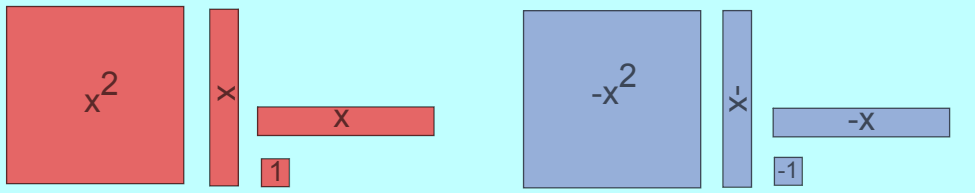
Factoring Simple Quadratic Trinomials in the form $x^2 + bx + c$

Oct 27/2011

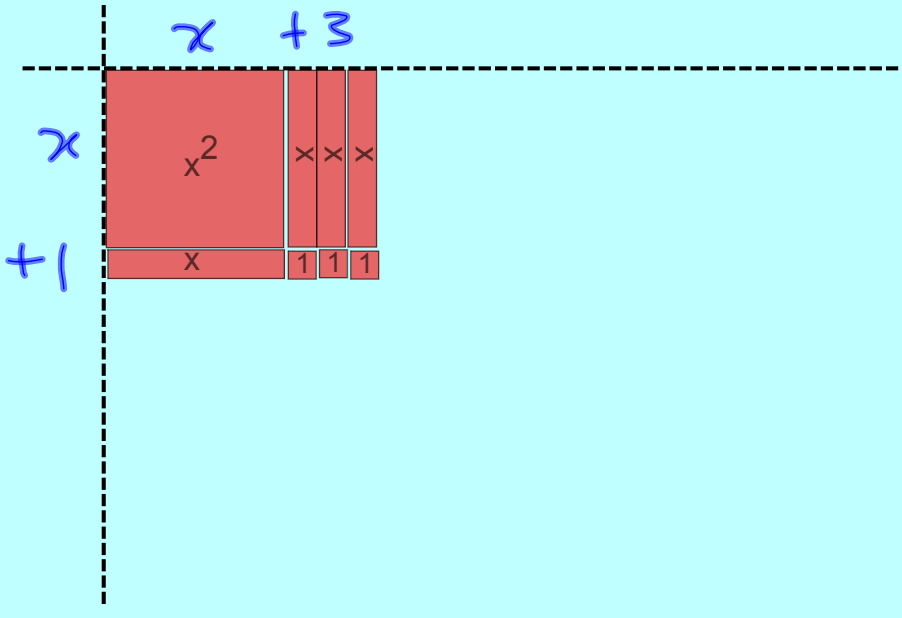
1. Using Alge-tiles

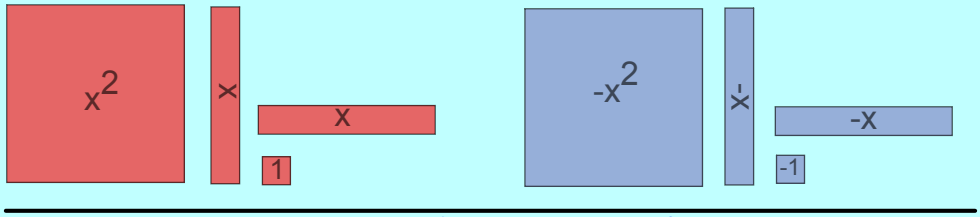
Model the expression as an area. The tiles must form a rectangle (or square).

The lengths of the sides are factors.

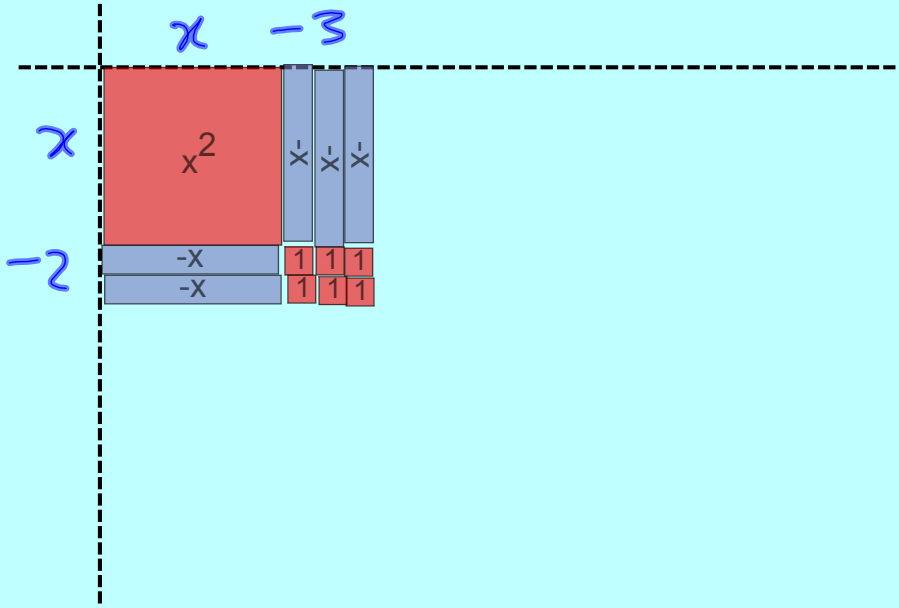


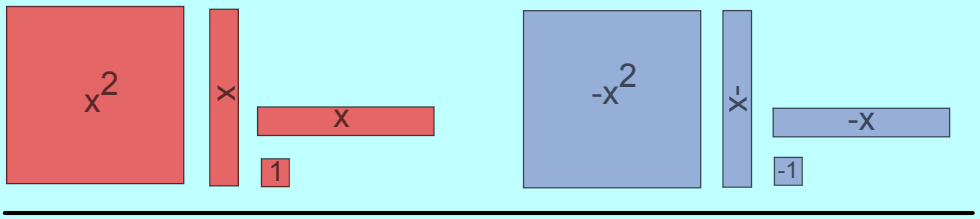
Factor: $x^2 + 4x + 3$ $= (x+3)(x+1)$



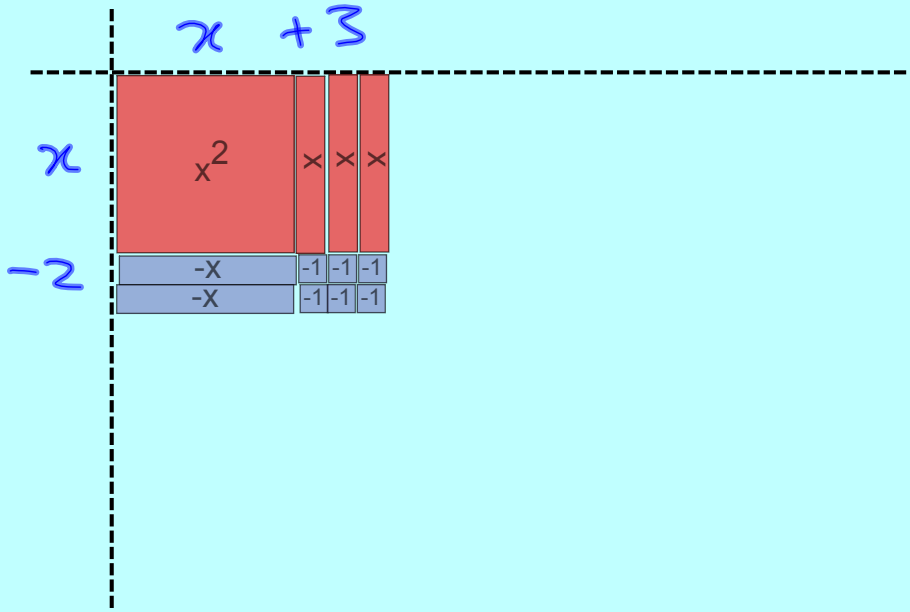


Factor: $x^2 - 5x + 6$ $= (x-3)(x-2)$





Factor: $x^2 + x - 6$ $= (x+3)(x-2)$



2. Algebraically

Consider: $(x + 2)(x + 3) = x^2 + 5x + 6$

What is the relationship between the factors and the coefficients of the answer?

$2 + 3 = 5$ addition

$2 \times 3 = 6$ multiplication

Ex.1 Factor

(a) $x^2 + 4x + 3$

add to 4?

multiply to 3? *

$1 + 3 = 4$ ✓

$-1 + (-3) = -4$

$x^2 + 4x + 3$

$= (x+1)(x+3)$

to check, expand (e.g., FOIL, area model)

(b) $x^2 - 8x + 12$

add to -8

multiply to 12 *

$1 + 12 = 13$

$2 + 6 = 8$

$3 + 4 = 7$

$-1 + (-12) = -13$

$-2 + (-6) = -8$ ✓

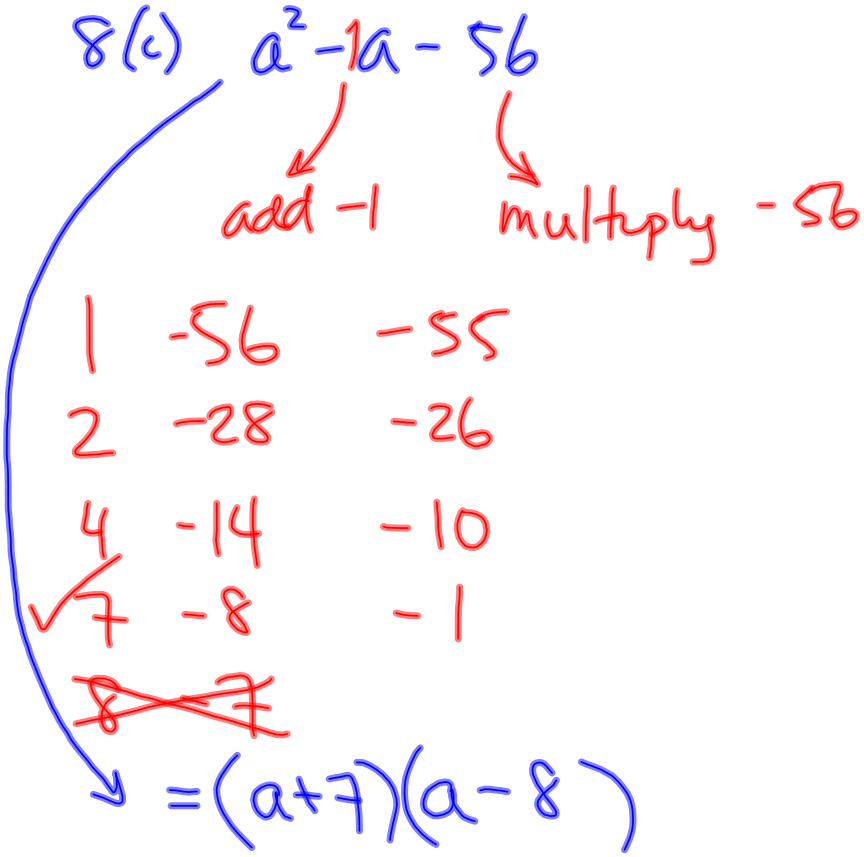
$-3 + (-4) = -7$

$x^2 - 8x + 12$

$= (x-2)(x-6)$

Assigned Work:

p.211 # 2, 4
(6, 7, 8)(ace)
9ace (look for common factors first)
12ace, 13ac



13. (c) $y = x^2 - 8x + 15$ Sum: -8

(i) $y = (x-5)(x-3)$ Product: 15

$-5, -3$

(ii) for zeroes, set $y = 0$

$0 = (x-5)(x-3)$

$x - 5 = 0$ ✓ $\quad x - 3 = 0$ ✓

$x = 5$ ✓ $\quad x = 3$ ✓

$(5, 0)$ ✓ $\quad (3, 0)$ ✓

(iii) x_{vertex} is MP of zeroes

$$x_v = \frac{5+3}{2}$$

$$= 4$$

for y_v, sub into equation

$y = (4-5)(4-3)$

$= (-1)(1)$

$y_v = -1$

$\therefore$ vertex is $(4, -1)$