In this worksheet you will use the quadratic formula to determine the real roots of quadratic equations with confidence. Read each question carefully and show all your working.

Easy Questions

1. Solve the quadratic equation $x^2 + 5x + 6 = 0$ using the quadratic formula.
2. Solve the quadratic equation $x^2 - 4x + 3 = 0$ using the quadratic formula.
3. Solve the quadratic equation $x^2 + 2x + 1 = 0$ using the quadratic formula.
4. Solve the quadratic equation $x^2 + x + 1 = 0$ using the quadratic formula. What do you find?
5. In your own words, explain how completing the square on a general quadratic equation leads to the quadratic formula.

Intermediate Questions

6. Solve the quadratic equation $2x^2 + 3x - 2 = 0$ using the quadratic formula.
7. Solve the quadratic equation $3x^2 - x - 4 = 0$ using the quadratic formula.
8. Solve the quadratic equation $5x^2 + 2x + 1 = 0$ using the quadratic formula.
9. Solve the quadratic equation $3x^2 - 7x + 2 = 0$ using the quadratic formula.
10. Solve the quadratic equation $4x^2 - 12x + 9 = 0$ using the quadratic formula.
11. Solve the quadratic equation $6x^2 + x - 2 = 0$ using the quadratic formula.
12. Solve the quadratic equation $7x^2 - 5x - 2 = 0$ using the quadratic formula.
13. Solve the quadratic equation $9x^2 + 6x + 1 = 0$ using the quadratic formula.
14. Solve the quadratic equation $8x^2 - 10x + 3 = 0$ using the quadratic formula.
15. Solve the quadratic equation $10x^2 + 3x - 1 = 0$ using the quadratic formula.
16. Solve the quadratic equation $x^2 - 6x - 10 = 0$ using the quadratic formula.
17. Solve the quadratic equation $2x^2 - 4x + 2 = 0$ using the quadratic formula.

18. Solve the quadratic equation $12x^2 - 11x + 2 = 0$ using the quadratic formula.

19. Solve the quadratic equation $11x^2 + 4x - 2 = 0$ using the quadratic formula.

20. Solve the quadratic equation $5x^2 - 9x + 1 = 0$ using the quadratic formula.

Hard Questions

21. Solve the quadratic equation $15x^2 + 7x - 8 = 0$ using the quadratic formula.

22. Solve the quadratic equation $\frac{1}{2}x^2 - \frac{3}{4}x + \frac{1}{8} = 0$ using the quadratic formula.

23. Solve the quadratic equation $6x^2 + 11x - 35 = 0$ using the quadratic formula.

24. A projectile is thrown vertically upward and its height in metres at time t seconds is given by $-5t^2 + 20t + 15$. Solve for the time t when the projectile reaches ground level.

25. Solve the quadratic equation $2x^2 + 3\sqrt{2}\,x - 5 = 0$ using the quadratic formula.

26. Solve the quadratic equation $4x^2 - (2+\sqrt{3})x + \sqrt{3} = 0$ using the quadratic formula.

27. Determine the values of m for which the quadratic equation $x^2 + mx + 9 = 0$ has no roots. (Hint: Consider the discriminant.)

28. Solve the quadratic equation $3x^2 + 4x + 2 = 0$ using the quadratic formula.

29. Solve the quadratic equation $x^2 + \frac{2}{3}x - \frac{1}{6} = 0$ using the quadratic formula.

30. Solve the quadratic equation $2x^2 - \frac{5}{2}x + \frac{3}{4} = 0$ using the quadratic formula.