# MATHS

# BOOKS - EDUCART PUBLICATION

# QUADRATIC EQUATIONS

## Objective Type Questions Multiple Choice Question 1 Mark

**1.** The value(s) of k for which the quadratic equation $2x^2 + kx + 2 = 0$ has equal roots, is

(a) 4

(b) '(pm)' 4

(c) -4

(d) 0

A. 4

B. $\pm 4$

C. $-4$

D. 0

**Answer: B**

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**2.** Find the values of $k$ for which the equation $x^2 - 4x + k = 0$ has distinct real roots.

A. k = 4

B. $k > 4$

C. $k = 16$

D. $k < 4$

**Answer: D**

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**3.** The equations $x^2 - 8x + k = 0$ has real and distinct roots if :

A. k = 16

B. k $> 16$

C. $k = 8$

D. $k < 16$

**Answer: D**

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**4.** Which of the following is a quadratic equation ?

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

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

C. $(k + 1)x^2 + \frac{3}{2}x = 7$ where k = -1

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

**Answer: D**

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**5.** Which of the following is not a quadratic equation ?

A. $2(x - 1)^2 = 4x^2 - 2x + 1$

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

C. $\left(\sqrt{2}x+\sqrt{3}\right)^2+x^2=3x^2-5x$

D. $\left(x^2+2x\right)^2=x^4+3+4x^3$

**Answer: C**

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**6.** For what value of k , $kx^2+8x+2=0$ has real roots

A. $k<8$

B. $k>8$

C. k = 8

D. none of these

**Answer: A**

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**7.** Which of the following equations has $2$ as a root?

A. $x^2 - 4x + 5 = 0$

B. $x^2 + 3x - 12 = 0$

C. $2x^2 - 7x + 6 = 0$

D. $3x^2 - 6x - 2 = 0$

**Answer: C**

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

A. 2

B. 1

C. 4

D. 3

**Answer: B**

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**9.** Which of the following equations has the sum of its roots as 3 ?

A. $2x^2 - 3x + 6 = 0$

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

C. $\sqrt{2}x^2 - \frac{3}{\sqrt{2}}x + 1 = 0$

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

**Answer: B**

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**10.** Is $x^3 - 4x^2 - x + 1 = (x - 2)^3$ a quadratic equation ?

A. yes

B. No

C. Can't say

D. This is a cubic equation

**Answer: A**

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**11.** For equal root , kx (x-2) + 6 = 0 , the value of k is

A. k = 0 , 6

B. k = 6 , -6

C. k = 2 , 3

D. k = 0, 3

**Answer: A**

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**12.** Roots of $-x^2 + \frac{1}{2}x + \frac{1}{2} = 0$ , are

A. $-\frac{1}{2}, 1$

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

C. $-\frac{1}{2}, -1$

D. $\frac{1}{2}, -\frac{1}{2}$

**Answer: A**

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**13.** The quadratic equation $2x^2 - \sqrt{5}x + 1 = 0$ has

A. two distinct real roots

B. two equal real roots

C. no real roots

D. more than 2 real roots

**Answer: C**

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**14.** Which of the following equations has two distinct real roots ?

A. $2x^2 - 3\sqrt{2}x + \frac{9}{4} = 0$

B. $x^2 + x - 5 = 0$

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

D. $5x^2 - 3x + 1 = 0$

**Answer: B**

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**15.** $\left(x^2 + 1\right)^2 - x^2 = 0$ has :

A. four real roots

B. two real roots

C. no real roots

D. one real root

**Answer: C**

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## Objective Type Questions Fill In The Blanks

**1.** The quadratic equation $2x^2 + px + 3 = 0$ has two equal roots if p = ..... .

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**2.** Equation $ax^2 + bx + c = 0$ represents a quadratic equation if and only if .....

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**3.** Sum of roots of quadratic equation $x^2 - 4x + 2 = 0$ is ..... of product of roots .

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**4.** The quadratic equation $2x^2 + x + 4$ has .....real roots

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**5.** The roots of $x + \frac{1}{x} = 2$ are .....

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**6.** The sum of the roots of the quadratic equation $2x^2 + 14x + 24 = 0$ is .....

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## Objective Type Questions Very Short Answer Type Questions

**1.** Find the values of 'k' for which x = 2 is a solution of the equation $kx^2 + 2x - 3 = 0$

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**2.** Find the value of k for which the quadratic equation $3x^2 + kx + 3 = 0$ has real and equal roots.

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**3.** For what values of k does the quadratic equation $4x^2 - 12x - k = 0$ have no real roots ?

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

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**5.** Is 0.2 a root of the equation $x^2 - 0.4 = 0$? Justify your answer.

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**6.** For what values of k , the roots of the equation $x^2 + 4x + k = 0$ are real ?

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**7.** If x = 2 and m = 3 , the equation is $3x^2 - 2kx + 2m = 0$ , find k .

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**8.** If one root of the quadratic equation $6x^2 - x - k = 0$ is $\frac{2}{3}$, then find the value of k.

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**9.** For what values of 'a' does the quadratic equation $x^2 - ax + 1 = 0$ not have real roots ?

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

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**11.** Find the value of k for which the roots of the quadratic equation $2x^2 + kx + 8 = 0$ will have equal value.

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## Short Answer Sa I Type Questions 2 Marks

**1.** For what positive values of k , does the quadratic equation $3x^2 - kx + 3 = 0$ not have real roots ?

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**2.** Solve for $x : 6x^2 + 11x + 3 = 0$

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**3.** Solve for $x : 8x^2 - 2x - 3 = 0$

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**4.** Solve the following quadratic equation :

$6a^2x^2 - 7abx - 3b^2 = 0$

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

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**6.** A quadratic equation with integral coefficients has integral roots. Justify your answer.

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**7.** Does there exist a quadratic equation whose coefficients are rational but both of its roots are irrational? Justify you answer.

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**8.** Solve for x :

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

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**9.** Find the roots of the quadratic equation $\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0.$

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**10.** If $b = 0, c < 0,$ is it true that the roots of$x^2 + bx + c = 0$ are numerically equal and opposite in sign? Justify your answer.

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**11.** 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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**12.** If $x = \frac{2}{3}$ and $x = -3$ are the roots of the quadratic equation $ax^2 + 7x + b = 0$ then find the values of a and b.

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**13.** If a and b are the roots of the equaltion $x^2 + ax - b = 0$, then find a and b.

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**14.** Solve for x : $\sqrt{2x + 9} + x = 13$

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

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## Short Answer Sa Ii Type Questions 3 Marks

**1.** Find the value of p, for which one root of the quadratic equation $px^2 - 14x + 8 = 0$ is 6 times the other.

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**2.** Solve $x^2 - 3\sqrt{5}x + 10 = 0$ using factorisation method. .

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**3.** Find the roots of the following quadratic equation by the factorisation method :

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

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

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**5.** Determine the condition for one root of the quadratic equation $ax^2 + bx + c = 0$ to be thrice the other .

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**6.** The sum of the areas of two squares is $157m^2$ . If the sum of their perimeters is 68 m , find the sides of the two squares .

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**7.** Write all the values of p for which the quadratic equation $x^2 + px + 16 = 0$ has equal roots . Find the roots of the equation so obtained .

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

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**9.** The product of two successive integral multiples of 5 is 1050 . Determine the multiples .

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**10.** A line segment AB of length 2 m is divided at a point C into two parts such that $AC^2 = AB \times CB$. Find the length of CB.

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**11.** Show that if the roots of the equation $(a^2 + b^2)x^2 + 2x(ac + bd) + c^2 + d^2 = 0$are real, they will be equal

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**12.** 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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**13.** 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 $\frac{a}{b}=\frac{c}{d}$

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**14.** Solve the following equation for x:

$9x^2-9(p+q)x+(2p^2+5pq+2q^2)=0$

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

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## Long Answer Type Questions 4 Marks

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

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**2.** Solve for $x: \frac{1}{a+b+x} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}, a \neq b \neq 0, x \neq 0, x \neq -(a+b)$

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**3.** Find a natural number whose square diminshed by 84 is equal to thrice of 8 more than the given number .

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**4.** A natural number when increased by 12, equals 160 times its reciprocal. Find number.

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**5.** 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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**6.** Find the dimensions of a rectangular park whose perimeter is 60 m and area 200 $m^2$

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**7.** If Zeba were younger by 5 years than what she really is, then the square of her age (in years) would have been 1 more than five times her actual age. What is her age now?

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**8.** At present Asha's age (in years) is 2 more than the square of her daughter Nisha's age. When Nisha grows to her mother's present age, Asha's age would be one year less than 10 times

the present age of Nisha. Find the present ages of both Asha and Nisha.

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**9.** In a class test , the sum of Arun's marks in Hindi and English is 30 . Had he got 2 marks more in Hindi and 3 marks less in English , the product of the marks would have been 210 . Find his marks in the two subjects .

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

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**12.** The altitude of a right-angled triangle is 7 cm less than its base . If the hypotenuse is 13 cm , then find the other two sides .

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**13.** Solve for x : $\frac{x+3}{x-2} - \frac{1-x}{x} = \frac{17}{4}, x - 0, 2$

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14. Find two consecutive odd natural numbers , the sum of whose squares is 290.

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15. A and B working together can do a work in 6 days . If A takes 5 days less than B to finish the work , in how many days can B can do the work alone ?

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16. Find x in terms of a , b and c :

$$\frac{a}{x-a}+\frac{b}{x-b}=\frac{2c}{x-c}, x-a, b, c$$

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17. Solve for x :

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

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18. At t minutes past 2 pm, the time needed by the minutes hand of a clock to show 3pm was found to be 3 minutes less than `(t^2)/4 minutes. Find t.

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19. Solve for x :

$$\frac{2x}{x-3}+\frac{1}{2x+3}+\frac{3x+9}{(x-3)(2x+3)}=0$$

$x \neq 3, -3/2$

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