

We have talked about four factoring methods: Grouping, ac Method, Special Cubics, and u-Substitution. Each one has their own techniques and specific uses. You must be able to identify when to use each technique in order to be successful, so let's talk about what to look for.

Grouping

- Four, six, or a larger (but even) number of terms
- Common ratio between coefficients of each group

ac Method

- Three terms
- Used for quadratic expressions where $a \neq 1$

Special Cubics

- Only two terms in the expression
- Both terms are perfect cubes. Learn to recognize the numbers on worksheet 405.

u-Substitution

- Three terms
- The largest exponent is double the middle exponent.

DISCLAIMER: If the polynomial equation you are trying to solve does not fit one of these descriptions, there are two possibilities.

- There is a GCF that you need to factor out of the equation before applying one of these techniques.
- The polynomial is not easily factorable and you should use your graphing calculator to find the solutions.

Solve the polynomial equations below. This set is focused on equations with complex (as in imaginary... not necessary difficult) solutions.

1. $x^3 + 2x^2 + 4x + 8 = 0$

2. $6x^3 - 15x^2 + 4x = 10$

3. $15x^3 + 24x^2 + 35x + 56 = 0$

4. $3x^3 + 24 = 9x^2 + 8x$

5. $x^5 + 12x^3 - 8x^2 = 96$

6.

7. $7x^3 + 15x^2 + 2x = 0$

8. $x^4 + 13x^2 = 30$

9. $8x^3 = 27$

10. $6x^4 - 11x^2 - 7 = 0$

11. $x^3 + x^2 + 36x + 36 = 0$

12. $27x^4 - 54x^3 + x = 2$

13. $x^5 - 10x^3 + 21x = 0$

14. $8x^4 - 8x^3 + 125x - 125 = 0$

15. $4x^5 + 16x^4 - 3x^3 - 12x^2 - 10x = 40$

16. $5x^2 - 3x = 2$

17. $27x^4 + 81x^3 - 8x - 24 = 0$

18. $x^6 - x^4 - 81x^2 + 81 = 0$

19. $x^6 + 7x^3 - 8 = 0$

20. $-6x^4 + 21x^2 = 9$