Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Points: \_\_\_\_\_\_

**1. The Greatest Common Factor**

The **greatest common factor** for a polynomial is the largest monomial that divides each term of the polynomial.

a. Factor 

b. Factor 

**2. Factoring by Grouping**

**Steps in factoring by grouping**

1. Factor out any monomial that is common to all four terms.

2. Group together pairs of terms and factor each pair.

3. If there is a common binomial factor, then factor it out.

4. If there is no common binomial factor, then interchange the middle two terms and repeat the process over. If there is still no common binomial, then the polynomial cannot be factored.

a. Factor 

b. Factor 

**3. Factoring Trinomials**

**Factoring Trinomials with Lead Coefficients of 1**

Since the product of two binomials is often a trinomial, it is expected that many trinomials will factor as two binomials. For example, to factor , we must find two binomials 

and  such that



where  (product is 18)

and

(sum of the two numbers is 9)

To find the numbers  and , we first list the possible factorizations of and find the one where the sum of the factors is .

The possible factorizations of  with their respective sums are:

|  |  |
| --- | --- |
| **Products of** | **Sums** |
|  |  |

Thus, and , and





**Steps to factoring trinomials with lead coefficient of 1**

1. Write the trinomial in descending powers.

2. List the factorizations of the third term of the trinomial.

3. Pick the factorization where the sum of the factors is the coefficient of the middle term.

4. Check by multiplying the binomials.

a. Factor 

b. Factor 

c. Factor 

d. Factor 

e. Factor 

**4. Factoring Trinomials with Lead Coefficients other than 1**

Two methods in factoring trinomials

1. Trial-and-error

2. Factoring by grouping

**Steps to factoring trinomial with lead coefficients other than 1**

1. Form the product .

2. Find a pair of numbers whose product is and whose sum is .

3. Rewrite the polynomial to be factored so that the middle term is written as the sum of the two terms whose coefficients are the two numbers found in step #2.

4. Factor by grouping.

a. Factor 

b. Factor 

**5. Factoring Special Products**

Many trinomials can be factored by using the following special product formulas:

Factoring Perfect Square Trinomial 



a. Factor 

b. Factor 

c. Factor 

**6. Factoring a Difference of Squares**

Factoring a Difference of Squares 

a. Factor 

b. Factor 

c. Factor 

d. Factor 

e. Factor completely 

**7. Factoring a Polynomial**

To factor a polynomial, first factor the greatest common factor, then consider the number of terms in the polynomial.

1. Two terms: Determine if the binomial is a difference of squares.

If it is a difference of squares, then 

1. Three Terms: Determine if the trinomial is a perfect square trinomial.

a) If the trinomial is a perfect square then





b) If the trinomial is not a perfect square, then

i) If it is , then

find two factors (x + first number)(x + second number)

ii) If it is , then use trial and error or the factoring method.

1. Four terms: Try to factor by grouping.

a. Factor completely 

b. Factor completely 