3.2

Date:

Objective:

Binomial Analysis: Multiply the following.

a) $(x+3)(x+5)$ b) $(n-7)(n-4)$ c) $(t-8)^2$

d) Explain how the numbers in your answer relate to the numbers in the factors?

x^2+bx+c Factoring a Trinomial where the 1st term is x^2 OR $a=1$

1. **GCF!** If there is a GCF, factor it out. 2. x^2+bx+c, Find two numbers that multiply to c and add/subtract to b. **NOTE:** IF there are no numbers, then the polynomial is **PRIME.** 3. Rewrite the middle term bx as $\mathbf{1st\#\cdot x+2nd\#\cdot x}$. 4. Factor the resulting polynomial. 5. If you factored a **GCF**, remember to put it back in.	**Example** $x^2-4x-45$ **Step 2:** b = -4 c = -45 (-9)(5) = -45 -9+5 = -4 **Step 3:** $x^2-9x+5x-45$ **Step 4:** $(x^2-9x)+(5x-45)$ $x(x-9)+5(x-9)$ **Factors:** $(x-9)(x+5)$
Shortcut where the 1st term is x^2 OR $a=1$ 1. **GCF!** If there is a GCF, factor it out. 2. x^2+bx+c, Find two numbers that multiply to c and add/subtract to b. 3. The direct factored form of x^2+bx+c is $(x+\mathbf{1st\#})(x+\mathbf{2nd\#})$. 4. If you factored a **GCF**, put it back in.	$2x^2-8x-90$ **Step 1:** GCF = 2 $2(x^2-4x-45)$ **Step 2:** b = -4 c = -45 (-9)(5) = -45 -9+5 = -4 **Step 3:** $(x-9)(x+5)$ **Step 4:** $2(x-9)(x+5)$

Practice: Factor the following polynomials.

a) $x^2+11x+30$ b) $m^2-8m+16$

c) $3t^2+18t-120$ d) $-5g^2+25g-30$

Binomial Analysis: Multiply the following.

a) $(2x+3)^2$ b) $(3v-1)(v+2)$ c) $(4c-3)(7c-2)$

ax^2+bx+c Factoring a Trinomial where the 1st coefficient is NOT 1 OR $a \neq 1$

1. **GCF!** If there is a GCF, factor it out. 2. ax^2+bx+c, Find two numbers that multiply to the answer for $(a \cdot c)$ and add/subtract to ***b.*** **NOTE:** IF there are no numbers, then the polynomial is **PRIME.** 3. Rewrite the middle term bx as $\mathbf{1st\#\cdot x+2nd\#\cdot x}$. 4. Factor the resulting polynomial. 5. If you factored a **GCF**, remember to put it back in.	**Example** $12x^2+x-6$ **Step 2:** **b = 1 a·c = -72** $(8)(-9)=-72$ $8-9=-1$ **Step 3:** $12x^2+8x-9x-6$ **Step 4:** $(12x^2+8x)+(-9x-6)$ $4x(3x+2)-3(3x+2)$ **Factors:** $(3x+2)(4x-3)$

Practice: Factor the following polynomials.

a) $9h^2+9h+2$ b) $2z^2-11z+12$

c) $4x^2-12x+9$ d) $9w^2+18w-6$

e) $12y^2+30y-72$ f) $4x^2-2xy-12y^2$

Factoring by looking for quadratic form expressions:

$ax^2 + bx + c$ **Standard Quadratic form.**
1. The given problem is a TRINOMIAL
2. The variables have the pattern of (variable) and (variable)^2
3. Can factor using quadratic factoring rules.

Practice: Factor the following polynomials.

a) $x^4 - 18x^2 + 81$

b) $2x^6 + 8x^3 - 90$

c) $4x^4 - 3x^2 - 10$

d) $6x^8 + 22x^4 + 12$

$ax^2 + bx + c = 0$ Solving a Quadratic Equation:

1. Make sure your equation is set = 0.
   NOTE: If Equation is already factored, DO NOT multiply. Go to step 3.
2. Factor the equation using quadratic factoring rules.
3. Set each x-factor = 0.
4. Solve each factor.

Practice: SOLVE the following polynomials.

a) $(x - 1)(x + 4)(2x + 3) = 0$

b) $3x^2 - 12x = 0$

c) $4y^2 - 4y + 1 = 0$

d) $4z^2 + 12x + 8 = 0$

e) $5x^3 - 15x^2 - 50x = 0$

f) $(w + 6)(w^2 - 9x + 20) = 0$