Finding Factors Physically

1. Form a rectangle with the pieces representing each expression given below. If a rectangle can be formed for the expression, write its dimensions in the column headed Factors.

	Expression	Factors
a)	x^2+6x+5	$(x+1)(\quad)$
b)	x^2+6x+8	
c)	$x^2+8x+15$	
d)	$x^2+7x+12$	
e)	$x^2+8x+16$	
f)	x^2+2x	
g)	$2x^2+7x+3$	
h)	$2x^2+5x+3$	
i)	$3x^2+5x+2$	
j)	$2x^2+7x+6$	

2. In problems a through e, you formed rectangles to represent expressions of the form x^2+bx+c. The dimensions of the rectangles were of the form $(x+p)$ by $(x+q)$. That is,

$$x^2+bx+c=(x+p)(x+q)$$

Use the results of problems a - e to answer the following questions.

a) What relationship exists between p, q, and the number c?

b) What relationship exists between p, q, and the number b?

3. Use your answers from 2a and 2b to find the factors of each expression below. Check your answers by actually forming the corresponding rectangles with the algebra tiles.

Expression	Factors
a) x^2+5x+6	
b) x^2+6x+9	
c) $x^2+9x+20$	
d) $x^2+10x+9$	

4. In problems g-j, you formed rectangles to represent expressions of the form ax^2+bx+c where a was a prime number. The dimensions of the corresponding rectangles were of the form $(ax+p)(x+q)$; that is,

$$ax^2+bx+c=(ax+p)(x+q)$$

use the results of problems g-j to answer the following questions

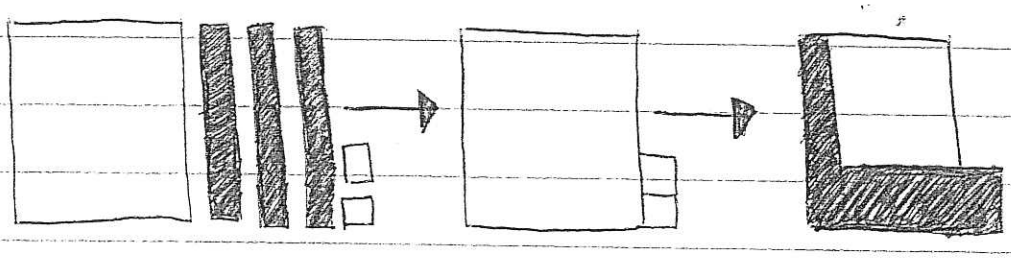
a) What relationship exists between p, q, and the number c?

b) What relationship exists between a, p, q, and the number b?

5. Use your answers to 4a and 4b to find the factors of each expression below. Check your answers by actually forming the corresponding rectangles with the algebratiles from sheet 4.

Expression	Factors
a) $2x^2+7x+6$	
b) $2x^2+9x+4$	
c) $2x^2+13x+15$	
d) $3x^2+10x+8$	

6. The red algebratiles are assumed to have "negative" area. The area of a red rectangle is $-x$, and the area of a small red square is -1. Thus, the areas of two congruent shapes of differing colors add to zero when placed one on top of the other. This fact can be used to find factors of an expression such as x^2-3x+2.



a) What are the dimensions of the white rectangle that was formed?

b) In factored form, $x^2-3x+2 =$ ( )( )

7. Use your algebratiles and the method illustrated above to form a rectangle representing each expression below. In the column headed Factors, write the dimensions of the rectangle that is formed.

	Expression	Factors
a)	$x^2 - 2x + 1$	
b)	$x^2 - 5x + 6$	
c)	$x^2 - 6x + 8$	
d)	$2x^2 - 5x + 2$	
e)	$2x^2 - 7x + 6$	
f)	$x^2 + x - 2$	

8. Analyze your results from problem 7 in a manner similar to that suggested in problems 2 & 4. Now try finding the factors of each expression below without using algebratiles.

	Expression	Factors
a)	$x^2 - 8x + 12$	
b)	$x^2 + x - 6$	
c)	$2x^2 - 13x + 15$	