Flip-Chip Algebra:
Using the Basic Kit

Introduction

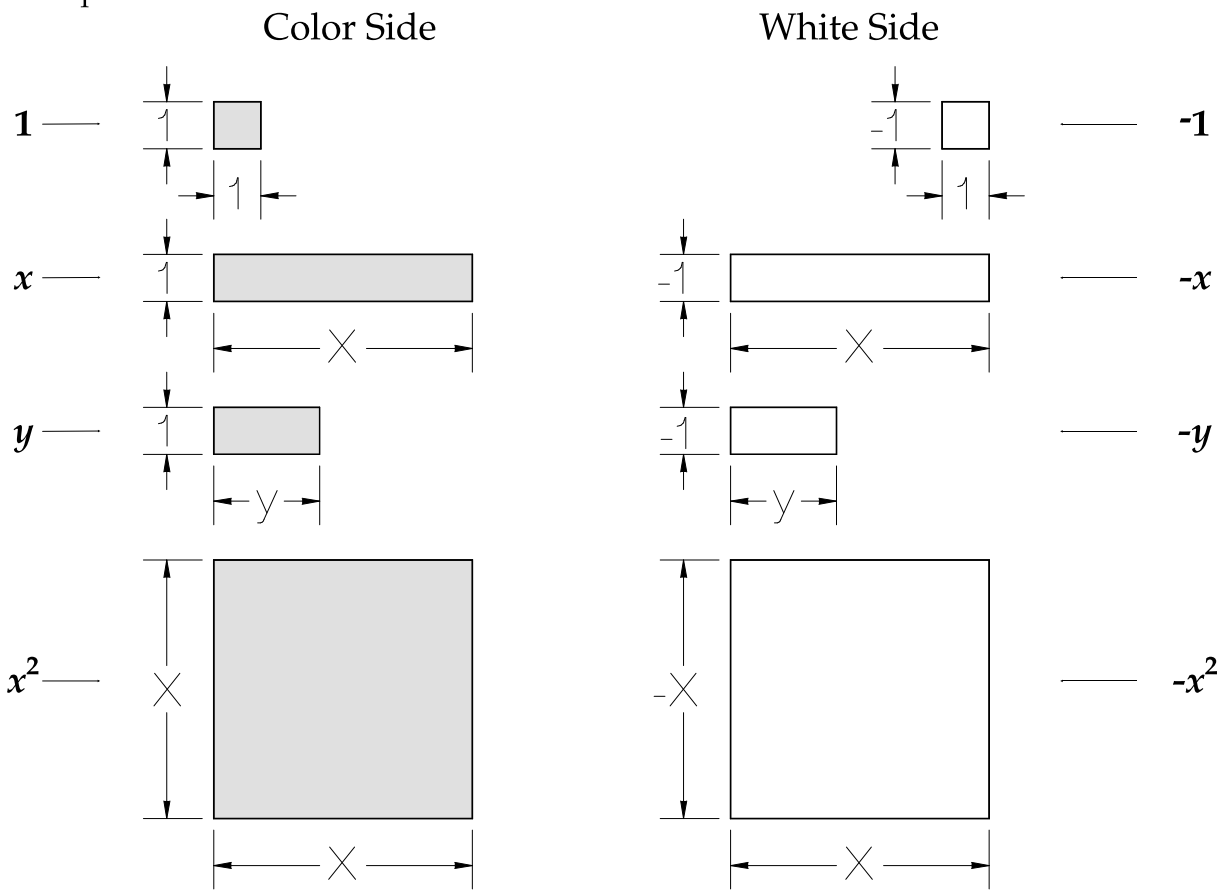
This handout is intended as a short demonstration of the possible uses of the Basic Kit. For a complete Algebra course using manipulatives, see ***Flip-Chip Algebra*** (567 pages). For a shorter course, see ***Flip-Chip Essentials*** (194 pages).

For more information, contact Flip-Chip Enterprises, 428 NW Rogers Street, Olympia WA 98502. You can also reach us by phone at (360) 943-4535.

Manipulative Pieces

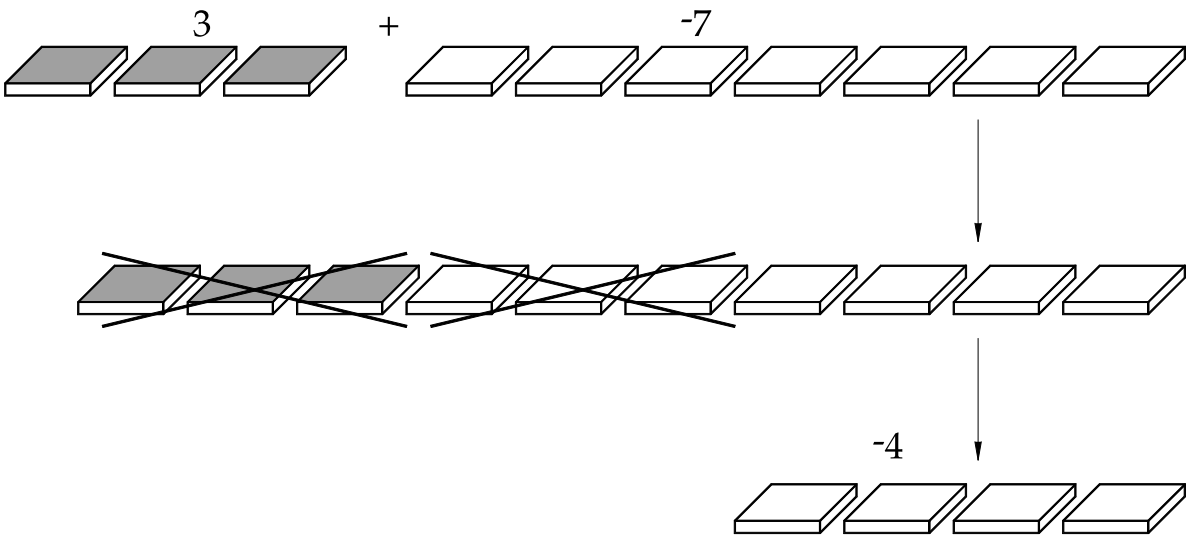
Contents:

60 unit squares
18 x rectangles
6 y rectangles
6 x^2 squares



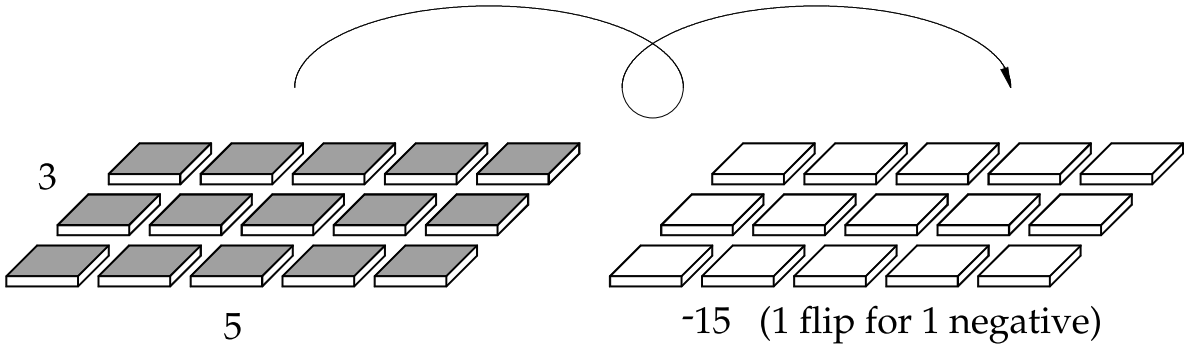
Adding Positive and Negative Numbers

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

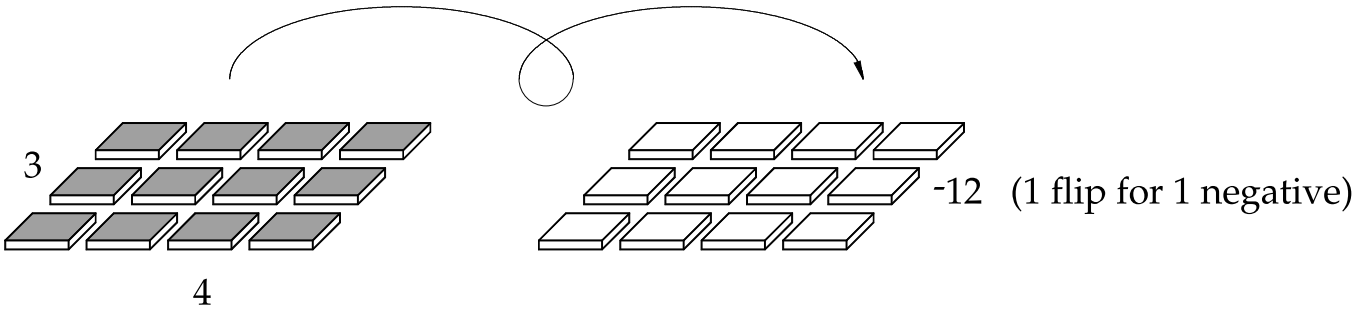


Multiplying Positive and Negative Numbers

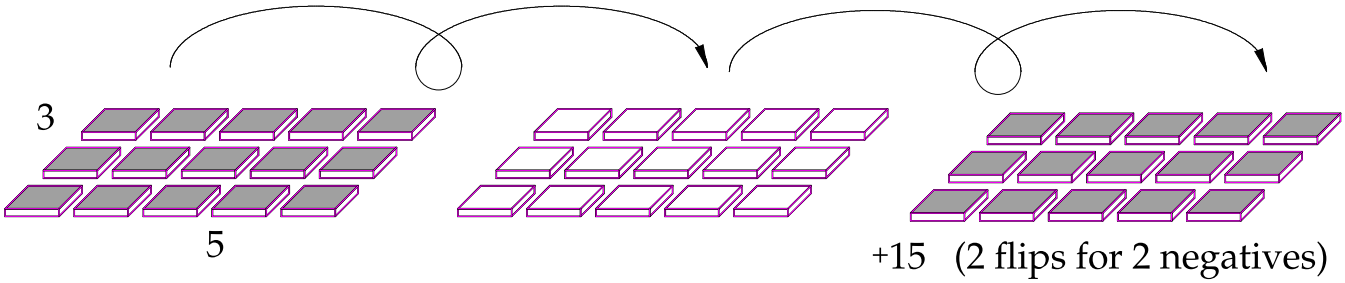
$$5 \cdot (-3) = -15$$



$-4 \cdot 3 = -12$

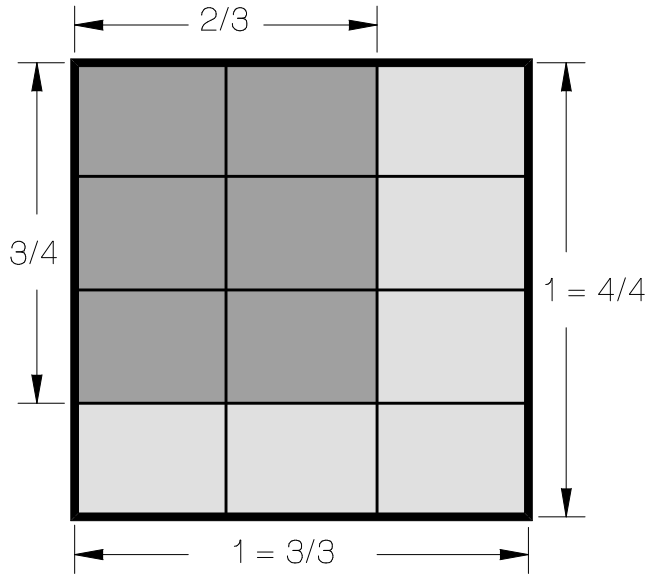


$(-3) \cdot (-5) = +15$



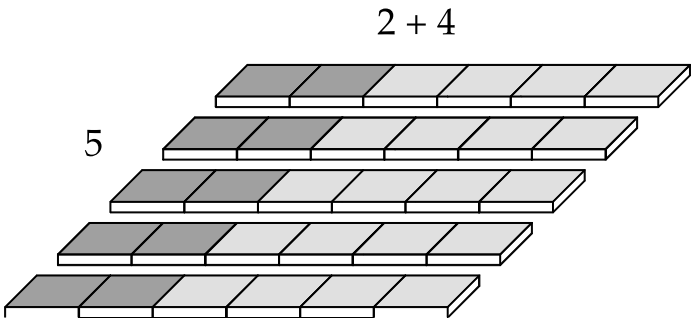
Multiplying Fractions

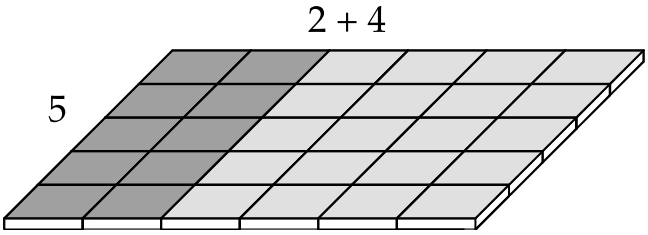
$$\frac{2}{3} \cdot \frac{3}{4} = \frac{6}{12}$$



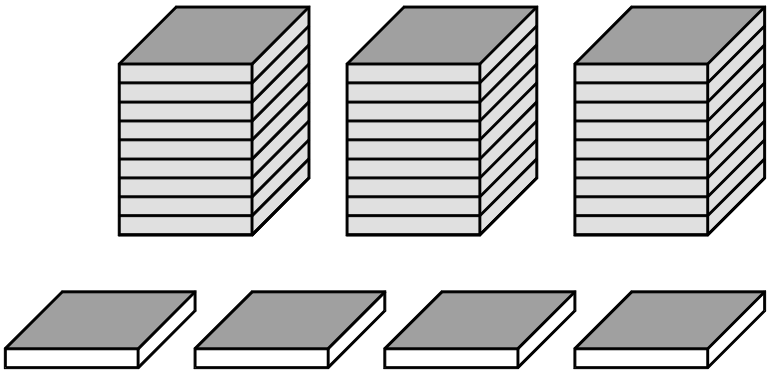
The Distributive Property

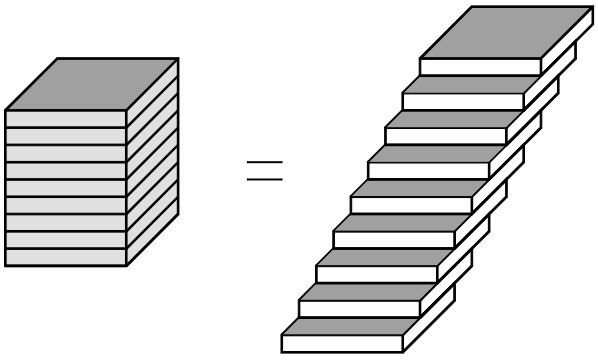
$$5(2 + 4) = (5 \cdot 2) + (5 \cdot 4)$$





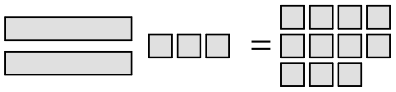
Using Stacks of Chips as Unknowns



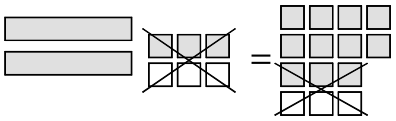


$x = 9$

Solving Equations

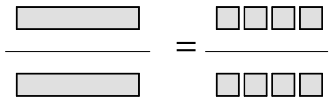


$$2x + 3 = 11$$

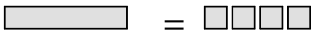


$$2x + 3 - 3 = 11 - 3$$

$$2x = 8$$

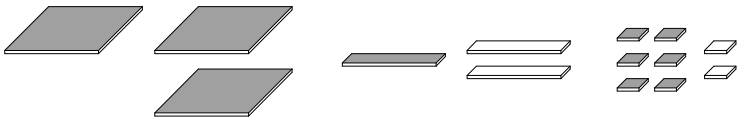


$$\frac{1}{2}(2x) = \frac{1}{2}(8)$$

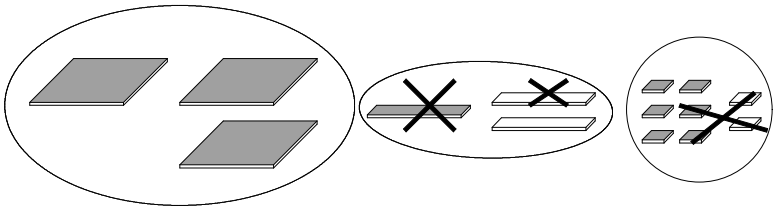


$$x = 4$$

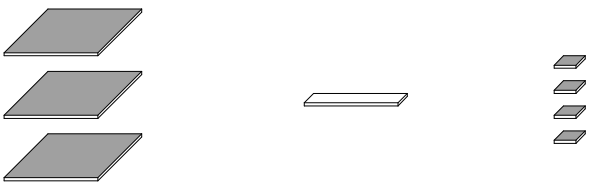
Adding Polynomials



$$x^2 + 2x^2 + x - 2x + 6 - 2$$



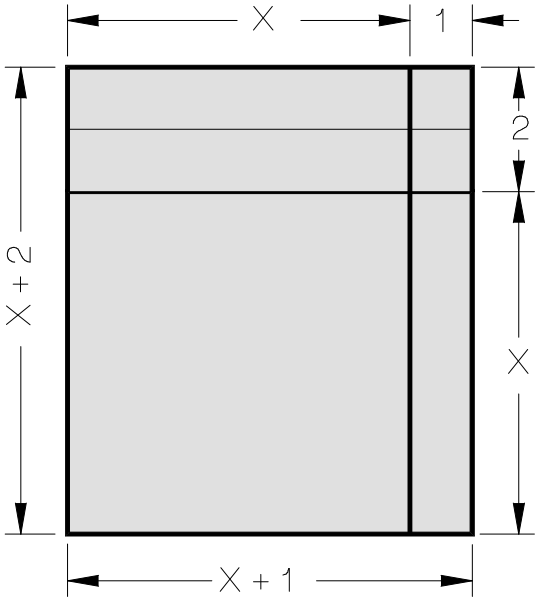
$$(x^2 + 2x^2) + (x - 2x) + (6 - 2)$$



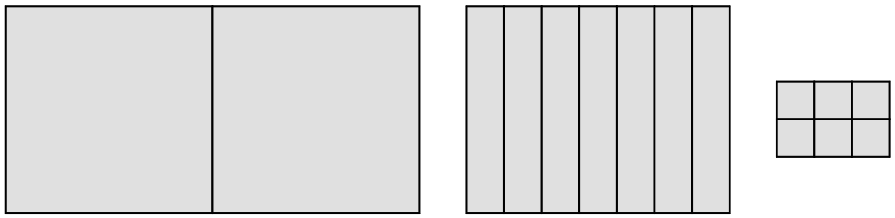
$$3x^2 - x + 4$$

Multiplying Polynomials

$$(x + 2)(x + 1) = x^2 + 3x + 2$$

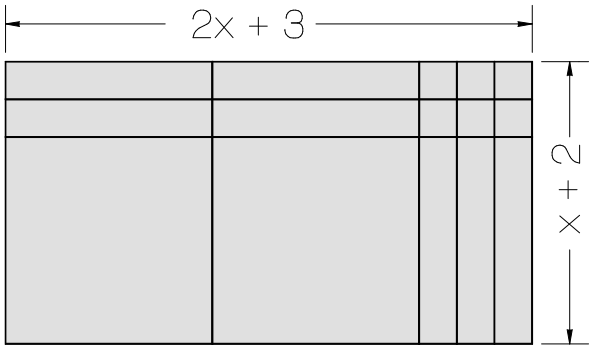


Factoring Polynomials

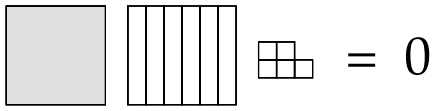


$2x^2$ $7x$ 6

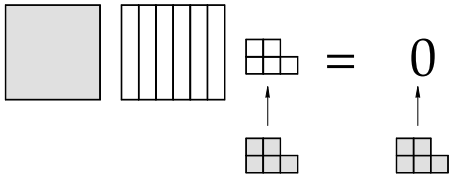
$2x^2 + 7x + 6$
equals
$(2x + 3)(x + 2)$



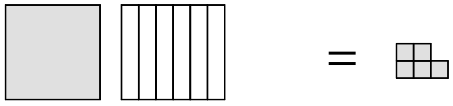
Solving Quadratic Equations



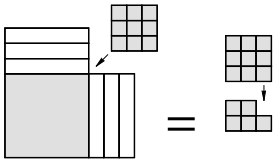
$$x^2 - 6x - 5 = 0$$



$$x^2 - 6x - 5 = 0$$
$$+5 \quad +5$$

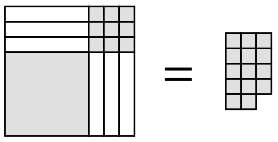


$$x^2 - 6x = 5$$



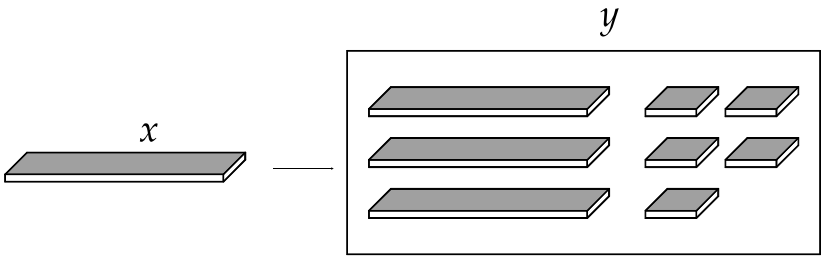
$$x^2 - 6x + 9 = 5 + 9$$

$(x-3)$ on each side

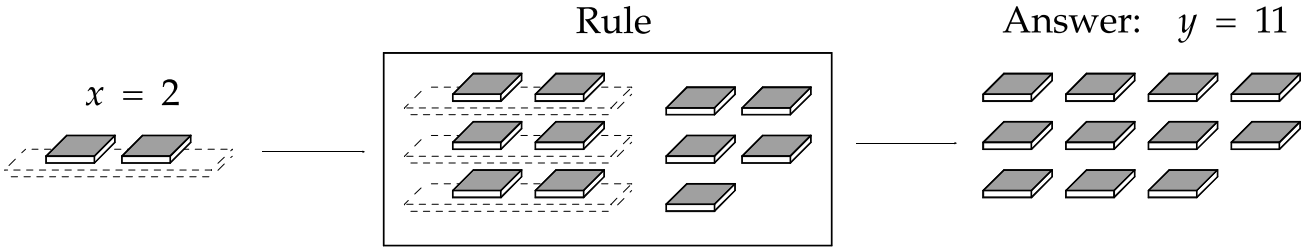


$$(x-3)^2 = 14$$
$$x - 3 = \pm\sqrt{14}$$
$$x = 3 \pm \sqrt{14}$$

Function Rules



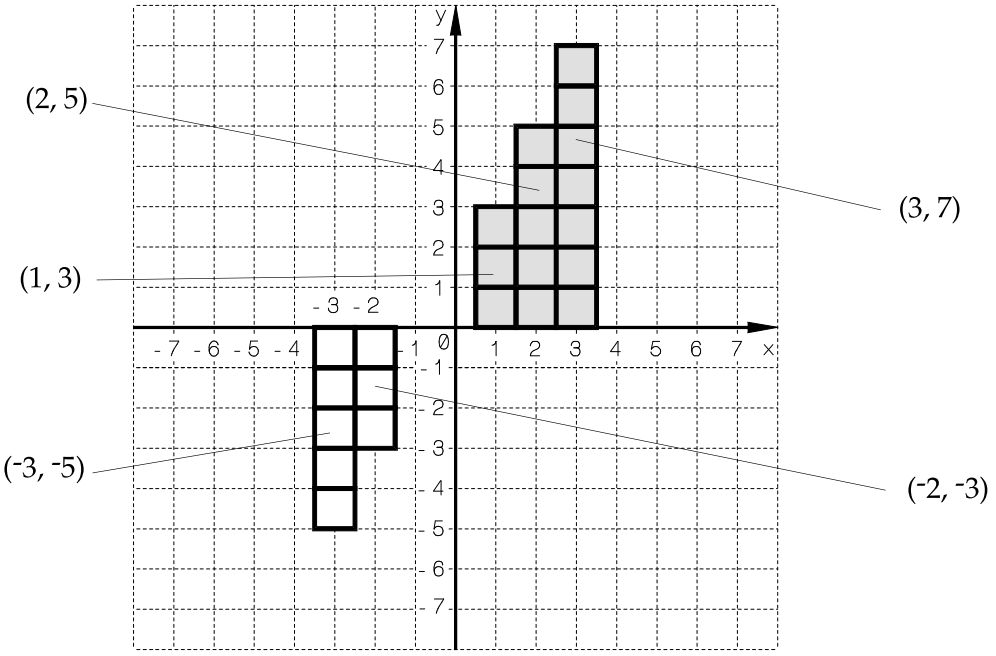
Rule: $y = 3x + 5$



Graphing a Linear Equation

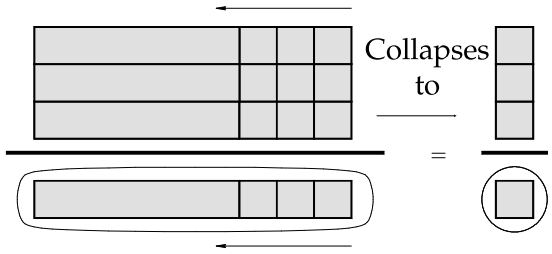
Simplifying a Rational Expression

$$y = 2x + 1$$



Cancels

$$\frac{3x+9}{x+3} = \frac{3(x+3)}{1(x+3)} = \frac{3}{1}$$



Cancels

$$\frac{2x-4}{3x-6} = \frac{2(x-2)}{3(x-2)} = \frac{2}{3}$$