

## R.4 Solving and Factoring

### 1 Patterns

#### Difference of Squares

$$a^2 - b^2 = (a - b)(a + b)$$

$$\text{Example: } 9x^2 - 64 = (3x + 8)(3x - 8)$$

#### Difference of Cubes

$$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$$

(On the right side, first sign is same, second is opposite, last is +).

$$\text{Example: } 2^3 + 5^3 = (2 + 5)(2^2 - 10 + 5^2)$$

### 2 Methods

#### Factor By Grouping

$$3t^3 + 6t^2 + 2t + 4$$

Take out common monomials for first 2 and last 2 (can rearrange nums)

$$3t^2(t + 2) + 2(t + 2)$$

$$(3t^2 + 2)(t + 2)$$

#### Into 2 Binomials

$$x^2 + 7x + 12$$

Fill in last number of each paren: (+4)(+3) - have to add to 7, multiply to 12

$$x^2 + bx + c$$

( +d) ( +e) - D and E have to add up to B and multiply to C