ILLAWARRA TUTORING

In this worksheet you will learn to expand and factorise expressions that are perfect square trinomials. You will practise recognising patterns such as $(a+b)^2 = a^2 + 2ab + b^2$ and $(a-b)^2 = a^2 - 2ab + b^2$. Read each question carefully and show all your working.

Easy Questions

1. Expand $(x+5)^2$.
2. Factorise $x^2 + 10x + 25$.
3. Expand $(2x-3)^2$.
4. Factorise $9x^2 - 12x + 4$.
5. Expand $(a-7)^2$.

Intermediate Questions

6. Expand $(3y+2)^2$.
7. Factorise $y^2 + 8y + 16$.
8. Expand $(4x-1)^2$.
9. Factorise $16x^2 - 8x + 1$.
10. Expand $\left(x + \frac{1}{2}\right)^2$.
11. Factorise $4x^2 + 4x + 1$.
12. Expand $(2a+3)^2$.
13. Factorise $a^2 + 12a + 36$.
14. Expand $(5-2b)^2$.
15. Factorise $4x^2 - 20x + 25$.
16. Expand $[3x-4]^2$.
17. Factorise $49y^2 - 14y + 1$.
18. Expand $[x+4]^2$.
19. Factorise $x^2 - 14x + 49$.
20. Expand $(2-x)^2$.

Hard Questions

21. Given that $(ax + b)^2 = 9x^2 + 24x + 16$, find the values of a and b.

22. Find the value of k so that $x^2 + kx + 25$ is a perfect square trinomial.

23. If $(2x + c)^2 = 4x^2 + 12x + 9$, determine the value of c.

24. Find p such that $(3x + p)^2$ equals $9x^2 + 18x + 9$.

25. For which value of m is $x^2 + mx + 16$ a perfect square?

26. Given that $(x + r)^2 = x^2 - 10x + 25$, find the value of r.

27. Determine the constant c if the expansion of $(2x - c)^2$ is $4x^2 - 12x + c^2$.

28. Express $49z^2 - 28z + 4$ in the form $(7z - a)^2$ and determine a.

29. If the quadratic $9t^2 + kt + 1$ is a perfect square, find the value of k.

30. Determine all real numbers a (with $a \neq 0$) such that the expression $4x^2 + kx + 9$ is a perfect square in x, and find the corresponding value of k.