

Factoring Worksheet

Factor out the Greatest Common Factor (GCF):

1. $15a + 25b$
2. $7c^3 - 28c^2d + 35cd^3$
3. $4a^4b - 16a^2b^2 + 4ab$

Factor by grouping:

4. $3x^2 + 9x + 4x + 12$
5. $2x^2 - 5x - 2x + 5$
6. $3x^2 + 18x - 7x - 42$
7. $m^2 + 8mn - 3mn - 24n^2$

Factor completely:

8. $x^2 - 13x + 36$
9. $x^2 - 2x - 48$
10. $x^2 + 12x - 45$
11. $x^2 - 6x + 5$
12. $x^2 - 5x - 6$
13. $4x^2 + 24x - 64$
14. $2x^2 + 11x + 15$
15. $3x^2 - 13x + 14$
16. $5x^2 + 28x + 15$
17. $2x^2 - 3x - 35$
18. $2x^2 - 7x - 72$
19. $12x^4 + 60x^3 + 27x^2$
20. $36x^2 - 49y^2$
21. $121 - 144y^2$
22. $27x^3 + 125$
23. $64 - y^3$

Factoring Worksheet Answers:

- $5(3a + 5b)$
- $7c(c^2 - 4cd + 5d^3)$
- $4ab(a^3 - 4ab + 1)$
- $(3x^2 + 9x) + (4x + 12) = 3x(x + 3) + 4(x + 3) = \boxed{(x + 3)(3x + 4)}$
- $(2x^2 - 5x) - (2x - 5) = x(2x - 5) - 1(2x - 5) = \boxed{(2x - 5)(x - 1)}$
- $(3x^2 + 18x) - (7x + 42) = 3x(x + 6) - 7(x + 6) = \boxed{(x + 6)(3x - 7)}$
- $(m^2 + 8mn) - (3mn + 24n^2) = m(m + 8n) - 3n(m + 8n) = \boxed{(m + 8n)(m - 3n)}$
- $(x - 4)(x - 9)$
- $(x + 6)(x - 8)$
- $(x + 15)(x - 3)$
- $(x - 1)(x - 5)$
- $(x + 1)(x - 6)$
- $4(x^2 + 6x - 16) = \boxed{4(x + 8)(x - 2)}$ ←Did you remember to factor out the GCF first?

For problems #14-19, you should try to factor by trial & error first. I have shown the method of grouping in the solutions since it is difficult to show the trial and error process.

- $2x^2 + 6x + 5x + 15 = (2x^2 + 6x) + (5x + 15) = 2x(x + 3) + 5(x + 3) = \boxed{(x + 3)(2x + 5)}$
- $3x^2 - 6x - 7x + 14 = (3x^2 - 6x) - (7x - 14) = 3x(x - 2) - 7(x - 2) = \boxed{(x - 2)(3x - 7)}$
- $5x^2 + 25x + 3x + 15 = (5x^2 + 25x) + (3x + 15) = 5x(x + 5) + 3(x + 5) = \boxed{(x + 5)(5x + 3)}$
- $2x^2 - 10x + 7x - 35 = (2x^2 - 10x) + (7x - 35) = 2x(x - 5) + 7(x - 5) = \boxed{(x - 5)(2x + 7)}$
- $2x^2 - 16x + 9x - 72 = (2x^2 - 16x) + (9x - 72) = 2x(x - 8) + 9(x - 8) = \boxed{(x - 8)(2x + 9)}$
- $3x^2(4x^2 + 20x + 9) = 3x^2(4x^2 + 2x + 18x + 9) = 3x^2[(4x^2 + 2x) + (18x + 9)]$
 $= 3x^2[2x(2x + 1) + 9(2x + 1)] = 3x^2[(2x + 1)(2x + 9)] = \boxed{3x^2(2x + 1)(2x + 9)}$ ←Did you remember to factor out the GCF first?

For problems #20-23, use the special formulas.

- Difference of Squares: $(6x)^2 - (7y)^2 = \boxed{(6x - 7y)(6x + 7y)}$
- Difference of Squares: $11^2 - (12y)^2 = \boxed{(11 - 12y)(11 + 12y)}$
- Sum of Cubes: $(3x)^3 + 5^3 = (3x + 5)[(3x)^2 - 15x + 5^2] = \boxed{(3x + 5)(9x^2 - 15x + 25)}$
- Difference of Cubes: $4^3 - y^3 = (4 - y)(4^2 + 4y + y^2) = \boxed{(4 - y)(16 + 4y + y^2)}$