**Special Cases: Squares and Cubes (5.6 & 5.7)** **Math 098**

Review: Multiply $(x+5)^2$

The formulas: Factoring a perfect-square trinomial

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

To recognize a perfect-square trinomial if given $ax^2+bx+c$

- Are *a* and *c* perfect squares? If they are, of what are they squares? These are your *A* and *B*.
- Is the middle term of the form $2AB$

Example 1: Factor

a.) $x^2-14x+49$

b.) $9r^2+36rs+36s^2$

c.) $25\alpha^2-25\alpha+4$

d.) $25x^2-20x+4$

Example 2: Factor

a.) $8n^2 - 40n + 50$

b.) $-4y^2 - 144y^8 + 48y^5$

The formula: Factoring a difference of two squares

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

To factor a difference of two squares, write the product of the sum and difference of the quantities being squared. *The sum of squares cannot be factored*.

Example 3: Factor

a.) $x^2 - 81$

b.) $16a^4 - 25b^2$

Example 4: Solve

a.) $16 = 81r^4$

b.) $x^3 + 3x^2 = 9x + 27$

Review: Multiply $(A+B)(A^2 - AB + B^2)$

The formulas: Factoring a sum or a difference of two cubes

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

Example 5: Factor

a.) $x^3 + 27$

b.) $125a^3 - 216b^3$

c.) $r^6 - 64$

d.) $2y^4 - 16y$

Summary: Useful factoring facts

Factoring a perfect-square trinomial

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

Factoring a difference of two squares

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

Factoring a sum or a difference of two cubes

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