MATHS

BOOKS - CALCUTTA BOOK HOUSE MATHS (BENGALI ENGLISH)

QUADRATIC EQUATION IN ONE VARIABLE

Examples

1. For what value of a, the equation $(a-2)x^2+3x+5=0$ will not be a quadratic equation?

A. 0

B. 1

C. 2

D. 3

Answer:

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2. For what power of the variable of the equation $x^6 - x^3 - 2 = 0$ will be a quadratic equation?

A. 0

B. 1

C. 2

D. 3

Answer:

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3. If the expression $\frac{x}{4-x} = \frac{1}{3x}(x \neq 0, x \neq 4)$ is expressed in the form of $ax^2 + bx + c = 0(a \neq 0)$, then the co-efficient of x will be

A. 0

B. 1

C. 2

D. 3

Answer:

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4. Which of the following is a quadratic polynomial ?

A. $x^3 - 7x + 2$

B. $7x^5 - x(x + 2)$

C. $2x(x + 5) + 1$

D. $2x - 1$

Answer:

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5. Write true or false :

The equation $x + \frac{1}{x} = 2(x \neq 0)$ is not a quadratic equation in one variable.

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6. Write true or false :

The equation $(x-1)^3 = x\left(x^2 - 1\right)$ is a quadratic equation of one variable.

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7. The co-efficient of x^3 in the equation $(x+1)^3 = x\left(x^2 + 1\right)$ _____

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8. The given equation $x^{-1} + x = t$ (t=constant is a _____ equation in _____ variable.

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9. The quadratic equation $ax^2 + bx + c = 0$ becomes a linear equation when a= _____.

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10. Express the term $3x^2 + 7x + 23 = (x + 4)(x + 3) + 2$ in the form of $ax^2 + bx + c = 0(a \neq 0)$.

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11. Express the term $(x + 2)^3 = x\left(x^2 - 1\right)$ in the form $ax^2 + bx + c = 0(a \neq 0)$ of quadratic equation and find the coefficient

of x^2, x and x^0.

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12. Form a quadratic equation in one variable from the following statement(s) :

The product of two consecutive positive odd numbers is 143.

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13. Express the term $x - 1 + \frac{1}{x} = 6(x \neq 0)$ in the form $ax^2 + bx + c = 0$ where a, b, c are real numbers and $a \neq 0$.

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14. Verift whether the following euqation can be written in the standard form or not : $x + \frac{3}{x} = x^2(x \neq 0)$

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15. The sum of squares of two consecutive numbers is 313.Hence find the required quadratic equation.

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16. The diagonal of a rectangular field is 15 m and its length is 3 m more than its breadth.Find out the required quadratic equation in one variable

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17. The distance between two stations is 300km. A train went to second station from first station with uniform velocity. If the velocity of the train had been 5 km / hour more, then the time taken by the train to reach the second station would be lesser by 2 hours.

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18. One person baught some kg of suger for RS 80. If he would get 4 kg sugar more with that money, then the price of 1 kg sugar would be less by RS 1.Hence find the required quadratic equation.

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19. A clock-seller sold a clock by purchasing it at RS 336. The amount of his profit percentage is as much as the amount with which he bought the clock.Hence find the required quadratic equation.

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20. If the velocity of the stream is 2 km/hr, then the time taken by Ratanmajhi to cover 21 km in downstream and upstream is 10 hours.Hence find the required quadratic equation.

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21. The time taken to clean out a garden by Majid is 3 hours more than that by Mahim. Both of them together can complete the work in 2 hours.Hence find the required quadratic equation.

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22. The unit digit of a two digit number exceeds its tens' digit by 6 and the product of two digits is less by 12 from the number.Hence find the required quadratic equation.

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23. There is a road of equal width around the outside of a rectangular play ground having the length 45 m and breadth 40 m and the area of the roda is 450 sq-m.

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24. The value of k for which $\frac{2}{3}$ is a root of the quadratic equation $7x^2 - kx - 3 = 0$ is

A. $-\frac{1}{6}$

B. $\frac{1}{6}$

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

D. $-\frac{5}{6}$

Answer:

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25. The value of k for which (-a) will be a root of the quadratic equation $x^2 + 3ax + k = 0$ is

A. a^2

B. $-a^2$

C. $-2a^2$

D. $2a^2$

Answer:

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26. One root of the equdratic equation $x^2 + 2x + 1 = 0$ is

A. 0

B. -1

C. 1

D. None of these.

Answer:

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27. One root of the quadratic equation $x^2 - \sqrt{3}x - 6 = 0$ is

A. $4\sqrt{3}$

B. $\sqrt{3}$

C. $2\sqrt{3}$

D. $-2\sqrt{3}$

Answer:

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28. The value of k for which a will be a root of the quadratic equation $x^2 + 3ax - k = 0$ is $4a^2$ TRUE or FALSE.

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29. The quadratic equation $x^2 - 2x + 1 = 0$ have no real root.

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30. Fill in the blanks :

The solutions of the quadratic equation $x + \frac{1}{x} = \frac{10}{3}$ are _____ and _____ .

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31. Fill in the blanks :

If one root of the quadratic equation $3x^2 - \sqrt{3}x - a = 0$ be $, \sqrt{3}$ then the value of a is _____ .

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32. Fill in the blanks :

If 1 be a root of the equation $x + kx^{-1} = 2$, the value of k is _____ .

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33. Short-answer type questions (S.A.) :

(i) Solve : $x + \frac{1}{x} = \frac{13}{6}$

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34. Short-answer type questions (S.A.) :

If one root of the quadratic equation $3x^2 + \sqrt{2}x + a = 0$ be $\sqrt{2}$, then find the value of a.

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35. Short-answer type questions (S.A.) :

Prove that the quadratic equation $x^2 - 6x + 5 = 0$ have the roots 1 and 5.

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36. Short-answer type questions (S.A.) :

For what value of k, 1 is a root of the equation $x + \frac{k}{x} = 2$?

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37. Long-answer type questions (L.A.)

If two root of the quadratic equation $ax^2 + 7x + b = 0$ be $\frac{2}{3}$ and -3, then find the value of a and b.

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38. Long-answer type questions (L.A.)

$(2x + 1)^2 + (x + 1)^2 = 6x + 47$

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39. Long-answer type questions (L.A.)

$$3x - \frac{24}{x} = \frac{x}{3}(x \neq 0)$$

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40. Long-answer type questions (L.A.)

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

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41. Long-answer type questions (L.A.)

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

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42. Long-answer type questions (L.A.)

$$\frac{x}{x+1} + \frac{x+1}{x} = 2\frac{1}{12}(x \neq 0, -1)$$

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43. Long-answer type questions (L.A.)

$$\frac{ax+b}{a+bx}=\frac{cx+d}{c+dx}\left(a\neq b, c\neq d, x\neq -\frac{a}{b}, -\frac{c}{d}\right)$$

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44. Long-answer type questions (L.A.)

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

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45. Long-answer type questions (L.A.)

$$\frac{x+3}{x-3}+6\left(\frac{x-3}{x+3}\right)=5, (x\neq 3, -3),$$

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46. Long-answer type questions (L.A.)

$$\frac{x+1}{2}+\frac{2}{x+1}=\frac{x+1}{3}+\frac{3}{x+1}-\frac{5}{6} \qquad (x \neq -1),$$

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47. Long-answer type questions (L.A.)

$$\frac{1}{a+b+x}=\frac{1}{a}+\frac{1}{b}+\frac{1}{x}\{x \neq 0, -(a+b)\}$$

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48. Long-answer type questions (L.A.)

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

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49. Long-answer type questions (L.A.)

$$\frac{1}{x}-\frac{1}{x+b}=\frac{1}{a}-\frac{1}{a+b}(x \neq 0, -b)$$

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50. Long-answer type questions (L.A.)

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

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51. Long-answer type questions (L.A.)

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

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52. Long-answer type questions (L.A.)

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

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53. The number of roots of a quadratic equation is

A. 1

B. 2

C. 3

D. None of these.

Answer:

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54. If $ax^2 + bx + c = 0$ be a quadratic equation, then

A. $b \neq 0$

B. $c \neq 0$

C. $a \neq 0$

D. None of these.

Answer:

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55. The highest power of the varible of a quadratic equation is

A. 1

B. 2

C. 3

D. None of these.

Answer: 2

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56. The equation $4\left(5x^2 - 7x + 2\right) = 5\left(4x^2 - 6x + 3\right)$ is

A. Linear

B. Quadratic

C. Cubic

D. None of these.

Answer:

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57. Root/ roots of the equation $\frac{x^2}{x} = 6$ is /are.

A. 0

B. 6

C. 0 and 6

D. -6

Answer:

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58. Write which of the following are true /false :

$(x-3)^2 = x^2 - 6x + 9$ is a quadratic equation.

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59. Write which of the following are true /false :

5 is the only one root of the equation $x^2 = 25$.

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60. If a=0 and $b \neq 0$ in the equation $ax^2 + bx + c = 0$, then the equation is a _____ equation.

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61. The roots of the equation $x^2 = 6x$ are _____ and _____.

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62. Find the value of a if 1 is a root of the equation $x^2 + ax + 3 = 0$.

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63. Determine the other root of the equation $x^2 - (2 + b)x + 6 = 0$ if one of its roots is 2.

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64. If 2 is root of the equation $2x^2 + kx + 4 = 0$, then what is the value of the other root?

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65. The difference of a proper fraction and its reciprocal is $\frac{9}{20}$. Then find the equation.

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66. If -5 and -7 be two roots of the equation $ax^2 + bx + 35 = 0$, then find the values of a and b.

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67. The difference of two positive whole numbers in 3 and the sum of their squars is 117. Find the two numbers.

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68. The base of a triangle is 18m more than the double of its height. If the area of the triangle be 360 sq-m, then find the height of the triangle.

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69. If 5 times of a positive whole number is 3 less than 2 times of its square, then find the number.

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70. The distance between two places is 200 km. The time taken by moter car to travel from one place to another is more by 2 hrs than the time taken by a zeep car.If the speed of the motor car is 5 kms/hr less than the speed of the zeep car, then find the speed of the motor car.

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71. The tens' digit of a two digit number is less by 3 than unit digit. If the product of the two digits is subtracted from the number the result is 15. Find the unit digit of the number.

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72. There are two pipes in a water reservoir of your school. Two pipes together take $11\frac{1}{9}$ minutes to fill the reservoir. If the two pipes are opened seperately, then one pipe would take 5 mintutes more time than the other pipe. Calculate the time taken to fill the reservoir seperately by each of the pipes.

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73. Laxmi and Kartik together complete a work in 4 days. If they work seperately, then the time taken by Kartik would be 6 days more than the time taken by Laxmi. Calculate the time taken by Laxmi alone to complete the work.

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74. If the price of 1 dozen pen is reduced by RS 6, then 3 more pens will be got at RS 30. Before the reduction of price, calculate the price of 1 dozen pen.

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75. The perfect square form of the quadratic equation $ax^2 + bx + c = 0 (a \neq 0)$ is

A. $\left(x + \frac{b}{2a}\right)^2 = \frac{b^2 - 4ac}{4a^2}$

B. $\left(x - \frac{b}{2a}\right)^2 = \frac{b^2 - 4ac}{4a^2}$

C. $\left(x + \frac{b}{2a}\right)^2 = \frac{b^2 - 4ac}{4a}$

D. $\left(x - \frac{b}{2a}\right)^2 = \frac{b^2 - 4ac}{2a}$

Answer:

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76. The perfect square form of the quadratic equation $5x^2 + 23x + 12 = 0$ is

A. $\left(x - \frac{23}{10}\right)^2 = \left(\frac{17}{10}\right)^2$

B. $\left(x+\frac{23}{10}\right)^2=\left(\frac{17}{10}\right)^2$

C. $\left(x-\frac{23}{10}\right)^2=\left(\frac{19}{10}\right)^2$

D. $\left(x+\frac{23}{10}\right)^2=\left(\frac{19}{10}\right)^2$

Answer:

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77. If the equation $(x-2)(x+4)+9=0$ be expressed in the form $ax^2+bx+c=0(a\neq 0)$, then the value of b is

A. 0

B. 1

C. 2

D. 3

Answer:

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78. If the equation $(4x-3)^2-2(x+3)=0$ is expressed in the form $ax^2+bx+c=0(a\neq 0)$ then the value of a is

A. -26

B. 26

C. -16

D. 16

Answer:

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79. If the equation $(x+2)(x-4)+10=0$ be expressed in the form $ax^2+bx+c=0(a\neq 0)$ then the value of c is 2.

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80. The perfect square form of the quadratic equation $3x^2 + 17x + 11 = 0$ is $\left(x + \frac{17}{6}\right)^2 = \left(\frac{\sqrt{157}}{6}\right)^2$

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81. The value of k is $x = \frac{k \pm 7}{2}$ when the quadratic equation $x^2 + x - 12 = 0$ is solved by Sreedhar Acharya's formula is _____.

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82. If the equation $(3x - 1)^2 + 2(x - 3) = 0$ is expressed in the form $ax^2 + bx + c = 0 (a \neq 0)$, then the value of a is _____.

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83. Explain whether Sreedhar Acharya's formula is applicable or not in solving the equation $4x^2 + (2x - 1)(2x + 1) = 4x(2x - 1)$.

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84. By applying Sreedhar Acharya's formula what type of equations can we solve ?

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85. What is the value of k if $x = \frac{k+12}{10}$ when the quadratic equation $5x^2 + 2x - 7 = 0$ is solved by Sreedhar Acharya's formula ?

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86. Express the equation $cx^2 + ax + b = 0, c \neq 0$ in the form of a perfect square.

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87. Multiplying LHS and RHS of the quadratic equation $5x^2 + 23x + 12 = 0$ by 5, find the roots of the equation using perfect square method.

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88. Solve the following equations using Sreedhar Acharya's formula :

$(x - 2)(x + 4) + 9 = 0$

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89. Solve the following equations using Sreedhar Acharya's formula :

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

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90. Solve the following equations using Sreedhar Acharya's formula :

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

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91. Solve the following equations using Sreedhar Acharya's formula :

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

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92. Adhir has drawn a right-angled triangle whose length of hypotenuse is 6 cm more than the twice of the shortest side. If the length of the third side is 2 cm less than the length of the hypotenuse, then calculate the lengths of the three sides of the right-angled triangle drawn by Adhir.

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93. If a two digit positive number is multiplied by its unit digit, then the product is 189 and if the tens' digit is twice of the unit digit, then calcutate the unit digit.

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94. There is a squared park and a rectangular park in the locality of Pradipbabu. The area of a rectangular park is 78 sq-m less than twice of the area of that square-shaped park whose length is 5 m more than the length of the side of that park and the breadth is 3 m less than the length of the side of that park. Calculate the length of side of the square-shaped park.

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95. Joshep and Kuntal work in a factory. Joshep takes 5 minutes less time than Kuntal to make a product. Joshep makes 6 product more than

Kuntal while working for 6 hours. Calculate the number of products Kuntal makes during that time.

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96. The speed of a boat in still water is 8 km/hr. If the boat can go 15 kms downstream and 22 km upstream in 5 hours, then calculate the speed of the stream.

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97. A superfast train runs having the speed 15 kms / hr more than that of an express train. Leaving same station the superfast train reached at a station of 180 kms distance 1 hour before than the express train. Determine the speed of the superfast train in km/ hr.

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

A. 2

B. -2

C. 6

D. -6

Answer:

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99. If the product of the roots of the quadratic equation $x^2 - 3x + k = 10$ be (-2), then the value of k is

A. -2

B. -8

C. 8

D. 12

Answer:

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100. If the roots of the equation $ax^2 + bx + c = 0 (a \neq 0)$ be equal, then

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

B.

C. $c = \frac{b}{2a}$

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

Answer: $c = \frac{b^2}{4a}$

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

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

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

C. -4

D. 4

Answer: $= \frac{-\frac{8}{3}}{\frac{2}{3}} = -4$

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102. If α and β be the roots of the equation $x^2 - px + q = 0$ then, $\left(\alpha^{-1} + \beta^{-1}\right) = \frac{p}{q}$.

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103. If the roots of the equation $px^2 + qx + r = 0 (p \neq 0)$ be equal, then $q = 2\sqrt{pr}$.

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

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105. If the roots of the equation $ax^2 + bx + c = 0 (a \neq 0)$ be reciprocal to each other, then c= _____.

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106. If the roots of the equation $ax^2 + bx + c = 0 (a \neq 0)$ be negatively reciprocal to each other, then a+c = _____ .

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107. If the sum of the roots of the equation $x^2 - x = k(2x - 1)$ be zero, then k ____.

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108. The sum of the roots of the quadratic equation is 14 and the product is 24, then find the quadratic equation.

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109. If the sum of the roots and product of the roots of the quadratic equation $kx^2 + 2x + 3k = 0(k \neq 0)$ are equal, then find the value of k.

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110. If the roots of the equation $x^2 - 22x + 105 = 0$ be α and β, then find the value of $(\alpha - \beta)$.

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111. If one root of the equations $x^2 + bx + 12 = 0$ and $x^2 + bx + q = 0$ be 2, then find the value of q.

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

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113. If the product of the roots of the equation $x^2 - 3kx + 2e^{2\log_e k} - 1 = 0$ be 7, then find the value of k.

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114. If one root of the quadratic equation be $\left(3+\sqrt{2}\right)$, then find the equation.

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115. Find the roots of the quadratic equation $\left|x^2\right|-3|x|+2=0$.

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116. If the two roots of the equation are 1 and 2, then find the equation.

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117. If the roots of a quadratic equation be p+q and p-q, then find the equation.

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118. Construct quadratic equations when the given roots are-

4,2

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119. Construct quadratic equations when the given roots are-

-4,-3

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120. Construct quadratic equations when the given roots are-

-4,3

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121. Construct quadratic equations when the given roots are-

5,-3

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122. For what value of m, the roots of the quadratic equation $4x^2 + 4(3m - 1)x + (m + 7) = 0$ are reciprocal to each other ?

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123. If the roots of the quadratic equation $(b - c)x^2 + (c - a)x + (a - b) = 0$ are real and equal then prove that 2b=a+c.

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

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125. Prove that the quadratic equation $2(a^2+b^2)x^2+2(a+b)x+1=0$ will have no real root if $a \neq b$.

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126. If α and β be the roots of the equation $5x^2+2x-3=0$, then find the values of $\left(\frac{1}{\alpha}+\frac{1}{\beta}\right)$

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127. If one root of the equation $ax^2 + bx + c = 0$ be double the another root of the eqaution, then prove that $2b^2 = 9ac$.

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128. Construct the quadratic equation, the roots of which are the reciprcocals of the root of the quadratic equation $x^2 + px + 1 = 0$.

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129. Construct a quadrtic equation, the roots of which are the squares of the roots of the equation $x^2 + x + 1 = 0$.

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130. Determine the nature of the roots of the quadratic equation $3x^2 - 2\sqrt{6}x + 2 = 0$.

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131. Find the value of k if the following two quadratic equations have real and equal roots :

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Exercise 11

1. For what value of K the equation (K+3) $x^2 + 2x - 1 = 0$ will not be a quadratic equation ?

A. -1

B. -2

C. -3

D. -4

Answer: c

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2. For what power of the variable x, the equation $x^8 + x^4 + 1 = 0$ is a quadratic equation ?

A. 2

B. 4

C. 6

D. 8

Answer: b

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3. If the equation $\frac{x}{3-x} = \frac{1}{4x}(x \neq 0, x \neq 3)$ is expressed in the form of $ax^2 + bx + c = 0(a \neq 0)$ then the coefficient of x is

A. 0

B. 1

C. 2

D. 3

Answer: b

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4. Which one of the following is a quadratic polynomial ?

A. 4x(x-1)+2

B. x-7

C. $5x^7 - 2x + 1$

D. $x^4 + x^2 + 1$

Answer: a

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5. The equation $x^4 + 1 = 0$ is a quadratic equation with respect to x^2

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6. Write true or false , The coefficient of x^0 in the given equation $x^2 + bx + \frac{1}{c} = 0$ is c.

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7. $2x^2 + x + 1$ is a quadratic _____

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8. The co-efficient of x in the equation $x^2 + 1 = 0$ is _____

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9. The standard form of euadratic equation in one varible is $ax^2 + bx + c = 0$ where a, b, c are _____ numbers and a $\neq$ _____

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10. Explain the term $2x^2 + 4x - 5 = (x - 3)(x + 4) + 2$ in the form of $ax^2 + bx + c = 0(a \neq 0)$.

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11. Explain the equation $(x - 1)^3 = x^2(x + 2)$ in the quadratic form of $ax^2 + bx + c = 0(a \neq 0)$ and determine the coefficient of x^2, x and x^0

.

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12. Form a quadratic equation in one variable from the following statement : The product of two consecutive even positive numbers is 528.

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13. Explain the term $x - \frac{1}{2x} + 2 = 8(x \neq 0)$ in the standard form of $ax^2 + bx + c = 0$ where a, b, c are real numbers and $a \neq 0$

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14. Which of the following polynomials are quadratic polynomials ?

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

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

C. 2x(x-4)-1

D. 5x-1

Answer: Quadratic polynomial;

Not quadratic polynomial

Quadratic polynomial;

Not quadratic polynomial;

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15. Express the following eqautions in the form of $ax^2 + bx + c = 0$, where a, b, c are real numbers and $a \neq 0$.

A. $x - a + \frac{a}{x} = 7(x \neq 0)$

B. $2(x + 2)^2 = x^2 - 4x + 4$

C. $2x + \frac{a}{x} = x(x \neq 0)$

D. $x^2 + x(a - 2x) - 7 = 0$

Answer: $x^2 - (a + 7)x + a = 0$

$x^2 + 12x + 4 = 0$

$x^2 + a = 0;$

$x^2 - ax + 7 = 0$

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16. Determine for which power of the variable x, the equation $x - 6\sqrt{x} + 2 = 0$ is a quadratic equation.

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17. Find for what value of a the equation $(a-1)x^2 + x(x+2) + 8 = 0$ is not a quadratic equation.

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18. Express the term $\frac{x}{k-x} = \frac{1}{4x}(x \neq 0, x \neq k)$ in the quadratic equation of the form $ax^2 + bx + c = 0(a \neq 0)$.

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19. Find the coefficient of x^3, x^2, x and x^0 of the equation $(x-1)^5 = x(x^4+1)$

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20. a is divided into two such parts that one part is equal to the square of the other part.

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21. The product of two consecutive positive odd numbers is 323.

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22. The length of the diagonal of a rectangle is 13m and the length of it is 7m more than its breadth.

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23. The distance between two station is d km. A train went the second station from the first station with uniform velocity. If the velocity of the train would be a km more, then the time taken by the train would be t hours lesser than before.

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24. A person bought some kg of suger for Rs p. If he would get 8 kg sugar more for same RS p, then the rate of value of suger per kg would be RS q lesser than before.

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25. A clock-seller sold a clock in RS $(\alpha + \beta)$ by purchasing it. Then his percentage of less was the same as the amount by which he had bought the clock.

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26. If the speed of the stream is a km/hr, then the time taken by Prosantamajhi to cover d km in downstream and upstream is t hours.

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27. There is a road of equal width around the outside of a rectangular play-ground having the length a m and breadth b m and the area of the road is A square-metre. Find the required quadratic equation .

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28. The unit digit of a two digit number exceeds its tens' digit by 7 and the product of two digits is less by 10 from the number. Find the quadratic equation.

Watch Video Solution

29. The time taken to clean out a garden by Priyo is t_1 hours more then that by Prosanta. Both of them together can complete the work in t_2 hours.Find the required quadratic equation.

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Exercise 1 2

1. For what value of k, $\frac{3}{5}$ is a root of the quadratic equation $4x^2 + kx - 3 = 0$?

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

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

C. $1\frac{3}{5}$

D. $3\frac{2}{5}$

Answer: b

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2. For what value of k(-a) is a root of the quadratic equation $2x^2 + 3ax + k = 0$?

A. $-a^2$

B. $-a$

C. a

D. a^2

Answer: d

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3. One root of the quadratic equation $x^2 + \left(2 - \sqrt{5}\right)x - 2\sqrt{5} = 0$ is

A. $\sqrt{5}$

B. $-\sqrt{5}$

C. 2

D. $\sqrt{2}$

Answer: a

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4. One root of the equation $x + \frac{1}{x} = -2$ is

A. 1

B. 2

C. -1

D. -2

Answer: c

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5. One root of the quadratic equation $x^2 + (\sqrt{5} - \sqrt{3})x - \sqrt{15} = 0$ is $\sqrt{3}$.

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6. (-1) is a root of the equation $\sqrt{x} + \frac{1}{\sqrt{x}} = 2$.

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7. The quadratic equation in one variable $x^2 + 1 = 0$ have no _____ roots.

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8. The roots of the quadratic equation $x^2 + a = 0$ are _____ .

Watch Video Solution

9. The roots of the quadratic equation $x^2 - 2x + 1 = 0$ are _____ and _____.

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10. Solve : $\sqrt{x} + \frac{1}{\sqrt{x}} = 2.$

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11. Determine for value of a if $\sqrt{2}$ is a root of the quadratic equation $ax^2 + \sqrt{2}ax + a = 0.$

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12. Prove that p and q are two roots of the quadratic $x^2 - (p+q)x + pq = 0.$

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13. Solve : $x + \frac{k}{x} = \sqrt{2}$.

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14. If $\frac{2}{5}$ and -5 be two roots of the quadratic equation $ax^2 - 5x + b = 0$, then find the values of a and b.

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15. If $\sqrt{2}$ and -1 be two roots of the quadratic equation $\sqrt{2}ax^2 + bx + 1 = 0$, then find the values of a and b.

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16. Solve the equations :

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

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17. Solve the equations :

$$\frac{b-ax}{bx-a}=\frac{d-cx}{dx-c}$$

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18. Solve the equations :

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

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19. Solve the equations :

$$\frac{x-3}{x+3}-\frac{x+3}{x-3}+6\frac{6}{7}=0$$

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20. Solve the equation

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

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21. Solve the equations :

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

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22. Solve the equations :

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

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23. Solve the equations :

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

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24. Solve the equations :

$$\frac{x-a}{x-b}+\frac{x-b}{x-a}=\frac{a}{b}+\frac{b}{a}$$

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25. Solve the equations :

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

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26. Solve the equations :

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

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Exercise 1 3

1. If $(a-1)^2x^2+bx+c=0$ be a quadartic equation, then

A. $a \neq 0$

B. $a \neq 1$

C. a=1

D. a=0

Answer: b

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2. One of the roots of the equation $x^2=a$ is

A. 1

B. $-\sqrt{a}$

C. a

D. 0

Answer: a

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3. The highest power of the variable of the equation $x - \frac{1}{x} = a^2$ (a=constant) is

A. 2

B. 3

C. -1

D. -3

Answer: a

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4. The number of roots of the equation $ax + \frac{a^2}{x} = \frac{1}{a^3}$ (a=constant)

A. 1

B. 2

C. 3

D. 4

Answer: b

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5. The highest power of the variable of the equation $\sqrt{x} - \frac{1}{\sqrt{x}} = a^2$ (a= constant) is 2.

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6. The value of n for which the equation $x^n + x^{-n} = k$ will be a quadratic equation is 1.

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7. _____ is a root of the equations $x^2 = \sqrt{a}$.

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8. The equation $\left(\sqrt{a} - 1\right)x^2 + bx + c = 0$ will be quadratic equation if $a \neq$ _____.

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9. One of the roots of equation $\frac{z^2}{z} = 2$ is _____ .

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10. The sum of a proper fraction and its reciprocal is $\frac{10}{3}$. Write the equation.

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11. For what value of n, the equation $x^n + \frac{1}{\sqrt{x}} = -k$ will be a quadratic equation ?

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12. Determine the roots of the equation $x^2 = 4x$.

Watch Video Solution

13. Root/ roots of the equation $\frac{x^2}{x} = 6$ is /are.

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14. Total price of 3 pens and 4 pencils is Rs. 37. Again , total price of 5 pens and 6 pencils is Rs. 60 . Find the price of each pen and of each pencil seperately.

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15. The price of 5 tables and 9 chairs together is RS 1900. Again, the price of 4 tables and 6 chairs together is RS 1300. What will be the price of 3 tables and 6 chairs together ?

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16. The price of 5 horses and 7 cows together is RS 8700. Again, the price of 3 horses and 4 cows together is RS 5100. What is the price of 1 horse and 1 cow together ?

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17. The price of 2 tables and 3 chairs together is RS 1075. Again, the price of 3 tables and 8 chairs together is RS 1875. Determine the price of one table.

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18. Satyababu went to a marked with RS 60 in pocket to buy some khatas and dot-pens. Witnessing the market price of khatas and dot-pens, he calcutated that if he had bought 15 khatas, then by the rest of his money, he would be able to buy 6 dot-pens only. Also, if he had bought 12 khatas, then by the rest of his money, he would be able to buy 7 dot-pens remaining RS 1 in hand. What was the market price of each khata and of each dot-pen ?

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19. The weight of Prodip and Prokash together is 80 kg. Half of the weight of Prodip is equal to the $\frac{5}{6}$ part of weight of Prokash. Determine the

weight of Prodip and Prokash seperately.

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20. A student walking at a speed of $2\frac{1}{2}$ km per hour reaches his school 6 minutes late than the scheduled time. In the next day, he gears-up his speed by 1 km per hour and reaches the school 6 minute before the scheduled time. Find the distance of the school from his house.

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21. Divide 77 into three such parts that three times of the sum of 1st and 2nd part, subtraction of 3 from the sum of 2nd and 3rd part and addition of 3 to the sum of 1st and 3rd part are all equal.

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22. Two men and 6 boys together can do a work in 5 days. 8 men and 3 boys together can do the same work in 3 days. In how many days will 1 man and 3 boys together do the work ?

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23. Before three years, the age of a father was 5 times the age of his son. After 4 years, the age of father will be 7 times of his son's age 4 years ago. Find the present ages of both father and his son.

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24. The sum of the ages of a father and his son is at present 50 years. When the age of the son will be equal to the present age of his father, then the sum of their ages will be 102 years. Find the present ages of the son and his father.

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25. The sum of two numbers is equal to 80. Three times of the difference of them is 20 more than the greatest number. Find the two numbers.

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26. The sum of the two digits of a two digits' number is 9. if the digits are interchanged, then the number thus obtained is 27 more than the original number. Find the number.

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27. If 1 is subtracted from the numerator and 2 is added to the denomenator of a fraction it becomes $\frac{1}{2}$, also, if 7 is subtracted from the numberator and 2 is subtracted from the denominator then the fraction becomes $\frac{1}{3}$. Find the fraction.

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28. If 2 is subtracted from the numerator and 3 is added to the demoenator a fraction becomes $\frac{1}{4}$. Again if 6 is added to the numerator and the denomenator is multiplied by 3, then it becomes $\frac{2}{3}$. Determine the fraction.

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29. A two digits number is 3 times of the sum of its digits. If the digits are interchanged, then the number thus obtained is 9 less than 3 times of the original number. Find the number.

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30. If the digits of a two digits' number are interchanged, then the number thus obtained is $\frac{5}{6}$ part of the original number and the difference of the digits is 1. Find the number.

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31. The tens' digit of a two digits number is twice of its unit digit. If 40 is subtracted from the number then the two digits of the new number becomes equal. Find the number.

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32. If a two digits' number is divided by the sum of digits, the quotient is 6 and the residue is 3. Again, if two digits are interchanged, then the new number thus obtained, is divided by the sum of the digits, the quotient is 4 and the residue is 9. Find the number.

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33. Rahul said to Rohan. "I am twice as old as you were when I was as old as you are" The sum of their present ages is 63 years. Find their ages.

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34. Fill the blank: Roots of the equation $x^2 = 6x$ are_____

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35. A man rowing at the rate 4 km an hour takes thrice as much time to go 30 km up a river as in going 30 km down. Find the rate at which the river flows.

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36. A boat goes up-stream 30 kilometres and down-stream 44 kilometres in 10 hours, it also goes up-stram 40 kilometres and down-stream 55 kilometres in 13 hours. Find the speed of the stream and of the boat.

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37. A boy was aksed to add 3 to a certain number and to divide the sum by 2, but he subtracted 2 from the number and multiplied the remainder

by 3 and got the same result. Find the number and the result.

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38. Milk and water are mixed in two pots at the ratios 2:3 and 5:4. In what ratio should the contents of the two pots be mixed so as to make the ratio between milk and water 1:1 ?

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39. A box contains one rupee, fifty paise and twenty five paise coins. The total value of coins is RS (a+b+c)x. The ratio of their number is $a:2b:4c$ respectively. Find the number of respective coins.

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40. The three sides of a triangle are (x+5), (4x-y) and (y+2) centimetres in length. If the triangle is equilateral, find its perimeter.

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41. If the length of a rectangle is decreased by 5 metres and the breadth is increased by 3 metres the area is decreased by 9 sq metres but if the length is increased by 3 metres and the breadth by 2 metres, the area is increased by 67 sq.metres. Find its length and breadth.

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42. The monthly income of two brothers is RS 1550. One of them gives half of his income and other gives $\frac{1}{3}$ of his income to their father. In each month, father gets RS 650 in all. What are the monthly incomes of the two brothers ?

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43. The total monthly salary of two persons is RS 7500. They spend 90% and 80% of their salaries respectively. If the ratio of their monthly savings

is 3:4, find their monthly salaries.

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Exercise 1 4

1. The perfect square form of the quadratic equation $px^2 + qx + r = 0 (p \neq 0)$ is

A. $\left(x - \frac{a}{2p}\right)^2 = \frac{q^2 - 4pr}{4p^2}$

B. $\left(x + \frac{q}{2p}\right)^2 = \frac{q^2 - 4pr}{4p^2}$

C. $\left(x + \frac{q}{2p}\right)^2 = \frac{q^2 - 4pr}{4p}$

D. $\left(x - \frac{q}{2p}\right)^2 = \frac{q^2 - 4pr}{2p}$

Answer: b

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2. The perfect square form of the quadratic equation $7x^2 + 5x - 1 = 0$ is

A. $\left(x + \frac{5}{14}\right)^2 + \frac{53}{196} = 0$

B. $\left(x - \frac{5}{14}\right)^2 = \frac{53}{196}$

C. $\left(x + \frac{5}{14}\right)^2 = \frac{53}{196}$

D. $\left(x + \frac{5}{14}\right)^2 = -\frac{53}{14}$

Answer: c

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3. If the equation $(x - p)(x + q) + r = 0$ is expressed in the form $ax^2 + bx + c = 0 (a \neq 0)$ then the value of b is

A. p-q

B. p+q

C. q-1

D. q-p

Answer: d

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4. If the equation $(4p+2)^2 - p(p-1) = 0$ is expressed in the form $ap^2 + bp + c = 0 (a \neq 0)$, then the value of a is .

A. 15

B. 13

C. -15

D. 17

Answer: a

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5. If the equation $(2p-1)^2 - p(p+1) = 0$ is expressed in the form $ap^2 + bp + c = 0 (a \neq 0)$, then b=-5.

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6. The perfect square form of the quadratic equation $lx^2 + mx + n = 0 (l \neq 0)$ is $\left(x + \frac{m}{2l}\right)^2 = \frac{m^2 + 4lm}{4l^2}$

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7. The perfect square form of the quadratic equation $x^2 + x + 1 = 0$ is _____.

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8. If the equation $(x+p)(x-q) - r = 0$ is expressed in the form $ax^2 + bx + c = 0 (a \neq 0)$, then the value of c is _____.

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9. Express the equation $px^2 + r = 0$ in the standard quadratic equation form $ax^2 + bx + c = 0(a \neq 0)$.

Watch Video Solution

10. Express the equation $lx^2 + mx + n = 0$ in a perfect square form.

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11. Solve the equation $2x^2 + x - 10 = 0$ by perfect square method.

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12. What is the value of k if in the solution of the equation $7x^2 + x - 1 = 0$ by Sreedhar Acharya's formula we have got

$x = \frac{-1 \pm \sqrt{k}}{14}$?

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13. Solve the quadratic equation $\alpha x^2 + \beta x + \gamma = 0$ by perfect square method.

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14. Solve by applying Sreedhar Acharya's formula -

$(b-1)x^2 + cx + d = 0$

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15. Determine a natural number which is less by 12 than its square.

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16. Somen has drawn a right-angled triangle, the hypotenuse of which is 3 cm more the twice of its smallest side. If the length of its third side be 1 cm less than the hypotenuse, then find the lengths of the sides of the right-angled triangle.

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17. The speed of Laxmi is 1m /sec more than that of Salma. To travel a distance of 180 metres, Laxmi reaches 2 seconds before Salma. What was the speed of Salma in meter per second ?

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18. In our village, Sankarbabu bought 350 chilli plants for planting in his rectangular land. When he put the plants in rows, he noticed that, if he would put 24 rows more than the number of plants in each row, 10 plants would remain excess. Calculate the number of plants he put in each row.

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19. Durgadebi went to the market and saw that the price of dal of 1 kg is RS 20 and the price of rice of 1 kg is RS 40 less than that of fish of 1 kg. The quantity of fish and that of dal in RS 240 is equal to the quantity of of rice in RS 280. Calculate the cost price of 1 kg fish, Durgadevi had bought in the market.

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20. Divide 50 into two parts such that the sum of their reciprocals may be $\frac{1}{12}$.

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21. If the price of pins decreases 2 paise per dozen, then the buyer will get 6 pins more than the number of pins he should normally get for 42 paise. What is the price per dozen of pins at present ?

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22. A boatman can row 7 km down a river and back in $4\frac{2}{3}$ hours. If the river runs at the rate of 2 km per hour, find the rate of the pull in still water.

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23. The sum of the squares of two consecutive numbers is 145. Find them.

Watch Video Solution

24. Divide unity into two parts such that the sum of their cubes is $\frac{7}{16}$

Watch Video Solution

25. $ax^2 + bx + c = 0$ is a quadratic equation then

A. $b \neq 0$

B. $c \neq 0$

C. $a \neq 0$

D.

Answer:

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26. Find a fraction which assumes twice or thrice its orginal value when 2 or 3 respectively is added to both its numerator and denominator.

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27. Find the fraction less than one such that the sum of the numerator and denominator is 10 and the difference between the fraction and its reciprocal is $\frac{40}{21}$.

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28. Number of roots in a quadratic equation is

A. 1

B. 2

C. 3

D. 4

Answer:

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Exercise 1 5

1. If the roots of the quadratic equation $x^2 - m(2x - 5) - 6 = 0$ are equal, then m=

A. 2,3

B. 6,1

C. 4,1

D. None of these

Answer: a

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

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3. If the roots of the equation $4x^2 - 5x + 2 = 0$ are $\frac{\alpha^2}{\beta}$ and $\frac{\beta^2}{\alpha}$ the the equation, the roots of which are α and β, is

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

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

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

D. None of these

Answer: b

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4. If the product of the roots of the quadratic equation $x^2 - 5kx + 3e^{\log_e k} - 1 = 0$ be 8, then the value of k =

A. -3

B. 3

C. $\sqrt[3]{3}$

D. None of these

Answer: c

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5. The quadratic equation one root of which is $(2-\sqrt{3})$, is $x^2-4x+1=0$.Find true or false.

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6. If the roote of the quadratic equation $x^2-p(x-3)-5=0$ are equal then one of the values of p is (-5).

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7. The product of the roots of the quadratic equation $ax^2+cx+b=0$ is _____.

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8. The sum of the roots of the quadratic equation $(2-\sqrt{3})x^2+x+1=0$ is _____ .

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9. Find the quadartic equation whose one root is $(3 - \sqrt{2})$

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

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11. Find the quadartic equation whose sum of the roots is 2 and sum of the cubes of the roots is 27.

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12. For what values of a, the roots of the quadratic equation $x^2 - (3a - 1)x + 2a^2 + 2a - 11 = 0$ are equal ?

Watch Video Solution

13. Determine the nature of the roots of the qaudratic equation $3\sqrt{2}x^2 + 19x + 8\sqrt{2} = 0.$

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14. If α and β be the roots of the quadratic equation $2x^2 + 2x - 3 = 0,$ then find the values of

$\alpha + \beta + 1$

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15. If α and β be the roots of the quadratic equation $2x^2 + 2x - 3 = 0$, then find the values of

$2\alpha\beta$.

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16. If α and β be the roots of quadratic equation $ax^2 + bx + c = 0$, then find the value of the following quantities :

$$\frac{1}{a\alpha + b} + \frac{1}{a\beta + b}$$

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17. If α and β be the roots of quadratic equation $ax^2 + bx + c = 0$, then find the value of the following quantities :

$(a\alpha + b)^{-2} + (a\beta + b)^{-2}$

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18. If α and β be the roots of the equation $x^2 + px + q = 0$, then find the values of the quantities given below :

$(\alpha + p)^{-3} + (\beta + p)^{-3}$

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19. If α and β be the roots of the equation $x^2 + px + q = 0$, then find the values of the quantities given below :

$\alpha^4\beta^7 + \beta^4\alpha^7$

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20. Solve by applying Sreedhar Acharya's formula -

$(px - 1)(qx + 2) + r = 0$

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21. If α and β be the roots of the quadratic equation $x^2 - px + q = 0$, then determine the value of $\left(\alpha^5\beta^7 + \alpha^7\beta^5\right)$ in terms of p and q.

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

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23. If α and β be the roots of the quadratic equation $x^2 + px + q = 0$, then find the quadratic equation whose roots are $(\alpha - \beta)^2$ and $(\alpha + \beta)^2$.

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24. If α and β be the roots of the quadratic equation $ax^2 + bx + c = 0$, then find the quadratic equation whose roots are $\left(\frac{1}{\alpha} + 1\right)$ and $\left(\frac{1}{\beta} + 1\right)$.

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25. If α and β be the roots of the quadratic equation $px^2 - qx + q = 0$, then show that $\sqrt{\frac{\alpha}{\beta}} + \sqrt{\frac{\beta}{\alpha}} - \sqrt{\frac{q}{p}} = 0$.

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26. If the ratio of the roots of the quadratic equation $lx^2 + nx + n = 0$ be p:q, then prove that $\sqrt{\frac{p}{q}} + \sqrt{\frac{q}{p}} + \sqrt{\frac{n}{l}} = 0$.

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

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28. If the ratio of the roots of the quadratic equation $x^2 - px + q = 0$ be 2:3, then prove that $6p^2 = 25q$.

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

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30. If the sum of the roots of the quadratic equation $ax^2 + bx + c = 0$ be equal to the sum of their squares, then prove that $2ac = ab + b^2$.

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

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32. if the roots of the equation $a(b-c)x^2 + b(c-a)x + c(a-b) = 0$ are equal then show that $\frac{2}{b} = \frac{1}{a} + \frac{1}{c}$

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

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

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

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36. If the ratio of the roots of the quadratic equation $ax^2 + bx + c = 0$ be m:n, then prove that $\frac{(m+n)^2}{mn} = \frac{b^2}{ac}$

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37. If the ratio of the roots of the quadratic equation $x^2 - px + q = 0$ be m:n, then prove that $p^2mn = q(m+n)^2$.

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38. If the difference of the roots of the quadratic equation $x^2 - px + q = 0$ be 1, then prove that $p^2 + 4q^2 = (1 + 2q)^2$.

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39. If the difference of the roots of the equations $x^2 + 2px + q = 0$ and $x^2 + 2px + p = 0 (p \neq q)$ be a constant, then prove that $p + q + 1 = 0$.

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40. α and β are the roots of the quadratic equation $x^2 + 2px - 2b^2 = 0$. If a, b are rational numbers, but if $\left(\alpha^2 + \beta^2\right)$ be not a perfect square, then find such a quadratic equation one root of which is $\alpha + \beta + \sqrt{\alpha^2 + \beta^2}$.

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