

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