

Mixed Factoring



Use this guide to help you!



FACTORING GUIDE

Step 1: Is there a GCF?

Step 2: Check for one of the following:

- Difference of Squares $(a^2 - b^2)$
- "Basic" Trinomial $(x^2 + bx + c)$
- "Slip & Slide" Trinomial $(ax^2 + bx + c)$
- Four Terms (Grouping)

Step 3: Check over and see if anything factors again.

Directions: Factor the following polynomials completely.

1. $28a^2b - 63b$

$$7b(4a^2 - 9)$$

$$7b(2a+3)(2a-3)$$

2. $3m^2 + 9m - 30$

$$3(m^2 + 3m - 10)$$

$$3(m-2)(m+5)$$

3. $x^3 + 2x^2y - 4x - 8y$

$$x^2(x+2y) - 4(x+2y)$$

$$(x+2y)(x^2-4)$$

$$(x+2y)(x+2)(x-2)$$

4. $4y^2 + 7y - 2$

$$4y^2 - y + 8y - 2$$

$$y(4y-1) + 2(4y-1)$$

$$(4y-1)(y+2)$$

5. $48w^3 - 3w$

$$3w(16w^2 - 1)$$

$$3w(4w^2+1)(4w^2-1)$$

6. $24x^2y^2 - 6xy^2 + 3xy$

$$3xy(8xy - 2y + 1)$$

7. $8x^4 - 4x^3 - 24x^2$

$$4x^2(2x^2 - x - 6)$$

$$4x^2(2x^2 - 4x + 3x - 6)$$

$$4x^2(2x(x-2) + 3(x-2))$$

$$4x^2(x-2)(2x+3)$$

8. $64x^2 - 4y^2$

$$4(16x^2 - y^2)$$

$$4(4x+y)(4x-y)$$

9. $x^3 + 3x^2 - 5x - 15$

$$x^2(x+3) - 5(x+3)$$

$$(x+3)(x^2-5)$$

10. $k^2 - 6k - 16$

$$(k-8)(k+2)$$

11. $ab^2 - a$

$$a(b^2 - 1)$$

$$\boxed{a(b+1)(b-1)}$$

12. $9y^2 - 12y + 4$

$$9y^2 - 6y - 6y + 4$$

$$3y(3y-2) - 2(3y-2)$$

$$\boxed{(3y-2)(3y-2)}$$

13. $24ab + 30ac$

$$\boxed{6a(4b+5c)}$$

14. $9x^3 + 9x^2y - x - y$

$$9x^2(x+y) - 1(x+y)$$

$$(x+y)(9x^2 - 1)$$

$$\boxed{(x+y)(3x+1)(3x-1)}$$

15. $x^3 - 10x^2 + 21x$

$$x(x^2 - 10x + 21)$$

$$\boxed{x(x-7)(x-3)}$$

16. $6y^3 - 150y$

$$6y(y^2 - 25)$$

$$\boxed{6y(y+5)(y-5)}$$

17. $8m^2 + 2m - 3$

$$8m^2 - 4m + 6m - 3$$

$$4m(2m-1) + 3(2m-1)$$

$$\boxed{(2m-1)(4m+3)}$$

18. $2w^2 + 38w + 140$

$$2(w^2 + 19w + 70)$$

$$\boxed{2(w+14)(w+5)}$$

19. $5x^3y - 5xy$

$$5xy(x^2 - 1)$$

$$\boxed{5xy(x+1)(x-1)}$$

20. $100 - 9y^2$

$$\boxed{(10+3y)(10-3y)}$$

21. $5a^2 + 10ab - 3a - 6b$

$$5a(a+2b) - 3(a+2b)$$

$$\boxed{(a+2b)(5a-3)}$$

22. $75x^2 - 30x + 3$

$$3(25x^2 - 10x + 1)$$

$$3(25x^2 - 5x - 5x + 1)$$

$$3(5x(5x-1) - 1(5x-1))$$

$$\boxed{3(5x-1)(5x-1)}$$

23. $x^2 - 7x - 78$

$$\boxed{(x-13)(x+6)}$$

24. $4x^2y - 24xy + 36y$

$$4y(x^2 - 6x + 9)$$

$$\boxed{4y(x-3)(x-3)}$$