Factorising Quadratic Expressions

Exercise A

Factorise the following:

1. $x^2 + 7x + 10$
2. $x^2 + 7x + 12$
3. $x^2 + 8x + 15$
4. $x^2 + 10x + 21$
5. $x^2 + 8x + 12$
6. $y^2 + 12y + 35$
7. $y^2 + 11y + 24$
8. $y^2 + 10y + 25$
9. $y^2 + 15y + 36$
10. $a^2 - 3a - 10$
11. $a^2 - a - 12$
12. $z^2 + z - 6$
13. $x^2 - 2x - 35$
14. $x^2 - 5x - 24$
15. $x^2 - 6x + 8$
16. $y^2 - 5y + 6$
17. $x^2 - 8x + 15$
18. $a^2 - a - 6$
19. $a^2 + 14a + 45$
20. $b^2 - 4b - 21$
21. $x^2 - 8x + 16$
22. $y^2 + 2y + 1$
23. $y^2 - 3y - 28$
24. $x^2 - x - 20$
25. $x^2 - 8x - 240$
26. $x^2 - 26x + 165$
27. $y^2 + 3y - 108$
28. $x^2 - 49$
29. $x^2 - 9$
30. $x^2 - 16$
31. The terms in the expression $2x^2 + 12x + 16$ have a common factor of 2. So $2x^2 + 12x + 16 = 2(x^2 + 6x + 8)$. Complete the factorisation.
32. Factorise:
    (a) $2x^2 + 4x - 30$ (b) $3x^2 + 21x + 30$ (c) $3x^2 + 24x + 45$
    (d) $2n^2 - 6n - 20$ (e) $5a^2 + 5a - 30$ (f) $4x^2 - 64$

Exercise B

Factorise the following:

1. $2x^2 + 5x + 3$
2. $2x^2 + 7x + 3$
3. $3x^2 + 7x + 2$
4. $2x^2 + 11x + 12$
5. $3x^2 + 8x + 4$
6. $2x^2 + 7x + 5$
7. $3x^2 - 5x - 2$
8. $2x^2 - x - 15$
9. $2x^2 + x - 21$
10. $3x^2 - 17x - 28$
11. $6x^2 + 7x + 2$
12. $3x^2 - 11x + 6$
13. $3y^2 - 11y + 10$
14. $6y^2 + 7y - 3$
15. $10x^2 + 9x + 2$
16. $6x^2 - 19x + 3$
17. $8x^2 - 10x - 3$
18. $12x^2 + 23x + 10$
19. $4y^2 - 23y + 15$
20. $6x^2 - 27x + 30$

Exercise C

Factorise the following:

1. $y^2 - a^2$
2. $m^2 - n^2$
3. $x^2 - t^2$
4. $y^2 - 1$
5. $x^2 - 9$
6. $a^2 - 25$
7. $x^2 - \frac{1}{4}$
8. $x^2 - \frac{1}{9}$
9. $4x^2 - y^2$
10. $a^2 - 4b^2$
11. $25x^2 - 4y^2$
12. $9x^2 - 16y^2$
13. $4x^2 - \frac{z^2}{100}$
14. $x^3 - x$
15. $a^3 - ab^2$
16. $4x^3 - x$
17. $8x^3 - 2xy^2$
18. $y^3 - 9y$
19. Find the exact value of $100\,003^2 - 99\,997^2$.
20. Find the exact value of $1\,500\,002^2 - 1\,499\,998^2$.
21. Rewrite 9991 as the difference of two squares. Use your answer to find the prime factors of 9991.