Part I. The Area Model: Numerical Products

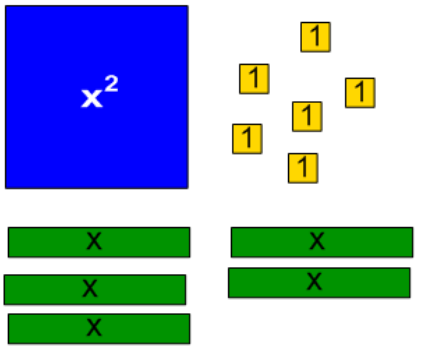
1. Start with a set of 24 colored tiles. Arrange them to represent different pairs of factors whose product is 24. Sketch your factor pairs below.

2. Use a set of base-10 blocks to model the products below. Sketch a rectangle to represent each product. Find the product using lattice multiplication and using the traditional algorithm. How are the three representations related?

Product: 12 x 16		
Area Model	Lattice	Traditional
Product: 12 x 23		
Area Model	Lattice	Traditional
Product: 23 x 15		
Area Model	Lattice	Traditional

Part 2. The Area Model: Algebraic Products

1. Start with the following set of algebra tiles: one x^2, five x, and 6 units. Arrange them into a rectangle and note the dimensions of the rectangle. These are the factors of $x^2 + 5x + 6$.

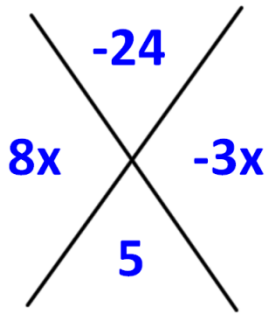


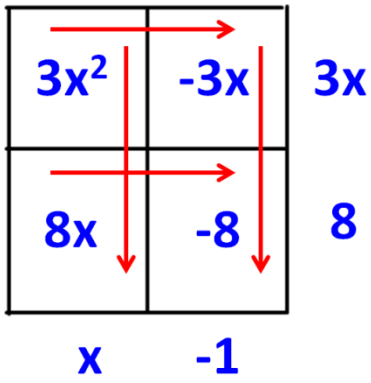
Polynomial	Area Model	Factors
$x^2 - 3x + 2$		
$2x^2 + 5x + 3$		
$2x^2 + 3x - 2$		
$2x^2 - 5x + 2$		

Part 3. The Factoring Methods and "Tricks"

Objective: Factor $3x^2 + 5x - 8$

1. The "X-Box" Method





2. The "Berry" Method

$3x^2 + 5x - 8$	ac = -24	(-3)(8) = -24	(-3) + 8 = 5
$(3x \pm \quad)(3x \pm \quad)$	create two binomials		
$(3x - 3)(3x + 8)$	fill in constants (-3) and 8		
$3(x - 1)(3x + 8)$	factor out common factor		
$(x - 1)(3x + 8)$	delete common factor		

3. The "AC" Method

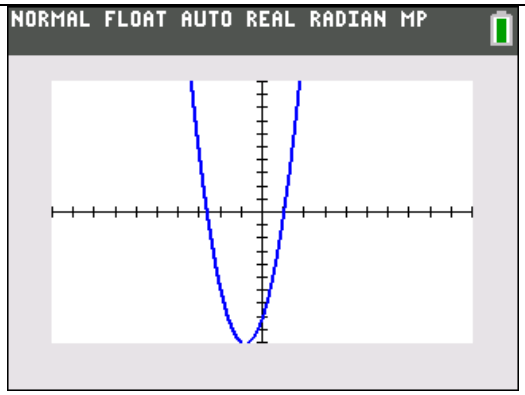
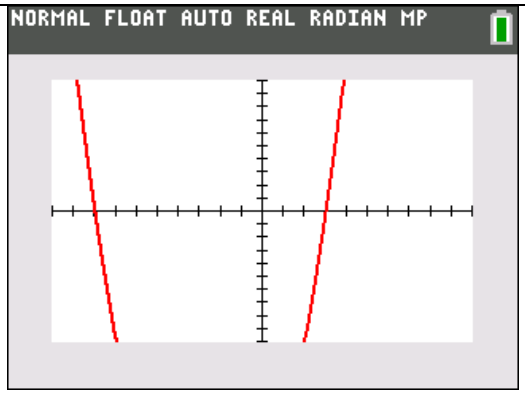
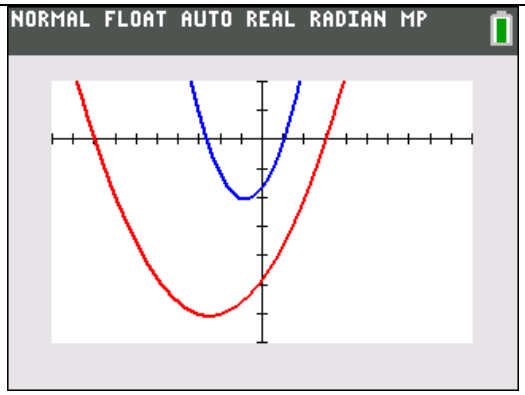
$3x^2 + 5x - 8$	ac = -24	(-3)(8) = -24	(-3) + 8 = 5
$3x^2 - 3x + 8x - 8$	replace 5x with -3x + 8x		
$3(x - 1) + 8(x - 1)$	factor by grouping		
$(x - 1)(3x + 8)$			

4. The "Slip-Slide" Method

$3x^2 + 5x - 8$	
$x^2 + 5x - 24$	Drop the 3. Multiply 3(-8) making this the new constant
$(x + 8)(x - 3)$	Factor new trinomial
$\left(x + \frac{8}{3}\right)\left(x - \frac{3}{3}\right)$	Turn constants into fractions
$\left(x + \frac{8}{3}\right)(x - 1)$	Simplify fraction if possible
$(3x + 8)(x - 1)$	Slide denominator in front of x

Part 4. Transformational Factoring

Objective: Factor $3x^2 + 5x - 8$

1. Create primary function f(x), where f(x) = $3x^2 + 5x - 8$.	
2. Create secondary function g(x), where g(x) = $x^2 + 5x - 24$.	
3. Find roots of each function. f(x): x = -8/3, 1 g(x): x = -8, 3 4. Compare roots. Generalize. g(x) roots = 3· f(x) roots	
5. Use roots of g(x) to find roots of f(x). Roots of g(x) → Roots of f(x)	Roots of f(x) =-8/3, 3/3 = -8/3, 1
6. Use roots of f(x) to find factors of f(x).	$\left(x - \frac{8}{3}\right)(x - 1)$
7. Multiply factors by constant 3 to obtain factors of original expression, $3x^2 + 5x - 8$	$3\left(x - \frac{8}{3}\right)(x - 1)$ $(3x - 8)(x - 1)$