Praadis Education
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MCQ WORKSHEET-I
CLASS X: CHAPTER – 4
QUADRATIC EQUATIONS

1. The roots of the equation $x^2 + 7x + 10 = 0$ are
(a) 2 and 5 (b) –2 and 5 (c) –2 and –5 (d) 2 and –5

2. If α, β are the roots of the quadratic equation $x^2 + x + 1 = 0$, then $\frac{1}{\alpha} + \frac{1}{\beta}$
(a) 0 (b) 1 (c) –1 (d) none of these

3. If the equation $x^2 + 4x + k = 0$ has real and distinct roots then
(a) $k < 4$ (b) $k > 4$ (c) $k \leq 4$ (d) $k \geq 4$

4. If the equation $x^2 – ax + 1 = 0$ has two distinct roots then
(a) $|a| = 2$ (b) $|a| < 2$ (c) $|a| > 2$ (d) none of these

5. If the equation $9x^2 + 6kx + 4 = 0$ has equal roots then the roots are both equal to
(a) $\pm\frac{2}{3}$ (b) $\pm\frac{3}{2}$ (c) 0 (d) ± 3

6. If the equation $(a^2 + b^2)x^2 – 2b(a + c)x + b^2 + c^2 = 0$ has equal roots then
(a) $2b = a + c$ (b) $b^2 = ac$ (c) $b = \frac{2ac}{a+c}$ (d) $b = ac$

7. If the equation $x^2 – bx + 1 = 0$ has two distinct roots then
(a) $–3 < b < 3$ (b) $–2 < b < 2$ (c) $b > 2$ (d) $b < –2$

8. If $x = 1$ is a common root of the equations $ax^2 + ax + 3 = 0$ and $x^2 + x + b = 0$ then $ab =$
(a) 6 (b) 3 (c) –3 (d) $\frac{7}{2}$

9. If p and q are the roots of the equation $x^2 – px + q = 0$, then
(a) $p = 1, q = –2$ (b) $p = –2, q = 0$ (c) $b = 0, q = 1$ (d) $p = –2, q = 1$

10. If the equation $ax^2 + bx + c = 0$ has equal roots then $c =$
(a) $\frac{-b}{2a}$ (b) $\frac{b}{2a}$ (c) $\frac{-b^2}{4a}$ (d) $\frac{b^2}{4a}$

11. If the equation $ax^2 + 2x + a = 0$ has two distinct roots if
(a) $a = \pm 1$ (b) $a = 0$ (c) $a = 0, 1$ (d) $a = –1, 0$

12. The possible value of k for which the equation $x^2 + kx + 64 = 0$ and $x^2 – 8x + k = 0$ will both have real roots, is
(a) 4 (b) 8 (c) 12 (d) 16

MCQ WORKSHEET-II
CLASS X: CHAPTER – 4
QUADRATIC EQUATIONS

1. The value of $\sqrt{6+\sqrt{6+\sqrt{6+....}}}$ is

(a) 4 (b) 3 (c) –2 (d) $\frac{7}{2}$

2. If 2 is the root of the equation $x^2 + bx + 12 = 0$ and the equation $x^2 + bx + q = 0$ has equal roots then q =

(a) 8 (b) 16 (c) –8 (d) –16

3. If the equation $(a^2 + b^2)x^2 – 2(ac + bd)x + c^2 + d^2 = 0$ has equal roots then

(a) ab = cd (b) ad = bc (c) ad = $\sqrt{bc}$ (d) ab = $\sqrt{cd}$

4. If a and b can take values 1, 2, 3, 4. Then the number of the equations of the form $ax^2 + bx + c = 0$ having real roots is

(a) 6 (b) 7 (c) 10 (d) 12

5. The number of quadratic equations having real roots and which do not change by squaring their roots is

(a) 4 (b) 3 (c) 2 (d) 1

6. If one of the roots of the quadratic equation $(k^2 + 4)x^2 + 13x + 4k$ is reciprocal of the other then k =

(a) 2 (b) 1 (c) –1 (d) – 2

7. If α, β are the roots of the quadratic equation $4x^2 + 3x + 7 = 0$, then $\frac{1}{\alpha}+\frac{1}{\beta}$

(a) $\frac{7}{3}$ (b) $\frac{-7}{3}$ (c) $\frac{3}{7}$ (d) $\frac{-3}{7}$

8. If α, β are the roots of the quadratic equation $x^2 – p(x + 1) – c = 0$, then $(\alpha+1)(\beta+1)$ =

(a) c – 1 (b) 1 – c (c) c (d) 1 + c

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

(a) $\pm 2\sqrt{6}$ (b) $2\sqrt{6}$ (c) 0 (d) ± 2

10. Find the values of k for which the quadratic equation $kx(x – 3) + 9 = 0$ has real equal roots.

(a) k = 0 or k = 4 (b) k = 1 or k = 4 (c) k = –3 or k = 3 (d) k = –4 or k = 4

11. Find the values of k for which the quadratic equation $4x^2 – 3kx + 1 = 0$ has real and equal roots.

(a) $\pm\frac{4}{3}$ (b) $\pm\frac{2}{3}$ (c) ± 2 (d) none of these

12. Find the values of k for which the quadratic equation $(k – 12)x^2 + 2(k – 12)x + 2 = 0$ has real and equal roots.

(a) k = 0 or k = 14 (b) k = 12 or k = 24 (c) k = 14 or k = 12 (d) k = 1 or k = 12

MCQ WORKSHEET-III
CLASS X: CHAPTER – 4
QUADRATIC EQUATIONS

1. The value of k for which equation 9x2 + 8xk + 8 = 0 has equal roots is:
(a) only 3 (b) only –3 (c) ±3 (d) 9

2. Which of the following is not a quadratic equation?
(a) $x-\frac{3}{x}=4$ (b) $3x-\frac{5}{x}=x^2$ (c) $x+\frac{1}{x}=3$ (d) $x^2-3=4x^2-4x$

3. Which of the following is a solution of the quadratic equation $2x^2 + x – 6 = 0$?
(a) x = 2 (b) x = –12 (c) x = $\frac{3}{2}$ (d) x = –3

4. The value of k for which x = –2 is a root of the quadratic equation $kx^2 + x – 6 = 0$
(a) –1 (b) –2 (c) 2 (d) $-\frac{3}{2}$

5. The value of p so that the quadratics equation $x^2 + 5px + 16 = 0$ has no real root, is
(a) p>8 (b) p<5 (c) $\frac{-8}{5}<x<\frac{8}{5}$ (d) $\frac{-8}{5}\le x<0$

6. If $px^2 + 3w + q = 0$ has two roots x = –1 and x = –2, the value of q – p is
(a) –1 (b) –2 (c) 1 (d) 2

7. The common root of the quadratic equation $x^2 – 3x + 2 = 0$ and $2x^2 – 5x + 2 = 0$ is:
(a) x = 2 (b) x = –2 (c) x = $\frac{1}{2}$ (d) x = 1

8. If $x^2 – 5x + 1 = 0$, the value of $\left(x+\frac{1}{x}\right)$ is:
(a) –5 (b) –2 (c) 5 (d) 3

9. If a – 3 = $\frac{10}{a}$, the value of a are
(a) –5, 2 (b) 5, –2 (c) 5, 2 (d) 5, 0

10. If the roots of the quadratic equation $kx^2 + (a + b)x + ab = 0$ are (–1, –b), the value of k is:
(a) –1 (b) –2 (c) 1 (d) 2

11. The quadratic equation with real coefficient whose one root is $2+\sqrt{3}$ is:
(a) $x^2 – 2x + 1 = 0$ (b) $x^2 – 4x + 1 = 0$ (c) $x^2 – 4x + 3 = 0$ (d) $x^2 – 4x + 4 = 0$

12. If the difference of roots of the quadratic equation $x^2 + kx + 12 = 0$ is 1, the positive value of k is:
(a) –7 (b) 7 (c) 4 (d) 8

MCQ WORKSHEET-IV
CLASS X: CHAPTER – 4
QUADRATIC EQUATIONS

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

(a) k = 0 or k = $\frac{1}{3}$ (b) k = 1 or k = $\frac{1}{3}$ (c) k = –1 or k = $\frac{1}{3}$ (d) k = –3 or k = $\frac{1}{3}$

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

(a) p =3, q = 9 (b) p =9, q = 3 (c) p = 3, q = $\frac{4}{9}$ (d) p = 3, q = $\frac{9}{4}$

3. If the roots of the equation $(a – b)x^2 + (b – c)x + (c – a) = 0$ are equal, then b + c =

(a) 2a (b) 2bc (c) 2c (d) none of these

4. Find the positive value of k for which the equations $x^2 + kx + 64 = 0$ and $x^2 – 8x + k = 0$ will have real roots.

(a) 8 (b) 16 (c) –8 (d) –16

5. Find the positive value of k for which the equation $kx^2 – 6x – 2 = 0$ has real roots

(a) $k \le \frac{-9}{2}$ (b) $k \ge \frac{-9}{2}$ (c) $k > \frac{-9}{2}$ (d) $k < \frac{-9}{2}$

6. Find the positive value of k for which the equation $3x^2 + 2x + k = 0$ has real roots

(a) $k \ge \frac{1}{3}$ (b) $k \le \frac{1}{3}$ (c) $k > \frac{1}{3}$ (d) $k < \frac{1}{3}$

7. Find the positive value of k for which the equation $2x^2 + kx + 2 = 0$ has real roots

(a) $k \ge 4$ (b) $k \le –4$ (c) both (a) and (c) (d) none of these.

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

(a) 3 (b) $\frac{1}{3}$ (c) both (a) and (c) (d) none of these

9. Divide 12 into two parts such that the sum of their squares is 74.

(a) 7 and 5 (b) 8 and 4 (c) 10 and 2 (d) none of these

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

(a) 14 and 5 (b) 14 and 15 (c) 10 and 5 (d) none of these

11. The sum of two numbers is 15 and the sum of their reciprocals is $\frac{3}{10}$. Find the numbers.

(a) 14 and 5 (b) 14 and 15 (c) 10 and 5 (d) none of these

12. Divide 12 into two parts such that their product is 32.

(a) 7 and 5 (b) 8 and 4 (c) 10 and 2 (d) none of these

PRACTICE QUESTIONS

CLASS X : CHAPTER - 4

QUADRATIC EQUATIONS

FACTORISATION METHOD

Solve the following quadratic equations:

1. $x^2 + 11x + 30 = 0$

2. $x^2 + 18x + 32 = 0$

3. $x^2 + 7x - 18 = 0$

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

5. $y^2 - 4y + 3 = 0$

6. $x^2 - 21x + 108 = 0$

7. $x^2 - 11x - 80 = 0$

8. $x^2 - x - 156 = 0$

9. $z^2 - 32z - 105 = 0$

10. $40 + 3x - x^2 = 0$

11. $6 - x - x^2 = 0$

12. $7x^2 + 49x + 84 = 0$

13. $m^2 + 17mn - 84n^2 = 0$

14. $5x^2 + 16x + 3 = 0$

15. $6x^2 + 17x + 12 = 0$

16. $9x^2 + 18x + 8 = 0$

17. $14x^2 + 9x + 1 = 0$

18. $2x^2 + 3x - 90 = 0$

19. $2x^2 + 11x - 21 = 0$

20. $3x^2 - 14x + 8 = 0$

21. $18x^2 + 3x - 10 = 0$

22. $15x^2 + 2x - 8 = 0$

23. $6x^2 + 11x - 10 = 0$

24. $30x^2 + 7x - 15 = 0$

25. $24x^2 - 41x + 12 = 0$

26. $2x^2 - 7x - 15 = 0$

27. $6x^2 + 11x - 10 = 0$

28. $10x^2 - 9x - 7 = 0$

29. $5x^2 - 16x - 21 = 0$

30. $2x^2 - x - 21 = 0$

31. $15x^2 - x - 28 = 0$

32. $8a^2 - 27ab + 9b^2 = 0$

33. $5x^2 + 33xy - 14y^2 = 0$

34. $3x^3 - x^2 - 10x = 0$

35. $x^2 + 9x + 18 = 0$

36. $x^2 + 5x - 24 = 0$

37. $x^2 - 4x - 21 = 0$

38. $6x^2 + 7x - 3 = 0$

39. $2x^2 - 7x - 39 = 0$

40. $9x^2 - 22x + 8 = 0$

41. $6x^2 + 40 = 31x$

42. $36x^2 - 12ax + (a^2 - b^2) = 0$

43. $8x^2 - 22x - 21 = 0$

44. $2x^2 - x + \frac{1}{8} = 0$

45. $4\sqrt{3}x^2 + 5x - 2\sqrt{3} = 0$

PRACTICE QUESTIONS
CLASS X : CHAPTER - 4
QUADRATIC EQUATIONS
FACTORISATION METHOD

Solve the following by Factorisation method:

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

2. $2x - \frac{3}{x} = 1$

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

4. $\frac{x}{x+1} + \frac{x+1}{x} = \frac{34}{15},\ x \neq -1$ and $x \neq 0$

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

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

7. $\frac{1}{a+b+x} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}, [x \neq 0, -(a+b)]$

8. $2\left(\frac{2x-1}{x+3}\right) - 3\left(\frac{x+3}{2x-1}\right) = 5, x \neq -3, \frac{1}{2}$

9. $5^{(x+1)} + 5^{(2-x)} = 5^3 + 1$

10. $5x - \frac{35}{x} = 18, x \neq 0$

11. $2^{2x} - 3.2^{(x+2)} + 32 = 0$

12. $4^{(x+1)} + 4^{(1-x)} = 10$

13. $3^{(x+2)} + 3^{-x} = 10$

14. $10x - \frac{1}{x} = 3$

15. $\frac{2}{x^2} - \frac{5}{x} + 2 = 0$

16. $\sqrt{3}x^2 + 11x + 6\sqrt{3} = 0$

17. $4\sqrt{3}x^2 + 5x - 2\sqrt{3} = 0$

18. $3\sqrt{7}x^2 + 4x - \sqrt{7} = 0$

19. $\sqrt{7}x^2 - 6x - 13\sqrt{7} = 0$

20. $4\sqrt{6}x^2 - 13x - 2\sqrt{6} = 0$

21. $x^2-(1+\sqrt{2})x+\sqrt{2}=0$

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

23. $\left(\frac{x}{x+1}\right)^2-5\left(\frac{x}{x+1}\right)+6=0,(x\neq-1)$

24. $2\left(\frac{2x-1}{x+3}\right)-3\left(\frac{x+3}{2x-1}\right)=5,\left(x\neq-3,\frac{1}{2}\right)$

25. $2\left(\frac{x-1}{x+3}\right)-7\left(\frac{x+3}{x-1}\right)=5,(x\neq-3,1)$

26. $\frac{a}{x-b}+\frac{b}{x-a}=2,(x\neq a,b)$

27. $\frac{a}{ax-1}+\frac{b}{bx-1}=a+b,\left(x\neq\frac{1}{a},\frac{1}{b}\right)$

28. $\frac{x+3}{x-2}-\frac{1-x}{x}=\frac{17}{4},(x\neq0,2)$

29. $\frac{2x}{x-4}+\frac{2x-5}{x-3}=\frac{25}{3},(x\neq4,3)$

30. $\frac{1}{x-3}-\frac{1}{x+5}=\frac{1}{6},(x\neq3,-5)$

31. $\frac{1}{x-2}+\frac{2}{x-1}=\frac{6}{x},(x\neq2,1)$

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

33. $\frac{1}{x-2}+\frac{1}{x-4}=\frac{4}{3},(x\neq2,4)$

34. $\frac{x-3}{x+3}-\frac{x+3}{x-3}=6\frac{6}{7},(x\neq-3,3)$

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

36. $x=\dfrac{1}{2-\dfrac{1}{2-\dfrac{1}{2-x}}},x\neq2$

37. $4x^2-2(a^2+b^2)x+a^2b^2=0$

38. $9x^2-9(a+b)x+(2a^2+5ab+2b^2)=0$

39. $4x^2-4a^2x+(a^4-b^4)=0$

40. $x^2+\left(\frac{a+b}{a}+\frac{a}{a+b}\right)x+1=0$

41. $x^2+x-(a+1)(a+2)=0$

42. $x^2+3x-(a^2+a-2)=0$

43. $a^2b^2x^2+b^2x-a^2x-1=0$

44. $x+\frac{1}{x}=25\frac{1}{25}$

45. $(x-3)(x-4)=\frac{34}{(33)^2}$

46. $x^2+\left(a+\frac{1}{a}\right)x+1=0$

47. $(a+b)^2x^2-4abx-(a-b)^2=0$

48. $7x+\frac{3}{x}=35\frac{3}{5}$

49. $\frac{x-a}{x-b}+\frac{x-b}{x-a}=\frac{a}{b}+\frac{b}{a}$

50. $(x-5)(x-6)=\frac{25}{(24)^2}$

PRACTICE QUESTIONS
CLASS X : CHAPTER - 4
QUADRATIC EQUATIONS
METHOD OF COMPLETING THE SQUARE

Solve the following quadratic equation (if they exist) by the method of completing the square:

1. $8x^2 - 22x - 21 = 0$

2. $2x^2 - x + \frac{1}{8} = 0$

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

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

5. $9x^2 - 15x + 6 = 0$

6. $2x^2 - 5x + 3 = 0$

7. $4x^2 + 3x + 5 = 0$

8. $5x^2 - 6x - 2 = 0$

9. $4x^2 + 4bx - (a^2 - b^2) = 0$

10. $a^2x^2 - 3abx + 2b^2 = 0$

11. $x^2 - (\sqrt{3} + 1)x + \sqrt{3} = 0$

12. $x^2 - 4ax + 4a^2 - b^2 = 0$

13. $x^2 - (\sqrt{2} + 1)x + \sqrt{2} = 0$

14. $\sqrt{3}x^2 + 10x + 7\sqrt{3} = 0$

15. $\sqrt{2}x^2 - 3x - 2\sqrt{2} = 0$

16. $4x^2 + 4\sqrt{3}x + 3 = 0$

17. $2x^2 + x + 4 = 0$

18. $2x^2 + x - 4 = 0$

19. $3x^2 + 11x + 10 = 0$

20. $2x^2 - 7x + 3 = 0$

21. $5x^2 - 19x + 17 = 0$

22. $2x^2 + x - 6 = 0$

23. $2x^2 - 9x + 7 = 0$

24. $6x^2 + 7x - 10 = 0$

25. $x^2 - 4\sqrt{2}x + 6 = 0$

PRACTICE QUESTIONS
CLASS X : CHAPTER - 4
QUADRATIC EQUATIONS
METHOD OF QUADRATIC FORMULA

Show that each of the following equations has real roots, and solve each by using the quadratic formula:

1. $9x^2 + 7x - 2 = 0$

2. $x^2 + 6x + 6 = 0$

3. $2x^2 + 5\sqrt{3}x + 6 = 0$

4. $36x^2 - 12ax + (a^2 - b^2) = 0$

5. $a^2b^2x^2 - (4b^4 - 3a^4)x - 12a^2b^2 = 0$

6. $(a+b)^2x^2 - 4abx - (a-b)^2 = 0$

7. $4x^2 - 2(a^2 + b^2)x + a^2b^2 = 0$

8. $9x^2 - 9(a+b)x + (2a^2 + 5ab + 2b^2) = 0$

9. $4x^2 - 4a^2x + (a^4 - b^4) = 0$

10. $\sqrt{3}x^2 + 11x + 6\sqrt{3} = 0$

11. $4\sqrt{3}x^2 + 5x - 2\sqrt{3} = 0$

12. $3\sqrt{7}x^2 + 4x - \sqrt{7} = 0$

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

14. $4\sqrt{6}x^2 - 13x - 2\sqrt{6} = 0$

15. $x^2 - (1+\sqrt{2})x + \sqrt{2} = 0$

16. $2x^2 + 5\sqrt{3}x + 6 = 0$

17. $x^2 - 2x + 1 = 0$

18. $3x^2 + 2\sqrt{5}x - 5 = 0$

19. $3a^2x^2 + 8abx + 4b^2 = 0, a \neq 0$

20. $2x^2 - 2\sqrt{6}x + 3 = 0$

21. $3x^2 - 2x + 2 = 0$

22. $\sqrt{3}x^2 + 10x - 8\sqrt{3} = 0$

23. $x^2 + x + 2 = 0$

24. $16x^2 = 24x + 1$

25. $25x^2 + 20x + 7 = 0$

26. $6x^2 + x - 2 = 0$

27. $x^2 + 5x + 5 = 0$

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

29. $abx^2 + (b^2 - ac)x - bc = 0$

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

31. $12abx^2 - (9a^2 - 8b^2)x - 6ab = 0$

32. $24x^2 - 41x + 12 = 0$

33. $2x^2 - 7x - 15 = 0$

34. $6x^2 + 11x - 10 = 0$

35. $10x^2 - 9x - 7 = 0$

36. $x^2 - x - 156 = 0$

37. $z^2 - 32z - 105 = 0$

38. $40 + 3x - x^2 = 0$

39. $6 - x - x^2 = 0$

40. $7x^2 + 49x + 84 = 0$

PRACTICE QUESTIONS
CLASS X : CHAPTER - 4
QUADRATIC EQUATIONS
NATURE OF ROOTS

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

2. Find the value of k for which the quadratic equation $kx(x – 3) + 9 = 0$ has two real equal roots.

3. Find the value of k for which the quadratic equation $4x^2 – 3kx + 1 = 0$ has two real equal roots..

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

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

6. Find the value of k for which the quadratic equation $(k – 12)x^2 + 2(k – 12)x + 2 = 0$ has two real equal roots..

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

8. If the roots of the equation $(a – b)x^2 + (b – c)x + (c – a) = 0$ are equal, prove that $b + c = 2a$.

9. Prove that both the roots of the equation $(x – a)(x – b) + (x – b)(x – c) + (x – c)(x – a) = 0$ are real but they are equal only when $a = b = c$.

10. Find the positive value of k for which the equation $x^2 + kx + 64 = 0$ and $x^2 – 8x + k = 0$ will have real roots.

11. Find the value of k for which the quadratic equation $kx^2 – 6x – 2 = 0$ has two real roots.

12. Find the value of k for which the quadratic equation $3x^2 + 2x + k = 0$ has two real roots.

13. Find the value of k for which the quadratic equation $2x^2 + kx + 2 = 0$ has two real roots.

14. Show that the equation $3x^2 + 7x + 8 = 0$ is not true for any real value of x.

15. Show that the equation $2(a^2 + b^2)x^2 + 2(a + b)x + 1 = 0$ has no real roots, when $a \neq b$.

16. Find the value of k for which the quadratic equation $kx^2 + 2x + 1 = 0$ has two real and distinct roots.

17. Find the value of p for which the quadratic equation $2x^2 + px + 8 = 0$ has two real and distinct roots.

18. If the equation $(1 + m^2)x^2 + 2mcx + (c^2 – a^2) = 0$ has equal roots, prove that $c^2 = a^2(1 + m^2)$.

19. If the roots of the equation $(c^2 - ab)x^2 - 2(a^2 - bc)x + (b^2 - ac) = 0$ are real and equal, show that either $a = 0$ or $(a^3 + b^3 + c^3) = 3abc$.

20. Find the value of k for which the quadratic equation $9x^2 + 8kx + 16 = 0$ has two real equal roots.

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

22. Prove that the equation $x^2(a^2 + b^2) + 2x(ac + bd) + (c^2 + d^2) = 0$ has no real root, if $ad \neq bc$.

23. If the roots of the equation $x^2 + 2cx + ab = 0$ are real unequal, prove that the equation $x^2 - 2(a + b) + a^2 + b^2 + 2c^2 = 0$ has no real roots.

24. Find the positive values of k for which the equation $x^2 + kx + 64 = 0$ and $x^2 - 8x + k = 0$ will both have real roots.

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

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

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

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

29. Find the value of k for which the quadratic equation $(4 - k)x^2 + (2k + 4)x + (8k + 1) = 0$ has real and equal roots.

30. Find the value of k for which the quadratic equation $(2k + 1)x^2 + 2(k + 3)x + (k + 5) = 0$ has real and equal roots.

PRACTICE QUESTIONS
CLASS X : CHAPTER - 4
QUADRATIC EQUATIONS
WORD PROBLEMS CATEGORY WISE

I. NUMBER BASED QUESTIONS

DIRECT QUESTIONS

1. The difference of two numbers is 5 and the difference of their reciprocals is $\frac{1}{10}$. Find the numbers.
2. Find two consecutive odd positive integers, sum of whose squares is 290.
3. The difference of the squares of two numbers is 45. The squares of the smaller number are 4 times the larger number. Find the numbers.
4. The sum of the squares of the two positive integers is 208. If the square of the larger number is 18 times the smaller number, find the numbers.
5. The denominator of a fraction is 3 more than its numerator. The sum of the fraction and its reciprocal is $2\frac{9}{10}$. Find the fraction.
6. The denominator of a fraction is one more than twice the numerator. The sum of the fraction and its reciprocal is $2\frac{16}{21}$. Find the fraction.
7. Two numbers differ by 3 and their product is 504. Find the numbers.
8. Find three consecutive positive integers such that the sum of the square of the first and the product of the other two is 154.
9. The sum of two numbers is 16 and the sum of their reciprocals is $\frac{1}{3}$. Find the numbers.
10. The sum of two numbers is 18 and the sum of their reciprocals is $\frac{1}{4}$. Find the numbers.
11. The sum of two numbers is 25 and the sum of their reciprocals is $\frac{3}{10}$. Find the numbers.
12. The sum of two numbers is 15 and the sum of their reciprocals is $\frac{3}{10}$. Find the numbers.
13. The sum of a number and its reciprocal is $3\frac{41}{80}$. Find the numbers.
14. The sum of the squares of three consecutive positive integers is 50. Find the integers.
15. Find two natural numbers, the sum of whose squares is 25 times their sum and also equal to 50 times their difference.

TWO-DIGIT PROBLEMS

1. A two digit number is such that the product of its digits is 12. When 36 is added to the number, the digits are reversed. Find the number.
2. A two digit number is such that the product of its digits is 8. When 54 is subtracted from the number, the digits are reversed. Find the number.
3. A two digit number is four times the sum and twice the product of its digits. Find the number
4. A two digit number is such that the product of its digits is 14. When 45 is added to the number, the digits interchange their places. Find the number.

5. A two digit number is such that the product of its digits is 18. When 63 is subtracted from the number, the digits interchange their places. Find the number.
6. A two digit number is four times the sum and three times the product of its digits. Find the number
7. A two digit number is such that the product of its digits is 8. When 18 is subtracted from the number, the digits are reversed. Find the number.
8. A two digit number is 4 times the sum of its digits and twice the product of its digits. Find the number.
9. A two digit number is 5 times the sum of its digits and is also equal to 5 more than twice the product of its digits. Find the number.
10. A two digit number is such that the product of its digits is 35. When 18 is added to the number, the digits interchange their places. Find the number.

II. AGE RELATED QUESTIONS

1. The sum of ages of a father and his son is 45 years. Five years ago, the product of their ages in years was 124. Find their present ages.
2. Seven years ago Varun's age was five times the square of Swati's age. Three years hence Swati's age will be two fifth of Varun's age. Find their present ages.
3. The product of Rohit's age five years ago with his age 9 years later is 15 in years. Find his present age.
4. The product of Archana's age five years ago with her age 8 years later is 30 in years. Find her present age.
5. The sum of the ages of a man and his son is 45 years. Five years ago, the product of their ages in years was four times the man's age at that time. Find their present ages.
6. The sum of the ages of a boy and his brother is 25 years and the product of their ages in years is 126. Find their ages.
7. The sum of the ages of a boy and his brother is 12 years and the sum of the square of their ages is 74 in years. Find their ages.
8. A boy is one year older than his friend. If the sum of the square of their ages is 421, find their ages.
9. The difference of the ages of a boy and his brother is 3 and the product of their ages in years is 504. Find their ages.
10. The sum of the ages of a boy and his brother is 57 years and the product of their ages in years is 782. Find their ages.

III. SPEED, DISTANCE AND TIME RELATED QUESTIONS

1. A motor boat whose speed is 18 km/hr in still water takes 1 hour more to go 24 upstream than to return to the same point. Find the speed of the stream.
2. A motorboat whose speed is 9km/hr in still water, goes 15 km downstream and comes back in a total time of 3 hours 45 minutes. Find the speed of the stream.
3. A passenger train takes 2 hours less for a journey of 300 km if its speed is increased by 5 km/hr from its usual speed. Find its usual speed.
4. In a flight for 3000 km, an aircraft was slowed down due to bad weather. Its average speed for the trip was reduced by 100 km/hr and consequently time of flight increased by one hour. Find the original duration of flight.
5. 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/hr from its usual speed. Find its usual speed.
6. An express train takes 1 hour less than a passenger train to travel 132 km between Mysore and Bangalore (without taking into consideration the time they stop at intermediate stations). If the

average speed of the express train is 11km/h more than that of the passenger train, find the average speed of the two trains.

7. 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.

8. In a flight for 6000 km, an aircraft was slowed down due to bad weather. Its average speed for the trip was reduced by 400 km/hr and consequently time of flight increased by 30 minutes. Find the original duration of flight.

9. The time taken by a man to cover 300 km on a scooter was $1\frac{1}{2}$ hours more than the time taken by him during the return journey. If the speed in returning be 10 km/hr more than the speed in going, find its speed in each direction.

10. A motorboat whose speed is 15 km/hr in still water, goes 30 km downstream and comes back in a total time of 4 hours 30 minutes. Find the speed of the stream.

11. The speed of a boat in still water is 8 km/hr. It can go 15 km upstream and 22 km downstream in 5 hours. Find the speed of the stream.

12. A motor boat goes 10 km upstream and returns back to the starting point in 55 minutes. If the speed of the motor boat in still water is 22 km/hr, find the speed of the current.

13. A sailor can row a boat 8 km downstream and return back to the starting point in 1 hour 40 minutes. If the speed of the stream is 2 km/hr, find the speed of the boat in still water.

14. A train covers a distance of 90 km at a uniform speed. Had the speed been 15 km/hr more, it would have taken 30 minutes les for the journey. Find the original speed of the train.

15. The distance between Mumbai and Pune is 192 km. Travelling by the Deccan Queen, it takes 48 minutes less than another train. Calculate the speed of the Deccan Queen if the speeds of the two trains differ by 20 km/hr.

16. An aeroplane left 30 minutes later than it schedule time and in order to reach its destination 1500 km away in time, it had to increase its speed by 250 km/hr from its usual speed. Determine its usual speed.

IV. GEOMETRICAL FIGURES RELATED QUESTIONS

1. The sum of the areas of two squares is 640 m^2. If the difference in their perimeters be 64 m, find the sides of the two squares.

2. The hypotenuse of a right triangle is $3\sqrt{10}$ cm. If the smaller side is tripled and the longer sides doubled, new hypotenuse will be $9\sqrt{5}$ cm. How long are the sides of the triangle?

3. A pole has to be erected at a point on the boundary of a circular park of diameter 13 metres in such a way that the differences of its distances from two diametrically opposite fixed gates A and B on the boundary is 7 metres. Is it possible to do so? If yes, at what distances from the two gates should the pole be erected?

4. The 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.

5. The hypotenuse of a right triangle is $3\sqrt{5}$ cm. If the smaller side is tripled and the longer sides doubled, new hypotenuse will be 15 cm. How long are the sides of the triangle?

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

7. The hypotenuse of a right triangle is 25 cm. The difference between the lengths of the other two sides of the triangle is 5 cm. Find the lengths of these sides.

8. The diagonal of a rectangular field is 60 m more than the shortest side. If the longer side is 30 m more than the shorter side, find the sides of the field.

9. The perimeter of a right triangle is 60 cm. Its hypotenuse is 25 cm. Find the area of the triangle.

10. The side of a square exceeds the side of the another square by 4 cm and the sum of the areas of the two squares is 400 cm^2. Find the dimensions of the squares.

11. The length of the rectangle exceeds its breadth by 8 cm and the area of the rectangle is 240 cm^2. Find the dimensions of the rectangle.

12. A chess board contains 64 squares and the area of each square is 6.25 cm^2. A border round the board is 2 cm wide. Find the length of the side of the chess board.

13. A rectangular field is 25 m long and 16 m broad. There is a path of equal width all around inside it. If the area of the path is 148 m^2, find the width of the path.

14. The length of a rectangle is thrice as long as the side of a square. The side of the square is 4 cm more than the breadth of the rectangle. Their areas being equal, find their dimensions.

15. A farmer prepares a rectangular vegetable garden of area 180 m^2. With 39 m of barbed wire, he can fence the three sides of the garden, leaving one of the longer sides unfenced. Find the dimensions of the garden.

16. A rectangular field is 16 m long and 10 m broad. There is a path of equal width all around inside it. If the area of the path is 120 m^2, find the width of the path.

17. The area of right triangle is 600 cm^2. If the base of the triangle exceeds the altitude by 10 cm, find the dimensions of the triangle.

18. The area of right triangle is 96 m^2. If the base of the triangle three times the altitude, find the dimensions of the triangle.

19. The length of the hypotenuse of a right triangle exceeds the length of the base by 2 cm and exceeds twice the length of the altitude by 1 cm. Find the length of each side of the triangle.

20. The hypotenuse of a right triangle is 1 m less than twice the shortest side. If the third side is 1 m more than the shortest side, find the sides of the triangle.

V. TIME AND WORK RELATED QUESTIONS

1. 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.

2. 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.

3. Two pipes running together can fill a cistern in $3\frac{1}{13}$ hours. If one pipe takes 3 minutes more than the other to fill the cistern. Find the time in which each pipe can separately fill the cistern.

4. A takes 10 days less than the time taken by B to finish a piece of work. If both A and B together can finish it in 12 days, find the time taken by B to finish the work.

5. If two pipes function simultaneously, a reservoir will be filled in 12 hours. One pipe fills the reservoir 10 hours faster than the other. How many hours will the second pipe take to fill the reservoir?

VI. REASONING BASED QUESTIONS

1. In a class test, the sum of Ranjitha's marks in mathematics and English is 40. Had she got 3 marks more in mathematics and 4 marks less in English, the product of the marks would have been 360. Find her marks in two subjects separately.

2. Out of a number of saras birds, one-fourth of the number are moving about in lots, $\frac{1}{9}$th coupled with $\frac{1}{4}$th as well as 7 times the square root of the number move on a hill, 56 birds remain in vakula trees. What is the total number of trees?

3. A teacher attempting to arrange the students for mass drill in the form of a solid square found that 24 students were left. When he increased the size of the square by 1 student, he found that he was short of 25 students. Find the number of students.

4. A rectangular park is to be designed whose breadth is 3 m less than its length. Its area is to be 4 square metres more than the area of a park that has already been made in the shape of an isosceles triangle with its base as the breadth of the rectangular park and of altitude 12 m (see Fig. 4.3). Find its length and breadth.

5. John and Jivanti together have 45 marbles. Both of them lost 5 marbles each, and the product of the number of marble they now have is 124. We would like to find out how many marbles they had to start with.

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

7. 300 apples are distributed equally among a certain number of students. Had there been 10 more students, each would have received one apple less. Find the number of students.

8. A man buys a number of pens for Rs. 80. If he has bought 4 more pens for the same amount, each pen would have cost him Re. 1 less. How many pens did he buy?

9. 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.

10. Out of a group of swans, $\frac{7}{2}$ times the square root of the number are playing on the shore of a tank. The two remaining ones are playing with amorous fight in the water. What is the total number of swans?

11. In a class test, the sum of the marks obtained by P in mathematics and science is 28. Had he got 3 more marks in mathematics and 4 marks less in science, the product of marks obtained in the two subjects would have been 180. Find the marks obtained by him in the two subjects separately.

12. Rs 250 was divided equally among a certain number of children. If there were 25 more children, each would have received 50 paise less. Find the number of children.

13. A peacock is sitting on the top of a pillar, which is 9m high. From a point 27 m away from the bottom of the pillar, a snake is coming to its hole at the base of the pillar. Seeing the snake the peacock pounches on it. If their speeds are equal at what distance from the whole is the snake caught?

14. A shopkeeper buys a number of books for Rs. 80. If he had bought 4 more books for the same amount, each book would have cost Rs. 1 less. How many books did he buy?

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