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. *GCF 1st always*
- Factoring a difference of squares.
- Factoring trinomials by inspection. *basic trinomials*

Class Ex. #1 Factor each polynomial by removing the greatest common factor.

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

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

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

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

GCF grade 8

Class Ex. #2 Factor, if possible, using the difference of squares method.

Diff of Squares grade 9

a) $x^2 - 81$

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

b) $25a^2 - 49$

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

c) $9x^2 + 4$

$$CNF$$

d) $16t^2 - 64$

$$16(t^2 - 4)$$
$$16(t + 2)(t - 2)$$

Class Ex. #3 Where possible, factor the following trinomials by inspection.

a = 1 grade 9 inspection

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

sum of = 11   product of = 30

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

b) $b^2 - b - 30$

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

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

$$CNF$$

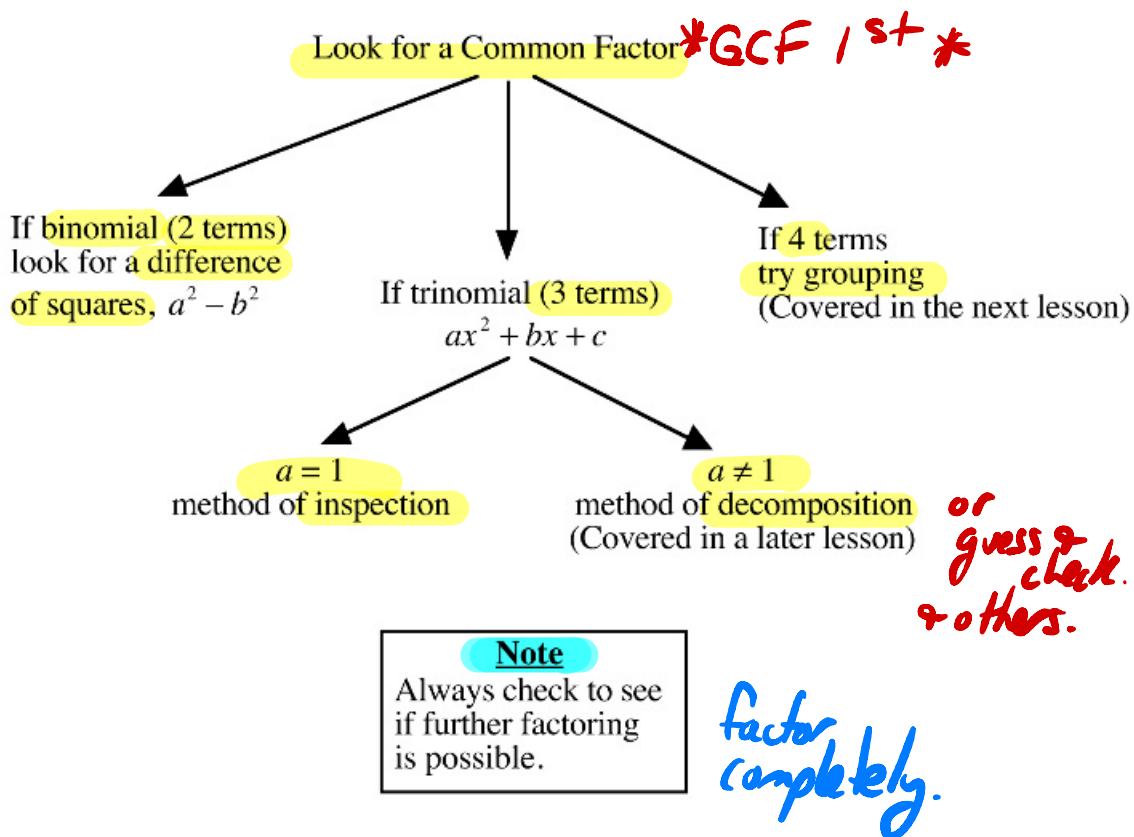**d)** $3x^3 - 21x^2 + 36x$

$$3x(x^2 - 7x + 12)$$
$$3x(x - 4)(x - 3)$$

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.

Look for a Common Factor ***GCF 1ˢᵗ ***

If binomial (2 terms) look for a difference of squares, $a^2 - b^2$

If trinomial (3 terms)
$$ax^2 + bx + c$$

If 4 terms try grouping (Covered in the next lesson)

$a = 1$
method of inspection

$a \neq 1$
method of decomposition (Covered in a later lesson) **or guess & check. & others.**

Note
Always check to see if further factoring is possible.

factor completely.

Class Ex. #4

Factor the following.

a) $36 - 9x^2$

$9(4 - x^2)$

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

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

reorganize.

$-x^2 + 3x + 28$

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

factor out the negative.

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

OR.

same.

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

Complete Assignment Questions #1 - #12

Assignment #1-3 (a, c, e...), 4, 6-11

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