

## Lesson 1 Factoring Polynomials

### Definitions:

**Factor:** a number that divides evenly into another number  
ie. factors of 18 are 1, 2, 3, 6, 9, and 18

**Multiples** of a number are determined by multiplying the number by any whole number other than 1 (or by skip counting)  
ie. some multiples of 6 are 6, 12, 18, 24...

**Greatest Common Factor (GCF)** of two or more terms is the greatest factor the terms have in common.

**Perfect Square Trinomial:**  $(a + b)^2 = a^2 + 2ab + b^2$

The square of the first term in the binomial  $a^2$

Twice the product of the first and second terms in the binomial  $2ab$

The square of the 2<sup>nd</sup> term in the binomial  $b^2$

### Example 1: Greatest Common Factor (GCF)

Factor:

a)  $x^2 + 4x$   
 $x(x + 4)$

b)  $y^3 - 2y^2$   
 $y^2(y - 2)$

c)  $4cd^2 + 20cd$   
 $4cd(d + 5)$

d)  $6p^2 + 6p$   
 $6p(p + 1)$

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## Example 2: Difference of Squares

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

Factor:

a)  $x^2 - 4$

$$(x+2)(x-2)$$

\* Always check for GCF first!

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

$$(5a-4b)(5a+4b)$$

## Example 3: Factoring Trinomials $a = 1$ (Product, Sum, Factors)

Factor:

a)  $x^2 - 4x - 21$

P -21  
S -4  
F -7, 3

$$(x+3)(x-7)$$

b)  $x^2 - 4x + 4$  ← perfect square trinomial

P 4  
S -4  
F -2, -2

$$(x-2)(x-2)$$

or

$$(x-2)^2$$

c)  $t^2 - 3t - 10$

P -10  
S -3  
F -5, 2

$$(t+2)(t-5)$$

d)  $x^2 + 3x - 28$

P -28  
S 3  
F 7, -4

$$(x-4)(x+7)$$

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#6 a, e, f, h, j  
11 a, c, e, g, i