

In this worksheet you will practise mixed factorisation. You will combine different factorisation methods, for example taking out common factors, factorising trinomials, grouping, and recognising special products, so as to simplify even the most complex expressions. Read each question carefully and show all your working.

## Easy Questions

- 1. Write your answer by factorising the expression 2x + 4.
- 2. Write your answer by first extracting the common factor from  $3x^2 + 6x$ .
- 3. Write your answer by factorising 5xy + 10xz.
- 4. Write your answer by factorising  $12a^2 + 18a$ .
- 5. Write your answer by factorising 7x + 14.

## Intermediate Questions

- 6. Write your answer by factorising  $2x^2 + 8x + 8$ .
- 7. Write your answer by factorising  $3x^3 + 12x^2 + 12x$ .
- 8. Write your answer by factorising  $2x^2 + 5x + 2$ .
- 9. Write your answer by factorising  $4x^3 + 8x^2 2x 4$  using grouping techniques.
- 10. Write your answer by factorising  $x^3 3x^2 4x + 12$  using grouping.
- 11. Write your answer by factorising  $6x^2 + 7x 20$ .
- 12. Write your answer by factorising  $2x^4 + 6x^3 + 4x^2$ .
- 13. Write your answer by factorising  $5y^3 + 10y^2 y 2$  using grouping.
- 14. Write your answer by factorising  $x^2 9x + 14$ .
- 15. Write your answer by factorising  $4x^3 16x$ .
- 16. Write your answer by factorising  $2x^2 + 7xy + 3y^2$ .
- 17. Write your answer by factorising  $x^3 + 2x^2 x 2$ .
- 18. Write your answer by factorising  $x^2y + 3xy^2 + 2y^3$ .

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- 19. Write your answer by factorising  $2x^3 + 6x^2 + 4x + 12$ .
- 20. Write your answer by factorising  $x^4 16$ .

## Hard Questions

- 21. Write your answer by factorising  $2x^3 + 9x^2 + 7x 6$ . (Hint: Verify that x = -2 is a root.)
- 22. Write your answer by factorising  $x^4 + 5x^3 + 2x^2 20x 24$ .
- 23. Write your answer by factorising  $3x^3 x^2 22x + 24$ .
- 24. Write your answer by factorising  $4x^4 + 12x^3 16x^2 48x$ .
- 25. Write your answer by factorising  $x^4 + 2x^3 5x^2 6x + 8$ .
- 26. Write your answer by factorising  $6x^4 + 5x^3 20x^2 25x 6$ . (Hint: Look for a factorisation into four linear factors.)
- 27. Write your answer by factorising  $2x^4 + 3x^3 11x^2 6x$ .
- 28. Write your answer by factorising  $x^4 + 4x^3 + x^2 + 2x 8$ . (Hint: Try to split the expression into two factors.)
- 29. Write your answer by factorising  $3x^5 x^4 16x^3 + 4x^2 + 16x$ . (Hint: Notice that x = 0 and x = 2 are roots.)
- 30. Write your answer by factorising  $2x^4 + 9x^3 + 9x^2 8x 12$ . (Hint: The expression can be written as  $(x + 2)^2(2x + 3)(x 1)$ .)