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Class-X Assignment (Chapter-4) Quadratic equation

Q1: Determine the value of k for which the quadratic equation $4x^2 - 3kx + 1 = 0$ has equal roots.

Q2: If the roots of quadratic equation $ax^2 + bx + c = 0$ are equal then show that $b^2 = 4ac$.

Q3: If one root of quadratic equation $2x^2 + ax + 3 = 0$ is 1, find the other root & the value of a.

Q4: Find the values of k such that the quadratic equation $x^2 - 2kx + (7k - 12) = 0$ has equal roots.

Q5: For what value of k, does the quadratic equation $9x^2 + 8kx + 16 = 0$ have equal roots?

Q6: If one root of the equation $3x^2 - kx - 2 = 0$ is 2, find the value of k. Also find the other root.

Q7: If -5 is a root of the quadratic equation $2x^2 + px - 15 = 0$ & the quadratic equation $p(x^2 + x) + k = 0$ has equal roots, find the value of k.

Q8: If one root of quadratic equation $2x^2 + kx - 6 = 0$ is 2, find the value of k. Also find the other root.

Q9: Solve for x:

(a) $9x^2 - 6ax + (a^2 - b^2) = 0$

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

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

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

Q10: The sum of the squares of two consecutive natural numbers is 421. Find the numbers.

Q11: The sum of the squares of three consecutive positive integers is 50. Find the integers.

Q12: A two-digit number is such that the product of its digits is 35. When 18 are added to the number, the digits interchange their places. Find the number.

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Q13: The sum two natural numbers is 8. Determine the numbers if the sum of their reciprocals is $\frac{8}{15}$.

Q14: Two numbers differ by 3 & their product is 504. Find the numbers.

Q15: If $x = 2$ & $x = 3$ are the roots of the equation $3x^2 - 2kx + 2m = 0$, find the values of k & m.

Q16: Find the value of k for which the given equation has real & equal roots.

(i) $x^2 + k(4x + k - 1) + 2 = 0$ $(ii)\ (x^2 - 2x(1 + 3k) + 7(3 + 2k) = 0$

Q17: If one root of the equation $x^2 - 5x + k = 0$ is equal to 4, find the value of k & the other root.

Q18: If p, q are real & $p \neq q$, then show that the roots of equation $(p - q)x^2 + 5(p + q)x - 2(p - q) = 0$ are real & unequal.

Q19: The sum of two numbers is 15. If the sum of their reciprocals is $\frac{3}{10}$, find the numbers.

Q20: The sum of a number & its positive square roots is $\frac{6}{25}$. Find the number.

Q21: The sum of squares of two consecutive natural numbers $is\ 313$. Find the numbers.

Q22: A person on tour has Rs. 360 for his daily expenses. If he exceeds his tour programme by 4 days, he must cut down his daily expenses by Rs. 3 per day. Find the number of days of his programme.

Q23: A piece of cloth costs Rs. 200. If the piece were 5m longer & each meter of cloth costed Rs. 2 less, the cost of piece would have remained unchanged. How long are the piece & what its original rate per meter is?

Q24: Rs. 6,500 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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Q25: An express train makes a run of 240km at a certain speed. Another train whose speed is 12km/hr less takes an hour longer to cover the same distance. Find the speed of the express train in km/hr.

Q26: A train covers a distance of 90km at a uniform speed. Had the speed been 15km per hour more, it would have taken half an hour less for the journey. Find the original speed of the train.

Q27: The area of right angled triangle is 600sq.cm. If the base of the triangle exceeds the altitude by 10cm, find the dimensions of the triangle.

Q28: In a flight of 2,800km, an aircraft was slowed down due to bad weather. Its average speed for the rip was reduced by 100km/hr & the time increased by 30 minutes. Find the original duration of flight.

Q29: Two pipes running together can fill a cistern in 6 minutes. If one pipe takes 5 minutes more than the other to fill the cistern, find the time in which each pipe would fill the cistern.

Q30: Two pipes running together can fill a cistern in $3\frac{1}{13}$ minutes. If one pipe takes 3 minutes more than the other to fill the cistern, find the time in which each pipe would fill the cistern.

Q31: Rs. 9,000 were divided equally among a certain number of persons. Had there been 20 more persons, each would have got Rs. 160 less. Find the original number of persons.

Q32: If the price of the book is reduced by Rs. 5, a person can buy 5 more books for Rs.300. Find the original list price of the book.

Q33: If the list price of the toy is reduced by Rs. 2, a person can buy 2 toys more for Rs. 360. Find the original price of the toy.

Q34: An aeroplane takes one hour less for a journey of 1200km if its speed is increased by 100km/hr from its usual speed. Find its usual speed.

Q35: A two digit number is such that the product of its digits is 15. If 8 are added to the number, the digits interchange their places. Find the number.

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Q36: A passenger train takes 2hrs less for a journey of 300lm if its speed is increased by 5km/hr from its usual speed. Find the usual speed of the train.

Q37: Aeroplane left 30 minutes later than its scheduled time & in order to reach destination 1500km away in time, it has to increase its speed by 250km/hr from its usual speed. Determine its usual speed.

Q38: A speed of a boat in still water is 11km/gr. It can go 12km upstream & return downstream to the original point in 2hrs 45minutes. Find the speed of the stream.

Q39: One-fourth of a herd of camels was seen in the forest. Twice the square root of the herd had gone to mountains and the remaining 15 camels were seen on the bank of a river. Find the total number of camels.

Q40: A piece of cloth costs Rs. 35. If the piece were 4m longer & each meter costs Rs. 1 less, the cost would remain unchanged. How long is the piece?

Q41: Some students planned a picnic. The budget for food was Rs. 480. But eight of these failed to go & thus the cost of food for each member increased by Rs. 10. How many students attended the picnic?

Q42: A dealer sells an article for Rs. 24 & gains as much per cent as the cost price of the article. Find the cost of the article.

Q43: The product of Shikha's age five years ago & her age 8 years later is 30, her age at both times being given in years. Find their present age.

Q44: Out of a group of swans, $\frac{7}{2}$ times the square root of the total number are playing on the shore of a pond. The two remaining ones are swimming in water. Find the total no. of swans.

Q45: Divide 16 into two parts such that twice the square of the longer part exceeds the square of smaller part by 164.

Q46: In a cricket match Kumble took one wicket less than twice the number of wickets taken by Srinath. If the product of the number of wickets taken by these two is 15, find the number of wickets taken by each.

Q47: A rectangle of perimeter 34 units is inscribed in a circle of diameter 13units. Find its sides.

Q48: The perimeter of a rectangle is 76cm. Its area is 357sq.cm. Find the length & breadth of the rectangle.

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Q49: The perimeter of a right angled triangle is 70 units & its hypotenuse is 29 units. Find the length of the other side.

Q50: The age of father is equal to the square of the age of his son. The sum of the age of father & five times the age of the son is 66 tears. Find their ages.

Q51: A motor-boat takes 2hrs more to cover a distance of 30km upstream than it takes to cover the same distance downstream. If the speed of the stream is 2km/hr, find the speed of the boat in still water.

Q52: In a class test, the sum of Shefali's marks in Mathematics & English is 30. Had she got 2 marks more in Mathematics & 3 marks less in English, the product of their marks would have been 210. Find her marks in the two subjects.

ANSWERS:

(1) $k = \pm\frac{4}{3}$ **(3)** Other root= $\frac{3}{2}$; a=-5 **(4)** $k = 4, 3$ **(5)** $k = \pm 3$

(6) $k = 5,\ Other\ root = -\frac{1}{3}$ **(7)** $k = \frac{7}{4}$ **(8)** $-\frac{3}{2}$

(9) (a) $x = \frac{a+b}{3}, \frac{a-b}{3}$ **(b)** $x = -a, -b, or\ x = \frac{c}{b}, -\frac{b}{a}$

(c) $x = 5$ **(d)** $x = \frac{q^2}{p^2}, -1$

(10) 14, 15

(11) 3,4,5 **(12)** 57 **(13)** 3 & 5

(14) $21, 24\ or\ -21, -24$ **(15)** $k = \frac{15}{2}$ & $m = 9$

(16) (i) $k = \frac{2}{3}, -1$ **(ii)** $k = 2, -\frac{10}{9}$

(17) k=4 & other root = 1 **(19)** 10 & 5 **(20)** $\frac{1}{25}$

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(21) 12, 13 **(22)** 20 **(23)** 20m, Rs.10 **(24)** 50

(25) 60km/hr **(26)** 45km/hr **(27)** 30, 40, 50

(28) $z = 3\frac{1}{2} hrs$ **(29)** 10 & 15 minutes **(30)** 5,8

(31) 25 **(32)** Rs. 20 **(33)** Rs. 20

(34) 300km/hr **(35)** 35 **(36)** 25km/hr

(37) 750km/hr **(38)** 5km/hr **(39)** 36

(40) 10m **(41)** 16 **(42)** Rs. 20

(43) 7yrs **(44)** 16 **(45)** 10, 6

(46) Kumble$= 5$, Srinath$= 3$ **(47)** 5, 12 **(48)** 21, 17

(49) 20, 21 **(50)** 36, 6 **(51)** $8km/hr$

(52) 13, 17 or 12, 18