1\right)x + \sqrt{3} = 0$

A. $x = -\sqrt{3}$ or $x = -1$

B. $x = -\sqrt{3}$ or $x = 1$

C. $x = \sqrt{3}$ or $x = -1$

D. $x = \sqrt{3}$ or $x = 1$

Answer: D

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47. Solve: $2x^2 + ax - a^2 = 0$

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48. Find the roots of the following quadratic equations by the factorisation method.

$3x^2 + 5\sqrt{5}x - 10 = 0$

A. $x = 2\sqrt{5}$ or $x = \frac{\sqrt{5}}{3}$

B. $x = -2\sqrt{5}$ or $x = \frac{\sqrt{5}}{3}$

C. $x = -2\sqrt{5}$ or $x = \frac{-\sqrt{5}}{3}$

D. $x = 2\sqrt{5}$ or $x = \frac{-\sqrt{5}}{3}$

Answer: B

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49. Solve : $\sqrt{3}x^2 + 10x - 8\sqrt{3} = 0.$

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50. Solve for x $\sqrt{3}x^2 - 2\sqrt{2}x - 2\sqrt{3} = 0$

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51. Solve by factorization: $4\sqrt{3}x^2 + 5x - 2\sqrt{3} = 0$

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52. Solve by factorization: $4x^2 + 4bx - \left(a^2 - b^2\right) = 0$

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53. Solve $x^2 + 5x - \left(a^2 + a - 6\right) = 0.$

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54. Solve for x: $x^2 + 6x - \left(a^2 + 2a - 8\right) = 0$

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55. Find the roots of each of the following equations, if they exist, by applying the quadratic formula:

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