# UNIT 7: FACTORING

**Factoring in Order:**

1) GCF - Greatest Common Factor

2) DOTS - Difference of Two Perfect Squares

3) E.T. - Easy Trinomials (a = 1)

4) H.T. – Hard Trinomials (a >1)

## GREATEST COMMON FACTOR

$$3x^5 - 12x^2$$

1) Find the GCF and put the GCF in front of one set of (   ).   $3x^2(\quad)$

   Look for a number (biggest # that goes into all the coefficients), then a variable (lowest exponent).

2) Divide everything by the GCF.

3) Whatever is leftover goes in the (   ).   $3x^2(x^3 - 4)$

4) Check your answer by distributing.

## DIFFERENCE OF TWO PERFECT SQUARES

$$4x^2 - 9$$

1) Make two (   ), one with a plus sign and one with a minus sign.   $(\ +\ )(\ -\ )$

2) Take the square root of the first term and put it in the beginning of each (   )   $(2x+\quad)(2x-\quad)$

3) Take the square root of the second term and put it in the back of each (   )   $(2x+3)(2x-3)$

4) To check, double distribute (shortcut- multiply the 1$^{st}$ terms and the last terms.)

# EASY TRINOMIAL (a = 1)

$$x^2 - 3x - 10$$

1) Make 2 sets of (   ), each with an x in the 1st spot.   $(x \quad)(x \quad)$

2) The 1st sign drops down in the 1st set of (   ).   $(x- \quad)(x \quad)$

3) Multiply the given signs in the given problem to find the sign of the 2nd (   ).

   $(x- \quad)(x + \quad)$

4) Find the factors of the last number that either add or subtract to the middle number.   (In this case, we need two numbers that subtract to 3 and multiply to 10)  5 and 2.

5) The bigger number always goes first!   $(x- 5)(x+2)$

6) Check by Double Distributing.

# HARD TRINOMIAL (a > 1)

$$2x^2 + 5x - 3$$

1) Multiply the first and last coefficients. ("eyeglasses")  so, -6.

2) Find factors that add or subtract to the middle term and multiply to the product of the first and last coefficients.   Subtracts to +5 and multiplies to -6.  So, +6 and -1.

3) Rewrite the problem with 4 terms.  $2x^2 + 6x - 1x - 3$

4) Factor by "Grouping"- Split problem down the middle.

5) Factor the 1$^{st}$ two terms (GCF).    $2x(x+3) - 1(x+3)$

6) Copy and paste the (   ) on the other side.

7) Put the GCF of last two terms in front.  $(x+3)(\quad)$

8) Factor using GCF- Your GCF will be a common (   ).  $(x+3)(2x-1)$