INTERNATIONAL INDIAN SCHOOL BURAIDAH

Worksheet for the Academic Year 2024-25

CLASS: X SUBJECT: MATHEMATICS DATE: 01-07-2024

LESSON:04 – QUADRATIC EQUATIONS

Level 1:

1. Check whether the following equations are quadratic or not:
   a) $y(8y + 5) = y^2 + 3$
   b) $x^2 + \frac{1}{x^2} = 2$
   c) $x + \frac{3}{x} = x^2$ (Ans: a) Yes b) No c) No)
2. Show that x = -3 is a solution of the equation $x^2 + 6x + 9 = 0$
3. If x = 2 and x = 3 are roots of the equation $3x^2 - 2ax + 2b = 0$, then find the values of a and b (Ans: a = $\frac{15}{2}$ & b = 9)
4. Find the value of k for which the roots of the equation $3x^2 - 10x + k = 0$ are reciprocal of each other. (Ans: k = 3)
5. Solve the following equations by factorization method:
   a) $5x^2 - 3x - 2 = 0$ (Ans: $\frac{-2}{5}$, 1)
   b) $x^2 - 10x + 21 = 0$ (Ans: 3, 7)
   c) $5x + \frac{1}{x} = 6$ (Ans: 1,$\frac{1}{5}$)
   d) $\frac{x+3}{x+2} = \frac{3x-7}{2x-3}$, $x \neq -2, \frac{3}{2}$ (Ans: -1,5)
   e) $4\sqrt{5}x^2 + 3x - 2\sqrt{5} = 0$ (Ans: $\frac{-2}{\sqrt{5}}, \frac{\sqrt{5}}{4}$)
6. Write the discriminant of the following Quadratic equations:
   a) $2x^2 - 5x + 3 = 0$ (Ans: 1)
   b) $x^2 - 2x + k = 0$ (Ans: 4 – 4k)
   c) $\sqrt{3}x^2 - 2\sqrt{2}x - 2\sqrt{3} = 0$ (Ans: 32)
7. Determine the nature of the roots of the following Quadratic equations:
   a) $4x^2 + 4\sqrt{3}x + 3 = 0$ (Ans: Real & equal)
   b) $4x^2 - 2x = 3$ (Ans: Real & distinct)
8. Find the roots of the following quadratic equations by applying the Quadratic formula
   a) $3x^2 + 11x + 10 = 0$ (Ans: $\frac{-5}{3}$, -2)
   b) $x^2 - 4\sqrt{2}x + 6 = 0$ (Ans: $\sqrt{2}$, $3\sqrt{2}$)

c) $\frac{1}{x-3} - \frac{1}{x+5} = \frac{1}{6}$, $x \neq 3, -5$ (Ans: -9,7)

9. Find the value of k for which the following equations has real and equal roots:
   a) $3x^2 + kx + 3 = 0$ (Ans: $k = \pm 6$)
   b) $9x^2 - 24x + k = 0$ (Ans: $k = 16$)
   c) $x^2 + k(2x + k - 1) + 2 = 0$ (Ans: $k = 2$)
   d) $(k+1)x^2 - 2(k-1)x + 1 = 0$ (Ans: $k = 0,3$)
10. The sum of the reciprocals of Varun's age (in years) 3 yrs ago and 5 yrs from now is $\frac{1}{3}$. Find his present age. (Ans: 7 yrs)
11. If the product of the two consecutive odd numbers is 143, then find the numbers (Ans: 11 & 13)
12. Divide 29 into two parts so that the sum of the squares of the parts is 425 (Ans: 13,16)

<u>Level 2 :</u>

13. In a flight of 600km, an aircraft was slowed down due to bad weather. Its average speed for the trip was reduced by 200km/hr and the time of flight increased by 30 minutes. Find the duration of the flight. (Ans: 1 hr)
14. A train travels 180km at a uniform speed. If the speed had been 9km/hour more, it would have taken 1 hour less for the same journey. Find the speed of the train (Ans: 36km/hr)
15. If the root of the quadratic equation $(a^2 + b^2)x^2 - 2(ac + bd)x + (c^2 + d^2) = 0$ are equal, prove that ad = bc
16. The hypotenuse of a right-angled triangle is 6m more than twice the length of the shortest side. If the length of the third side is 2m less than the hypotenuse, then find all sides of the triangle. (Ans: 10,24 & 26)

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