

# Factoring and Applications Lesson #1:

## Review of Factoring

### Factoring

Factoring involves writing a sum or difference of monomials as a product of polynomials. In this lesson, we will review the following factoring techniques learned in previous math courses:

- Factoring by taking out (or removing) a common factor.
- Factoring a difference of squares.
- Factoring trinomials by inspection.

Class Ex. #1

Factor each polynomial by removing the greatest common factor.

a)  $15x^3 - 5x^2$

b)  $8p^3 - 4p^2 - 4$

$= 5x^2(3x-1)$

$= 4(2p^3 - p^2 - 1)$

Class Ex. #2

Factor, if possible, using the difference of squares method.

a)  $x^2 - 81$

b)  $25a^2 - 49$

$= (x-9)(x+9)$

$= (5a-7)(5a+7)$

c)  $9x^2 + 4$

d)  $16t^2 - 64$

Not factorable

$= 16(t^2 - 4)$

$= 16(t-2)(t+2)$

Class Ex. #3

Where possible, factor the following trinomials by inspection.

a)  $a^2 + 11a + 30$

b)  $b^2 - b - 30$

$= (a+5)(a+6)$

$= (b+5)(b-6)$

c)  $x^2 - 4x + 48$

d)  $3x^3 - 21x^2 + 36x$

Not factorable

$= 3x(x^2 - 7x + 12)$

$= 3x(x-3)(x-4)$

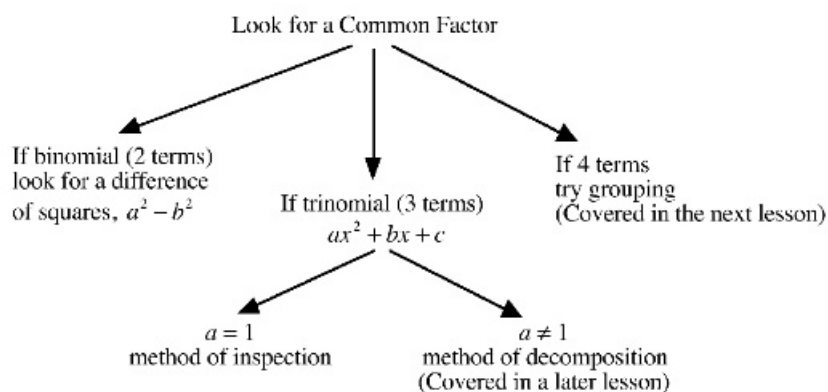
$$\begin{array}{r|l} x & + \\ -30 & -1 \\ \hline & \hookrightarrow 1, 30 \\ & 2, 15 \\ & 3, 10 \\ & \textcircled{5, 6} \end{array}$$

### Guidelines for Factoring a Polynomial Expression

If we are asked to factor a polynomial expression, the following guidelines should help us to determine the best method.

1. Look for a common factor. If there is one, take out the common factor and look for further factoring.
2. If there is a binomial expression, look for a difference of squares.
3. If there is a trinomial expression of the form  $x^2 + bx + c$ , look for factoring by inspection.
4. If there is a trinomial expression of the form  $ax^2 + bx + c$ , look for factoring by decomposition. (Note: This will be covered in a later lesson.)
5. If there is a polynomial with four terms, look for factoring by grouping (Note: This will be covered in the next lesson.)
6. After factoring, check to see if further factoring is possible.

The guidelines can be shown in a flowchart.



**Note**  
 Always check to see  
 if further factoring  
 is possible.



Factor the following.

a)  $36 - 9x^2$

$$= 9(4 - x^2)$$

$$= 9(2 - x)(2 + x)$$

b)  $28 + 3x - x^2 = -x^2 + 3x + 28$

$$= -(x^2 - 3x - 28)$$

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

$$\begin{array}{r} x \quad + \\ -28 \overline{) -3} \\ \hline \end{array}$$

$\hookrightarrow -7, 4$

Complete Assignment Questions #1 - #12

**Assignment**

Do # 1-12 (not 5)

1. Factor where possible.

a)  $x^2 + 5x + 6$

b)  $x^2 + 6x + 5$

c)  $x^2 + 9x + 10$

d)  $x^2 + 10x + 9$

2. Factor.

a)  $x^2 - 1$

b)  $x^2 + 2x - 15$

c)  $16x^2 + 4$

d)  $16x^2 - 4$

e)  $16x^2 - 4x$

f)  $b^2 - 7b + 10$

3. Factor where possible.

a)  $100 - a^2$

b)  $24 + 10x - x^2$

c)  $c^2 + 21c + 38$

d)  $9x - 4x^2$

e)  $x^2 - 17x + 40$

f)  $5f^2 - 45f - 50$