

## Special Factoring Techniques

Recall:

$$A^2 + 2AB + B^2 = (A + B)^2$$

$$A^2 - 2AB + B^2 = (A - B)^2$$

$$A^2 - B^2 = (A + B)(A - B)$$

To help us factor certain kinds of polynomials, we can use the above formulas.

**Ex 1.**

Factor:  $16x^2 - 25$

**Ex 2.**

Factor:  $100y^6 - 9x^4$

**Ex 3.**

Factor:  $x^2 + 14x + 49$

**Ex 4.**

Factor:  $16x^2 + 40xy + 25y^2$

**Ex 5.**Factor:  $4y^4 - 20y^2 + 25$ **Sum or Difference of Two Cubes**

Here are a couple of formulas that can help factoring sums or differences of cubes:

$$A^3 + B^3 = (A + B)(A^2 - AB + B^2)$$

$$A^3 - B^3 = (A - B)(A^2 + AB + B^2)$$

**Ex 6.**Factor:  $x^3 + 27$ **Ex 7.**Factor:  $x^6 - 1000y^3$ 

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**Practice**

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1. Factor:  $6y - 6x^2y^7$  (Hint: factor out the GCF first)2. Factor completely:  $81x^4 - 16$  (Note: you'll need to factor more than once, so keep going!)3. Factor completely:  $x^3 + 7x^2 - 4x - 28$ (Hint: first factor by grouping, then factor again via the  $A^2 - B^2 = (A + B)(A - B)$  formula)4. Factor:  $x^3 - 8$ 5. Factor:  $1 + 27x^3y^3$ 

Q: What question can someone ask all day long, always get completely different answers, and yet all the answers could be correct?