



Attempt questions first; check the separate key afterward. Show steps and draw labelled diagrams where asked.

A. Very short answers - 1 mark each

1. Define a quadratic equation.
2. Write the discriminant of $ax^2+bx+c=0$.
3. Find roots of $x^2-16=0$.
4. Can a quadratic with negative discriminant have real roots?
5. Solve $x^2-5x+6=0$.
6. Solve $x(x-7)=0$.
7. Find discriminant of $x^2+4x+4=0$.
8. State the quadratic formula.

B. Short answers / practice - 2 marks each

9. Solve $2x^2-7x+3=0$.
10. Solve $x^2+6x+5=0$.
11. Solve $3x^2-12=0$.
12. Find nature of roots of $2x^2+x+3=0$.
13. Find k for equal roots of $x^2-6x+k=0$.
14. Two consecutive positive integers have product 72. Find them.
15. A rectangle has area 48 cm^2 and length 2 cm greater than breadth. Find sides.
16. Solve $x^2+2x-8=0$ by completing the square.
17. Solve $x^2-3x-1=0$.
18. Find k if 3 is a root of $2x^2+kx-3=0$.
19. Solve $4x^2-4x+1=0$.
20. Are roots of $x^2+1=0$ real?

C. Application / reasoning - 3 marks each

21. The sum of squares of consecutive positive integers is 85. Find integers.

22. A positive number exceeds its reciprocal by $3/2$. Find it.

23. A train covers 120 km. Increasing speed by 10 km/h saves 1 h. Find original speed.

24. Solve $6x^2-x-2=0$.

25. Find k so $x^2+kx+16=0$ has equal roots.

26. Check whether $(x+1)^2=x^2+3$ is a quadratic equation after simplification.

27. Solve $5x^2-13x+6=0$.

28. Find k if x^2-8x+k has equal roots.

29. A rectangle has perimeter 34 cm and area 60 cm^2 . Find its sides.

30. Find two consecutive positive even integers whose product is 168.

31. A car travels 180 km; increasing speed by 15 km/h saves 1 h. Find original speed.

D. Extended practice - 5 marks each

32. Derive the quadratic formula by completing the square.

33. A rectangular field is 60 m^2 . Its diagonal is 13 m. Find its sides.

34. Two taps fill a tank together in 6 h. One takes 5 h more than the other alone. Find individual times.

35. Solve $1/x+1/(x+2)=3/4$ and state restrictions.

ANSWER KEY - Numerical / closed questions

- 2) b^2-4ac . 3) ± 4 . 4) No. 5) 2, 3. 6) 0, 7. 7) 0.
8) $(-b \pm \sqrt{b^2-4ac})/(2a)$. 9) 3, $1/2$. 10) -1, -5.
11) ± 2 . 12) No real roots. 13) 9. 14) 8, 9. 15) 8 cm, 6 cm. 16) 2, -4. 17) $(3 \pm \sqrt{13})/2$. 18) -5.
19) $1/2$ repeated. 20) No. 21) 6, 7. 22) 2. 23) 30 km/h. 24) $2/3, -1/2$. 25) $k = \pm 8$. 26) No; $2x-2=0$. 27) $2, 3/5$. 28) 16. 29) 12 cm, 5 cm. 30) 12, 14. 31) 45 km/h. 32) 12 m, 5 m. 33) 10 h, 15 h. 34) $x=2$ or $-4/3$; $x \neq 0, -2$.