

COLLECTION BY J.R.KALIA (TGT MATHS)

QUADRATIC EQUATION

1 MARK

If $x^2 + 2kx + 4 = 0$ has a root $x = 2$, then the value of k is ?

- (A) -1 (B) -2 (C) 2 (D) -4

For what value of k will $\frac{7}{3}$ be a root of $3x^2 - 13x - k = 0$.

- (A) 14 (B) $\frac{3}{7}$ (C) $\frac{-7}{2}$ (D) -14

One of the roots of the quadratic equation $6x^2 - x - 2 = 0$ is :

- (A) $\frac{1}{2}$ (B) $-\frac{1}{2}$ (C) $-\frac{2}{3}$ (D) -1

The positive root of $\sqrt{3x^2 + 6} = 9$ is :

- (A) 3 (B) 4 (C) 5 (D) 7

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

- (A) 2 (B) 8 (C) -8 (D) 16

Which of the following equations has two distinct real roots ?

- (A) $2x^2 - 3\sqrt{2}x + 9/4 = 0$ (B) $x^2 + x - 5 = 0$
(C) $x^2 + 3x + 2\sqrt{2} = 0$ (D) $5x^2 - 3x + 1 = 0$

The quadratic equation whose roots are real and equal is :

- (A) $2x^2 - 4x + 3 = 0$ (B) $x^2 - 4x + 4 = 0$
(C) $3x^2 - 5x + 2 = 0$ (D) $x^2 - 2\sqrt{2}x - 6 = 0$

The roots of the quadratic equation $x^2 + 7x + 12 = 0$ are :

- (A) $-4, -3$ (B) $4, -3$ (C) $4, 3$ (D) $-4, 3$

Which of the following is not a quadratic equation :

- (A) $(x-2)^2 + 1 = 2x - 3$ (B) $x(x+1) + 8 = (x+2)(x-2)$
(C) $x(2x+3) = x^2 + 1$ (D) $(x+2)^3 = x^3 - 4$

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

- (A) $-\sqrt{3}, \sqrt{\frac{1}{3}}$ (B) 2, 3 (C) $\frac{\sqrt{3}}{2}, -\frac{2}{\sqrt{3}}$ (D) $\sqrt{3}, \frac{-1}{\sqrt{3}}$

The value of k for which the equation $x^2 - 4x + k = 0$ has equal roots is

- (A) 2 (B) -2 (C) 4 (D) -4

If $\frac{1}{2}$ is a root of the equation $x^2 + kx - \frac{5}{4} = 0$, then the value of k is :

- (A) $\frac{1}{2}$ (B) -2 (C) $\frac{1}{4}$ (D) 2

The value of k for which $3x^2 + 2x + k = 0$ has real roots is :

- (A) $k > \frac{1}{3}$ (B) $k \leq \frac{1}{3}$ (C) $k \geq \frac{1}{3}$ (D) $k < \frac{1}{3}$

The value of p for which the quadratic equation $x(x-4) + p = 0$ has real roots, is :

- (A) $p < 4$ (B) $p \geq 4$ (C) $p = 4$ (D) None of these

The value of k, for which the quadratic equation $4x^2 + 4\sqrt{3}x + k = 0$ has equal roots is :

- (A) $k = 2$ (B) $k = -2$ (C) $k = -3$ (D) $k = 3$

If $r = 3$ is a root of quadratic equation $kr^2 - kr - 3 = 0$ value of k is :

- (A) $\frac{1}{2}$ (B) 2 (C) -2 (D) $-\frac{1}{2}$

Value of k for which quadratic equation $2x^2 - kx + k = 0$ has equal roots is :

- (A) -4 (B) 4 (C) 8 (D) -8

If the equation $kx^2 + 4x + 1 = 0$ has real and distinct roots, then :

- (A) $k < 4$ (B) $k > 4$ (C) $k \leq 4$ (D) $k \geq 4$

The roots of the equation $3x^2 - 4x + 3 = 0$ are :

- (A) real and unequal (B) real and equal
(C) imaginary (D) none of these

If the equation $9x^2 + 6kx + 4 = 0$ has equal roots, then the value of k is :

- (A) ± 2 (B) $\pm \frac{3}{2}$ (C) 0 (D) ± 3

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If the discriminant of $3x^2 + 2x + a = 0$ is double the discriminant of $x^2 - 4x + 2 = 0$, then the value of a is :

- (A) 2 (B) -2 (C) 1 (D) -1

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

- (A) $b^2 = 4a$ (B) $b^2 < 4a$ (C) $b^2 > 4a$ (D) $ab = \frac{1}{4}$

If $\frac{1}{2}$ is the root of the equation $x^2 + kx - \frac{5}{4} = 0$ then the value of k is :

- (A) 2 (B) -2 (C) $\frac{1}{4}$ (D) $\frac{1}{2}$

If $x=3$ is one root of the quadratic equation $x^2 - 2kx - 6 = 0$, then value of k is

- (A) 1 (B) 2 (C) $\frac{1}{2}$ (D) $\frac{1}{3}$

Which of the following is a root of the equation $2x^2 - 5x - 3 = 0$?

- (A) $x = 3$ (B) $x = 4$ (C) $x = 1$ (D) $x = -3$

For what value of k , the equation $kx^2 - 6x - 2 = 0$ has equal roots ?

- (A) $\frac{7}{2}$ (B) $-\frac{9}{2}$ (C) -3 (D) $-\frac{7}{2}$

If one root of the equation $2x^2 - 10x + p = 0$ is 2 then the value of p is :

- (A) -3 (B) -6 (C) 9 (D) 12

Which of the following is a solution of the quadratic equation $x^2 - b^2 = a(2x - a)$?

- (A) $a + b$ (B) $2b - a$ (C) ab (D) $\frac{a}{b}$

The values of 'k' for which the equation $2x^2 - (k-1)x + 8 = 0$ will have real and equal roots are

- (A) 9 and -7 (B) only 9 (C) only -7 (D) -9 and -7

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

- (A) $\sqrt{3}, 1$ (B) $-\sqrt{3}, 1$ (C) $-\sqrt{3}, -1$ (D) $\sqrt{3}, -1$

2 MARKS

Find the values of k for which the following quadratic equation has two equal roots.

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

For what value of k the equation $4x^2 - 2(k+1)x + (k+1) = 0$ has real and equal roots ?

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For what value of k , the quadratic equation $9x^2 + 8kx + 16 = 0$ has equal roots ?

Find the values of k for which roots of the equation $x^2 - 8kx + 2k = 0$ are equal.

Find value of p such that the quadratic equation.

$(p-12)x^2 - 2(p-12)x + 2 = 0$ has equal roots.

Find the roots of the quadratic equation $3x^2 - 14x + 8 = 0$.

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

For what value(s) of k , the equation $x^2 - 2kx - k = 0$ will have equal roots ?

Solve the equation : $10ax^2 + 15ax - 6x - 9 = 0, a \neq 0$.

Find the roots of the quadratic equation

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

Solve for x

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

Find the roots of the following quadratic equation :

$$(x+3)(x-1) = 3\left(x - \frac{1}{3}\right)$$

Find the value of k such that the quadratic equation : $x(x-2k) + 6 = 0$, has real and equal roots.

Find the values of k such that the quadratic equation : $x^2 - 2kx + (7k-12) = 0$, has real and equal roots.

Find the nature of roots of the quadratic equation $\sqrt{2}x^2 - \frac{3}{\sqrt{2}}x + \frac{1}{\sqrt{2}} = 0$.

Find the roots of $6x^2 - \sqrt{2}x - 2 = 0$

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

Find the roots of the following quadratic equation

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

If -4 is a root of the quadratic equation $x^2 + px - 4 = 0$ and the equation $2x^2 + px + k = 0$ has equal roots, find the value of k .

Write all the values of k for which the quadratic equation $2x^2 + kx + 8 = 0$, has equal roots. Also find the roots.

$$\text{Solve : } 2x - \frac{3}{x} = 1$$

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For what values of k does $(k-12)x^2 + 2(k-12)x + 2 = 0$ have equal roots ?

If $4a^2x^2 - 4abx + k = 0$ has equal roots of x , then find the value of k .

Find the roots of the following quadratic equation by factorisation method.

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

Sum of the areas of two squares is 468 m^2 . If the difference of their perimeters is 24 m , find the sides of the two squares.

One root of the equation $2x^2 - 8x - m = 0$ is $\frac{5}{2}$. Find the other root and the value of m .

Find the value of k for which the equation $kx(x-2) + 6 = 0$ has equal roots.

3 MARKS

Using quadratic formula, determine the roots of following equation :

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

Solve the following quadratic equation :

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

Solve for x :

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

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

Solve for x :
$$\frac{1}{x-3} - \frac{1}{x+5} = \frac{1}{6}$$

Solve for x :

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

Solve for x : $\sqrt{7}x^2 - 6x - 13\sqrt{7} = 0$.

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

The length of a rectangular plot is greater than thrice its breadth by 2 m . The area of the plot is 120 sq.m . Find the length and breadth of the plot.

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Find the roots of the equation $\frac{1}{x} - \frac{1}{x-2} = 3, x \neq 0, 2$

Find two positive numbers whose squares have the difference 48 and the sum of the numbers is 12.

Find the roots of the quadratic equation $2x^2 - 9x + 4 = 0$.

Solve for x :

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

Solve for x :

$$9x^2 - 3(a+b)x + ab = 0$$

Find the roots of the equation : $\frac{1}{x} - \frac{1}{x-2} = 3, x \neq 0, 2$

Find two consecutive odd positive integers, sum of whose squares is 290.

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

If two pipes function simultaneously, a reservoir will be filled in twelve hours. First pipe fills the reservoir 10 hours faster than the second pipe. How many hours will the second pipe take to fill the reservoir ?

Find two natural numbers, which differ by 3 and whose squares have the sum 149.

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

If one root of the quadratic equation $x^2 - 5x + 6k = 0$ is reciprocal of other, find the value of k . Also find the roots.

Solve the equation for x :

$$\frac{x+3}{x-2} - \frac{1-x}{x} = \frac{17}{x}$$

Solve for x by using quadratic formula $36x^2 - 12ax + (a^2 - b^2) = 0$

The sum of a number and its reciprocal is $\frac{10}{3}$. Find the number.

Find the value of x :

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

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The sum of two natural numbers is 8. Determine the numbers if the sum of their reciprocals is $\frac{8}{15}$.

Find the roots of the quadratic equation :

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

The sum of the squares of two consecutive natural numbers is 421. Find the numbers.

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

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

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

Find the roots of the equation $4x^2 + 4\sqrt{3}x + 3 = 0$.

Solve for x :

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

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

Find the roots of the following quadratic equation by the factorisation method.

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

Find the roots of the following quadratic equation :

$$-x^2 + 7x - 10 = 0$$

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

$$\text{Solve for } x: \frac{x}{x+1} + \frac{x+1}{x} = \frac{34}{15}$$

Solve the following quadratic equation for x :

$$p^2x^2 + (p^2 - q^2)x - q^2 = 0$$

The speed of a boat in still water is 11 km/hour. It can go 12 km upstream and return downstream to the original point in 2 hours 45 minutes. Find the speed of the stream.

If the equations $5x^2 + (9+4p)x + 2p^2 = 0$ and $5x + 9 = 0$ are satisfied by the same value of x , find the value of p .

$$\text{Solve for } x: \frac{1}{a+b+x} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}$$

The sum of a number and its positive square root is $\frac{6}{25}$. Find the number.

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4 MARKS

Solve the following equation for x .

$$9x^2 - 9(a + b)x + (2a^2 + 5ab + 2b^2) = 0$$

The sum of the squares of two consecutive odd natural numbers is 130. Find the numbers.

Solve the following equation using method of factorisation $\frac{4}{x} - 3 = \frac{5}{2x + 3}$, $x \neq 0, \frac{-3}{2}$

Find the roots of the quadratic equation : $a^2b^2x^2 + b^2x - a^2x - 1 = 0$

The product of Tanay's age (in years) five years ago and his age ten year later is 16. Determine Tanay's present age.

A plane left 30 minutes later than the schedule time and in order to reach its destination 1500 km away in time, it has to increase its speed by 250 km/h from its usual speed. Find its usual speed.

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.

Three consecutive positive integers are taken such that the sum of the square of the first and the product of the other two is 154. Find the integers.

The speed of a boat in still water is 11 km/hr. It can go 12 km upstream and return downstream to the original point in 2hrs 45 min. Find the speed of the stream.

The product of the digits of a two digit positive number is 24. If 18 is added to the number then the digits of the number are interchanged. Find the number.

Two pipes can together fill a tank in $3\frac{1}{13}$ minutes. If one pipe takes 3 minutes more than the other to fill it, find the time in which each pipe can fill the tank.

By increasing the speed of a bus by 10 km/hr, it takes one and half hours less to cover a journey of 450 km. Find the original speed of the bus.

A two digit number is such that the product of its digits is 12. When 36 is added to this number, the digits interchange their places. Find the number.

A person on tour has Rs. 360 for his daily expenses. If he extends his tour for four days, he has to cut down his daily expenses by Rs. 3. Find the original duration of the tour.

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

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Solve for x : $\left(\frac{x+4}{7}\right) + \left(\frac{7}{x+4}\right) = 2$

A motor boat whose speed is 18 km/ hour in 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.

A train travels 300 km at a uniform speed. If the speed of the train had been 5 km/ hour more, it would have taken 2 hours less for the same journey. Find the usual speed of the train.

The sum of two natural numbers is 8. Determine the numbers, if the sum of their reciprocals is $\frac{8}{15}$.

The numerator of fraction is 3 less than its denominator. If 2 is added to both numerator as well as denominator, the sum of new and original fraction is $\frac{29}{20}$, find the Fraction.

The hypotenuse of right angled triangle is 6 cm more than twice its shortest side. If third side is 2 cm less than hypotenuse, find the sides of this triangle.

The speed of 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 stream.

The sum of ages of father and his son is 45 years. 5 years ago, the product of their ages was 124. Determine their present ages.

The speed of a boat in still water is 11 km/hour. It can go 12 km upstream and return downstream to the original point in 2 hours 45 minutes. Find the speed of the stream.

The difference of squares of two natural numbers is 45. The square of the smaller number is four times the larger number. Find the numbers.

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.

A train travels at a uniform speed for a distance of 63 km and then travels a distance of 72 km at an average speed of 6 km/h more than its original speed. If it takes 3 hours to complete the total journey, what is the original speed of the train ?

Sum of the areas of two squares is 468 m². If the difference of their perimeters is 24 m, find the sides of the two squares.

A person has a rectangular garden whose area is 100 sq m. He fences three sides of the garden with 30 m barbed wire. On the fourth side, the wall of his house is constructed; find the dimensions of the garden.

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

Some students planned a picnic. The budget for food was Rs. 480. But 8 of them failed to go, the cost of food for each member increased by Rs. 10. How many students attended the picnic ?

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A train travels at a certain average speed for a distance of 63 km and then travels a distance of 72 km at an average speed of 6 km/hour more than its original speed. If it takes 3 hours to complete the total journey, what is its original average speed ?

A fast train takes 3 hours less than a slow train for a journey of 600 km. If the speed of the slow train was 10 km/hr less than that of the fast train, find the speeds of the trains.

A man bought a certain number of toys for Rs. 180. He kept one for his own use and sold the rest for one rupee each more than he gave for them. Besides getting his own toy for nothing, he made a profit of Rs. 10. Find the number of toys, he initially bought.

A farmer wishes to start a 100 sq.m. rectangular vegetable garden. Since, he has only 30 m barbed wire, he fences three sides of the rectangular garden letting his house compound wall act as the fourth side of the fence. Find the dimensions of his garden.

Some students arranged a picnic. The total budget for food was Rs. 240. Because four students of the group failed to go, the cost of food to each student got increased by Rs. 5. How many students went for the picnic ?

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.

Two Pipes running together can fill a tank in 6 minutes. If one pipe takes 5 minutes more than the other to fill the tank, find the time in which each pipe would fill the tank separately.