

# Math 115E Activity 14

## Chapter 5 Section 1-2 Factoring Quadratics Part 2

### How to factor quadratic equations

#### Quadratic factoring when $a = 1$ :

When factoring, the form  $x^2 + bx + c$  can be factored as  $(x + m)(x + n)$

Start with real numbers  $m$  and  $n$  so: they both multiply to  $c$  and both add to  $b$   
There is not a value in front of either  $x$

#### Quadratic factoring when $a \neq 1$ :

When factoring, the form  $ax^2 + bx + c$  can be factored as  $(px + m)(qx + n)$

Start with two real numbers such that: multiply to  $a \cdot c$  and yet add to  $b$   
then we re-group the terms and factor

Example: Factor  $3x^2 - 11x + 10$

Step 1: Find the factors of  $3 \cdot 10 = 30$  that add up to  $-11$ , (Write the factors if needed)

Step 2: The factors of 30 are:  $\pm(1, 30), \pm(2, 15), \pm(3, 10), \pm(5, 6)$ ,  
so the pair that adds to  $-11$  is  $-5$  and  $-6$

Step 3: Rewrite the quadratic:  $3x^2 + (-6x - 5x) + 10 = 0$

Step 4: Regroup so that each group has a common factor:  $(3x^2 - 6x) + (-5x + 10) = 0$

Step 5: Factor out a common term:  $(3x)(x - 2) - 5(x - 2) = 0$

Step 6: Factor again with the  $x - 2$  term:  $(3x - 5)(x - 2) = 0$

DONE: So starting with  $3x^2 - 11x + 10 = 0$ , we got  $(3x - 5)(x - 2) = 0$

Note: If we aren't able to factor again in Step 5, then go back to Step 3 and swap the factor pair.

### Factor the following quadratic equations

#1)  $x^2 + 9x + 14$

#7)  $9x^2 - 27x + 18$

#2)  $x^2 - 8x + 7$

#8)  $4x^2 - 13x + 10$

#3)  $x^2 + x - 30$

#9)  $2x^2 - 13x - 7$

#4)  $3x^2 + 10x + 8$

#10)  $4x^2 + 20x + 25$

#5)  $2x^2 - 9x + 10$

#11)  $3x^2 - 19x + 20$

#6)  $2x^2 - 6x - 20$

#12)  $8x^2 - 6x - 9$

Find two numbers such that:  
the first number and the second number both multiply to 6,  
and the first plus the product of 4 and the second number give us -14

Expand  $(2x + 3)(3x - 1)$