ILLAWARRA TUTORING

This worksheet will help you understand how to factorise and expand expressions that involve perfect square trinomials. Work through the questions, showing all your expansion and factorisation steps. Recall that a perfect square trinomial takes the form $(x+a)^2 = x^2 + 2ax + a^2$ or $(x-a)^2 = x^2 - 2ax + a^2$.

Easy Questions

1. Expand the expression $(x+3)^2$.
2. Factorise $x^2 + 8x + 16$.
3. Expand $(2x-5)^2$.
4. Factorise $x^2 - 10x + 25$.
5. Expand $(x-2)^2$.

Intermediate Questions

6. Expand $(3x+4)^2$.
7. Factorise $4x^2 - 12x + 9$.
8. Factorise $y^2 + 10y + 25$.
9. Expand $(x-7)^2$.
10. Factorise $16x^2 + 48x + 36$.
11. Expand $(3y-2)^2$.
12. Factorise $25z^2 + 20z + 4$.
13. Expand $(2a+5)^2$.
14. Factorise $m^2 - 14m + 49$.
15. Find the missing constant C in $x^2 + 14x + C$ so that the expression is a perfect square.
16. Expand $(4x-1)^2$.
17. Factorise $n^2 + 6n + 9$.

18. Expand $(2x+3)^2$.
19. Factorise $49y^2 - 42y + 9$.
20. Expand $(x+8)^2$.

Hard Questions

21. Given that $(ax+b)^2 = a^2x^2 + 2abx + b^2$, determine the values of a and b such that
$$9x^2 + 30x + 25 = (ax+b)^2.$$
22. Explain why the quadratic equation $x^2 + 2ax + a^2 = 0$ has a discriminant of zero. Write a short explanation.
23. Expand and simplify $(x+2)^2 - (x-3)^2$.
24. Expand $\left(\frac{1}{2}x - 3\right)^2$.
25. Factorise $9x^2 - 30x + 25$.
26. Factorise completely $4\Big(x^2 + 6x + 9\Big)$.
27. Determine the value of c for which
$$(x+c)^2 = x^2 + 8x + 16.$$
28. Expand $(2x+3y)^2$.
29. Factorise $49x^2 + 14x + 1$ to show that it is the square of a binomial.
30. Determine the value of c for which
$$(2x+c)^2 = 4x^2 + 12x + 9.$$