

**CLASS-X**  
**MATHEMATICS WORKSHEET**  
**CHAPTER-4: QUADRATIC EQUATIONS**

**VERY SHORT ANSWER TYPE QUESTIONS**

- Q1. Show that  $x = -3$  is the solution of the equation  $x^2 + 6x + 9 = 0$ .
- Q2. For what value of  $k$  are the roots of quadratic equation  $3x^2 + 2kx + 27 = 0$  real and equal?
- Q3. Write the nature of roots of quadratic equation  $4x^2 + 4\sqrt{3}x + 3 = 0$ .
- Q4. If  $a$  and  $b$  are the roots of the equation  $x^2 + ax - b = 0$ , then find  $a$  and  $b$ .
- Q5. If  $x = 3$  is one root of the quadratic equation  $x^2 - 2kx - 6 = 0$ , then find the value of  $k$ . (CBSE 2018)
- Q6. Which of the following are quadratic equations
- $x^3 - x = x^2 + 2$
  - $\sqrt{x} + 4 = x + 1$
  - $(x + 1)(x^2 - 2) = (x + 3)^3$

**SHORT ANSWER TYPE QUESTIONS**

- Q7. Solve for  $x$ :
- $x^2 - 2(a^2 + b^2)x + (a^2 - b^2)^2 = 0$
  - $2x^2 + ax - a^2 = 0$
  - $p^2x^2 + (p^2 - q^2)x - q^2 = 0$
  - $\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$
  - $(a + b)^2x^2 + 8(a^2 - b^2)x + 16(a - b)^2 = 0$
  - $1/(a + b + x) = 1/a + 1/b + 1/x$ ,  $a \neq 0$ ,  $b \neq 0$ ,  $x \neq 0$ .
- Q8. If  $ad \neq bc$ , then prove that the equation  $(a^2 + b^2)x^2 + 2(ac + bd)x + (c^2 + d^2) = 0$  has no real roots.
- Q9. If  $\sin\theta$  and  $\cos\theta$  are roots of the equation  $ax^2 + bx + c = 0$ , prove that  $a^2 - b^2 + 2ac = 0$ .
- Q10. If one root of the equation  $3x^2 - kx - 2 = 0$  is 2, find the value of  $k$ . Also find the other root.
- Q11. If  $-5$  is a root of the quadratic equation  $2x^2 + px - 15 = 0$  and the quadratic equation  $p(x^2 + x) + k = 0$  has equal roots, find the value of  $k$ .
- Q12. Find the value of  $k$  for which the roots of the quadratic equation  $(k - 4)x^2 + 2(k - 4)x + 2 = 0$  are equal.
- Q13. Find the value of  $k$  for which the equation  $x^2 + kx + 64 = 0$  has real roots.
- Q14. If the roots of the equation  $(b - c)x^2 + (c - a)x + (a - b) = 0$  are equal then prove that  $2b = a + c$ .
- Q15. If the roots of the equation  $(c^2 - ab)x^2 - 2(a^2 - bc)x + b^2 - ac = 0$  are equal, then prove that either  $a = 0$  or  $a^3 + b^3 + c^3 = 3abc$ .
- Q16. If the roots of the equation  $(1 + m^2)x^2 + 2mcx + (c^2 - a^2) = 0$  are equal, then prove that  $c^2 = a^2(1 + m^2)$ .

**LONG ANSWER TYPE QUESTIONS**

- Q17. A train travels at a certain average speed for a distance of 63km and then travels at a distance of 72km at an average speed of 6km/hr more than its original speed. If it takes 3 hours to complete total journey, what is the original average speed? (CBSE 2018)
- Q18. An aeroplane left 30 minutes later than its scheduled time and in order to reach its destination 1500km away in time, it has to increase its speed by 250 km/hr from its usual speed, determine its usual speed. (CBSE 2018)
- Q19. Two water taps together can fill a tank in  $1\frac{7}{8}$  hours. The tap with longer diameter takes 2 hours less than the tap with smaller one to fill the tank separately. Find the time in which each tap can fill the tank separately. (CBSE 2019)
- Q20. 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 the work in 4 days, find the time taken by B to finish the work.
- Q21. (a)  $(x + 1)/(x - 1) + (x - 2)/(x + 2) = 3$ ,  $x \neq 1, -2$   
(b)  $(3x - 4)/7 + 7/(3x - 4) = 5/2$ ,  $x \neq 4/3$

ANSWERS

2.  $k = \pm 9$
3. Real and equal roots
4.  $a = -1, b = 2$
5.  $\frac{1}{2}$
6. (c)
7. (a)  $(a+b)^2, (a-b)^2$   
(b)  $\frac{a}{2}, -a$   
(c)  $\frac{q^2}{p^2}, -1$   
(d)  $-\frac{5}{\sqrt{2}}, -\sqrt{2}$   
(e)  $-4(a-b), (a+b)$   
(f)  $-a, -b$
10. 2,  $-\frac{1}{3}$
11.  $\frac{7}{4}$
12. 6
13.  $k \geq 16$
17. 42km/hr
18. 750km/hr
19. 5,  $\frac{3}{4}$
20. 12 days
- 21 (a) -5, 2  
(b) 6,  $\frac{5}{2}$

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