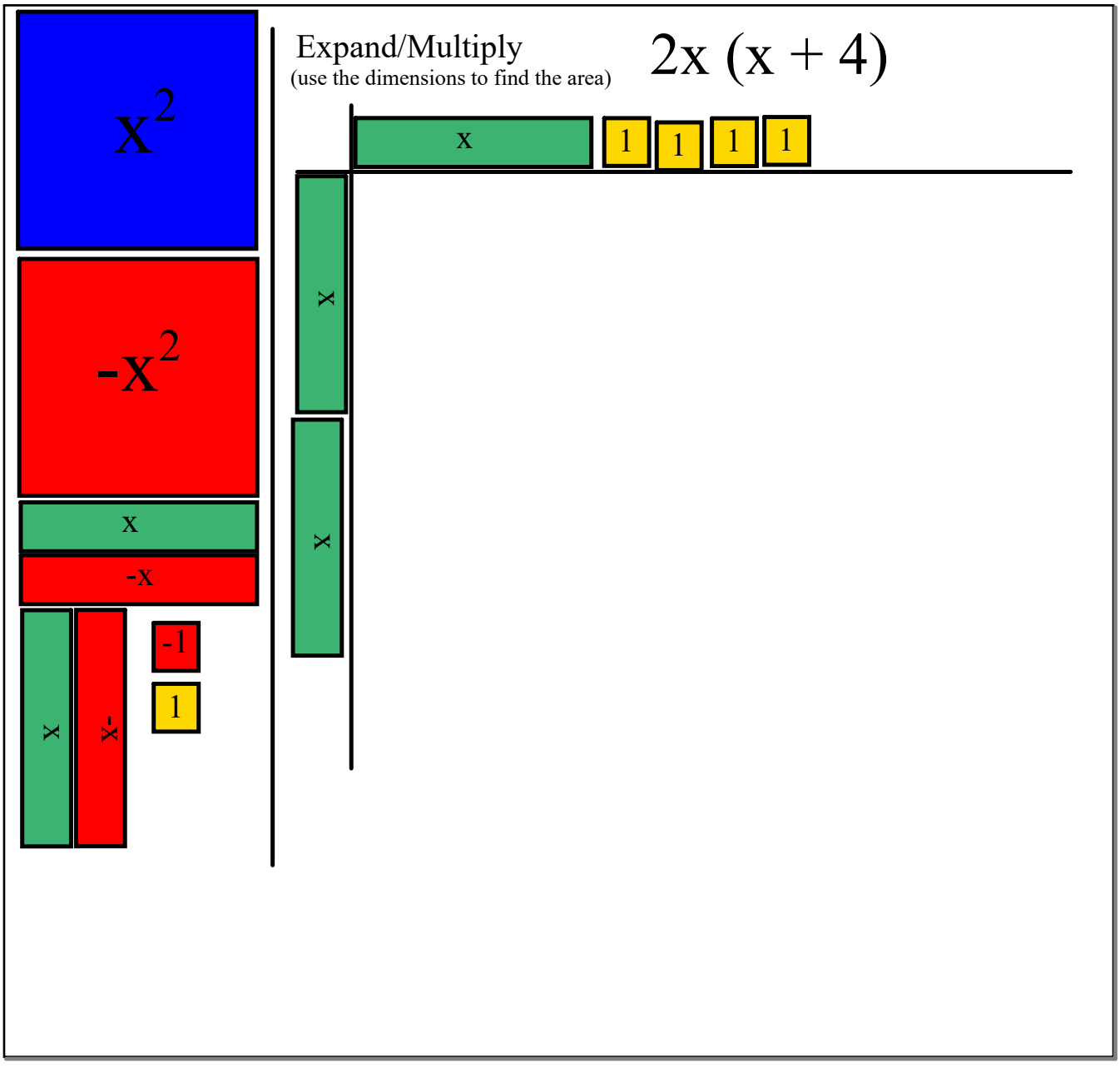
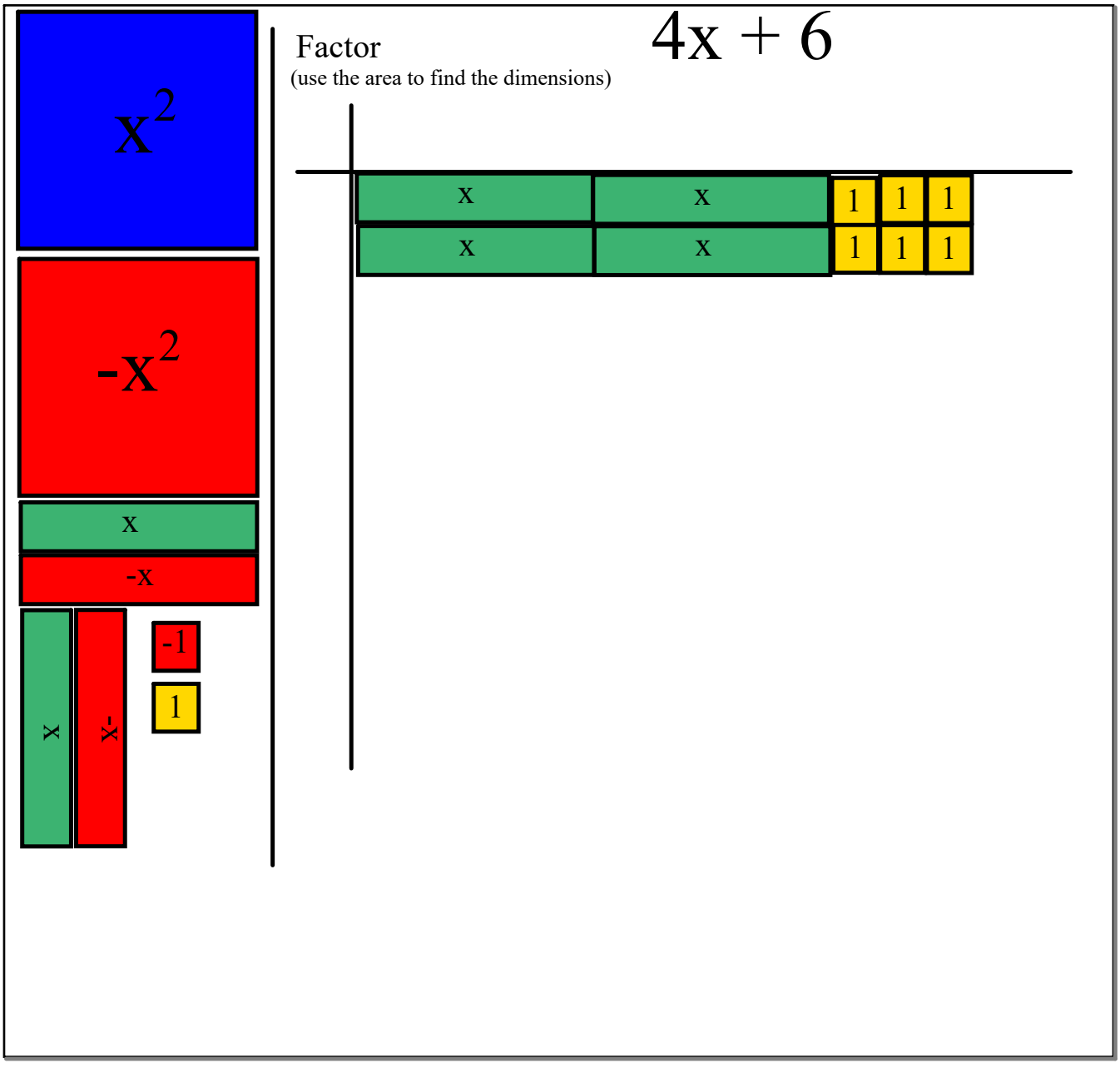

x^2
$-x^2$
x
-x
x
x'
-1
1
Expand/Multiply
(use the dimensions to find the area)
$2x\ (x + 4)$
x
1
1
1
1
x
x

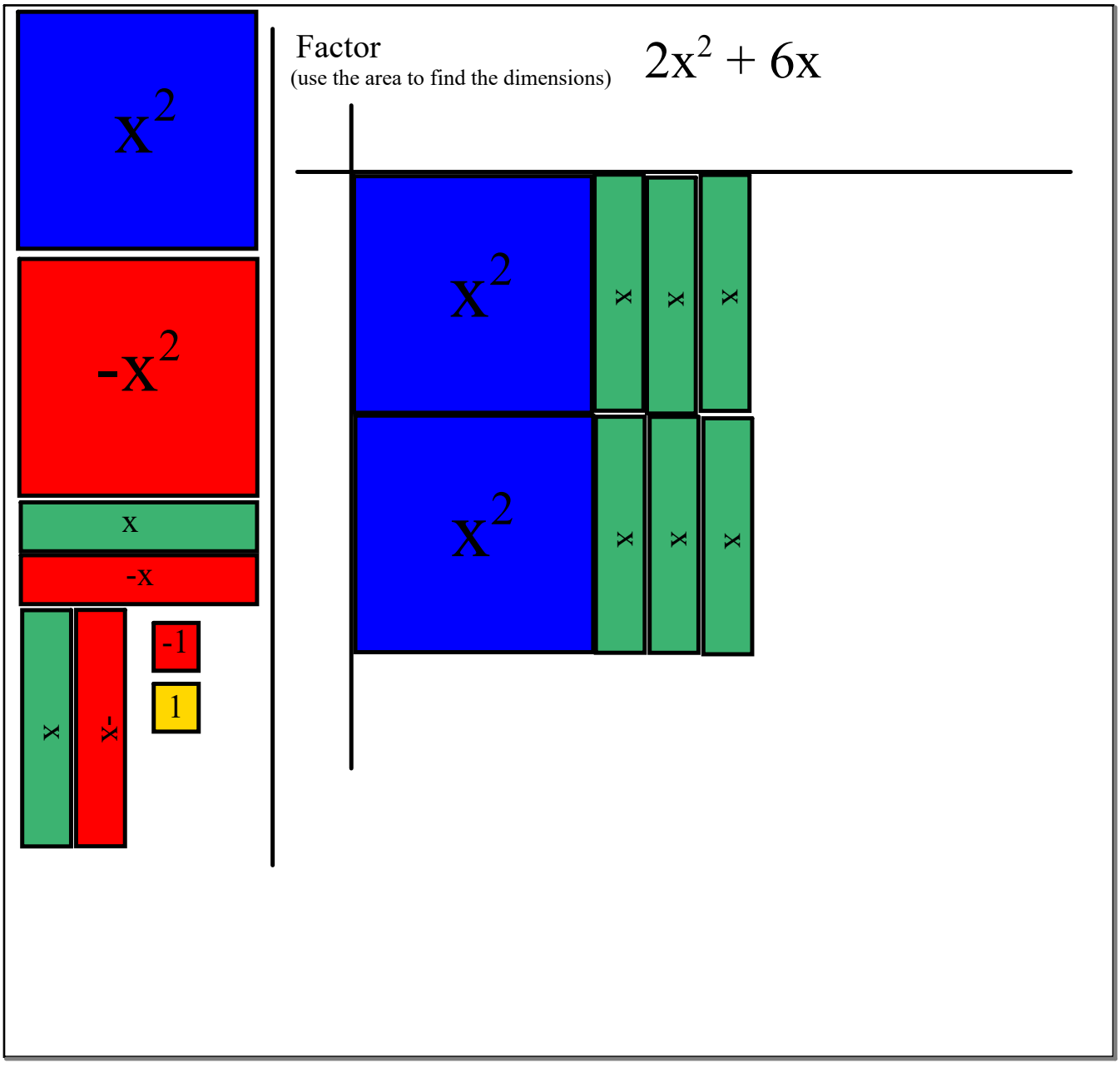
Learning Goal: By the end of today, I will be able to determine the greatest common factor for a collection of numbers AND I will be able to common factor a simple polynomial expression.

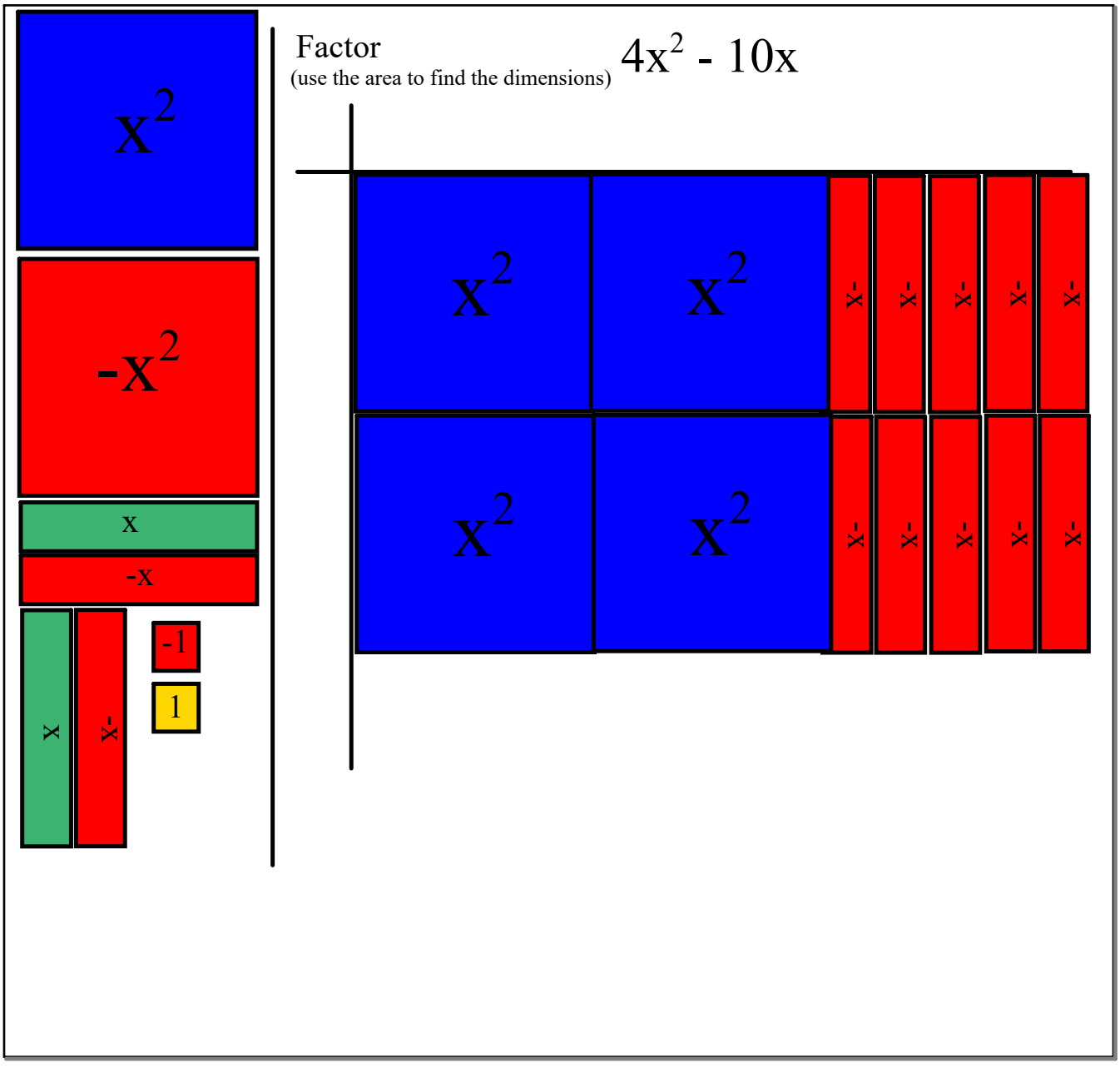
FACTOR means to use the area to find the dimensions of the rectangular area.

There may be more than one answer.

Ex. Find the dimensions of the rectangle with an area of 16 m^2


x^2
$-x^2$
x
-x
x
x
-1
1
Factor
(use the area to find the dimensions)
4x + 6
x
x
1
1
1
x
x
1
1
1

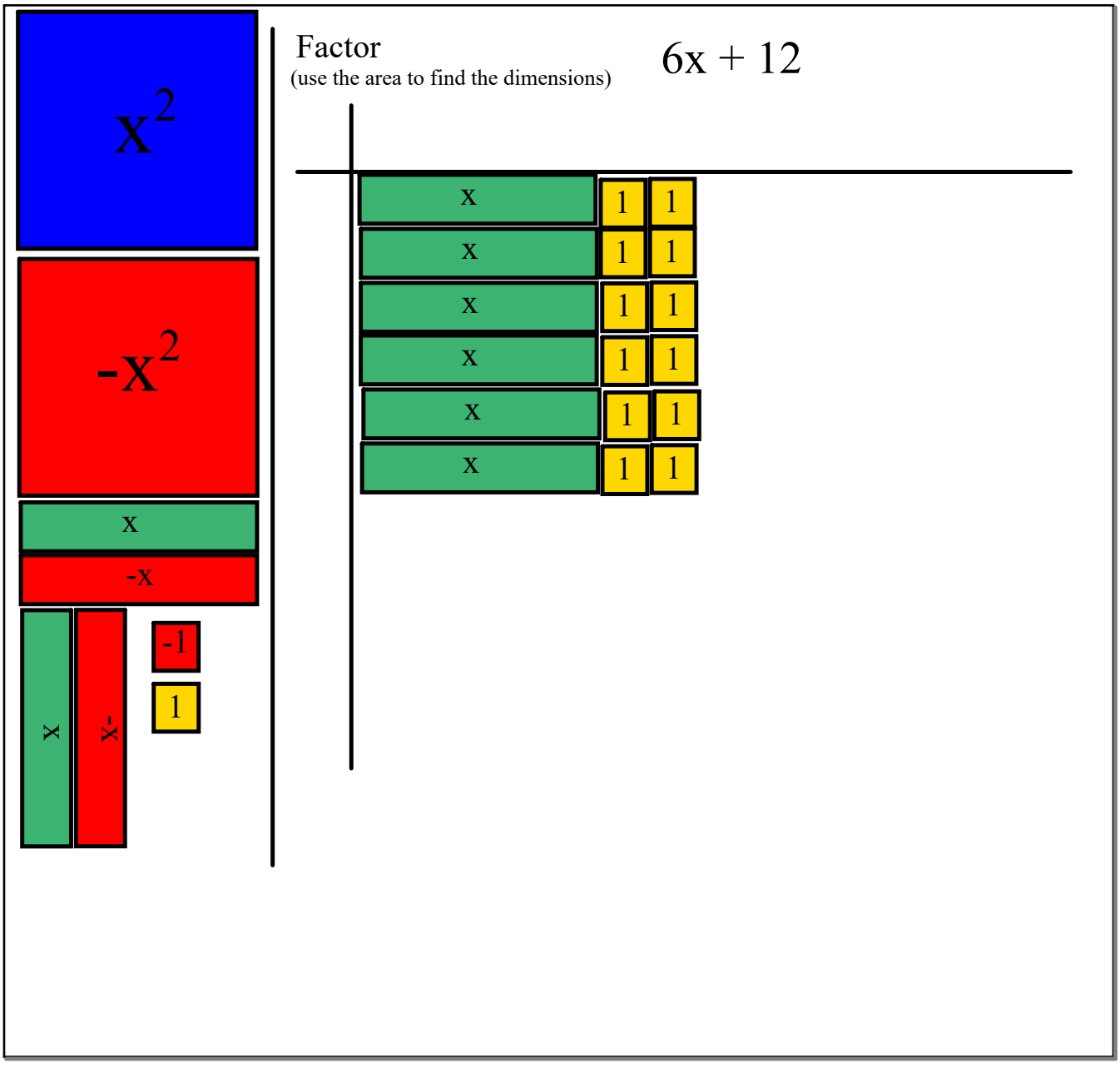

x^2
$-x^2$
x
-x
x
x
-1
1
Factor
(use the area to find the dimensions)
$2x^2 + 6x$
x^2
x^2
x
x
x
x
x
x

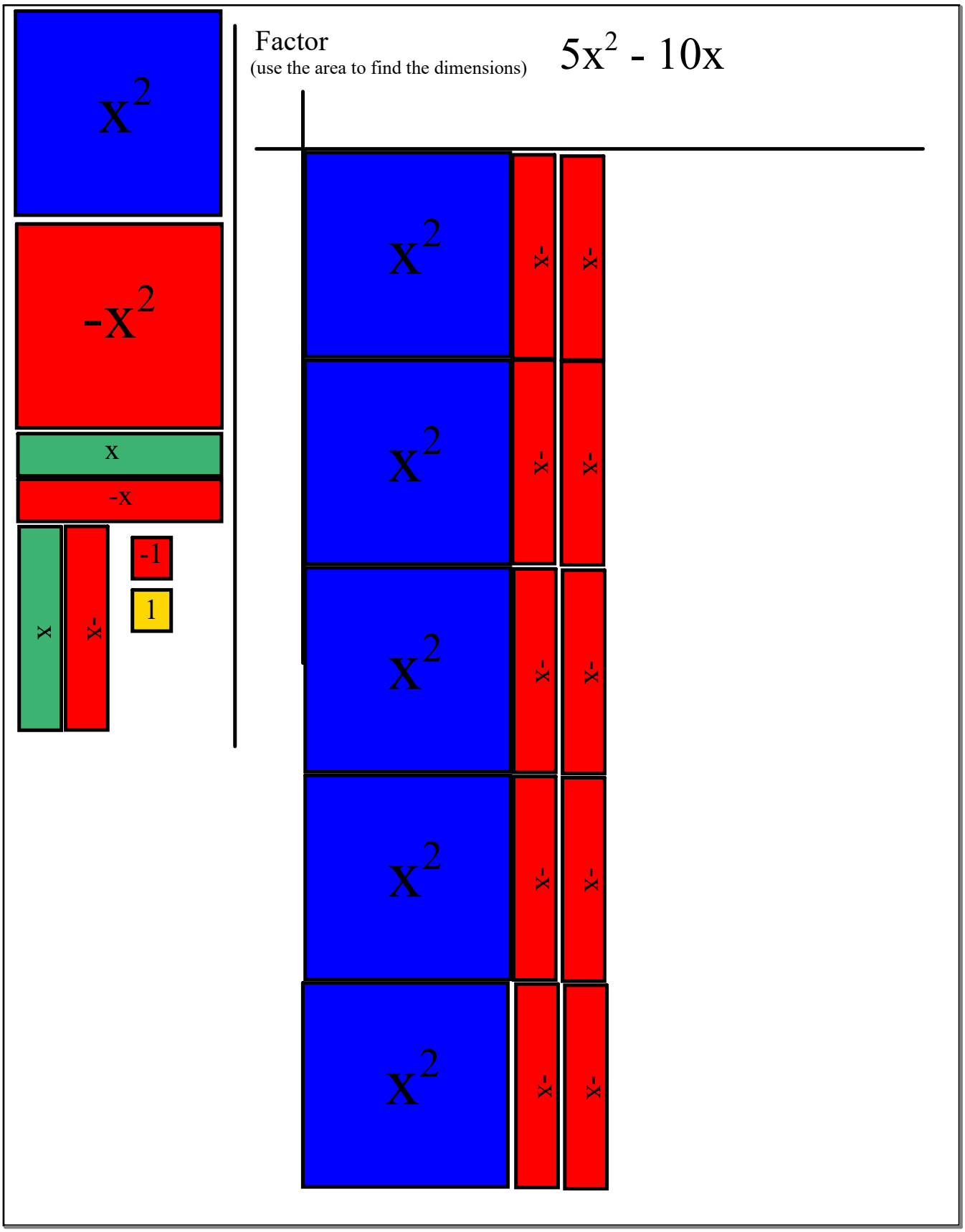

x^2
$-x^2$
x
-x
x
x-
-1
1
Factor
(use the area to find the dimensions)
$4x^2 - 10x$
x^2
x^2
x^2
x^2
x-
x-
x-
x-
x-
x-
x-
x-
x-
x-

Factor the following using your Algetiles or by drawing a picture:

(a) $6x + 12$

(b) $5x^2 - 10x$


x^2
$-x^2$
x
-x
x
x
-1
1
Factor
(use the area to find the dimensions)
6x + 12
x 1 1
x 1 1
x 1 1
x 1 1
x 1 1
x 1 1


Factor
(use the area to find the dimensions)
$5x^2 - 10x$
x^2
$-x^2$
x
-x
x
x-
-1
1
x^2
x-
x-
x^2
x-
x-
x^2
x-
x-
x^2
x-
x-
x^2
x-
x-

Greatest Common Factor
(Finding the GCF between two or more terms)
An algebraic approach to factoring.

Greatest Common Factor - Definitions

Factors - factors are numbers that act as "building blocks" to create larger numbers, through the operation of multiplication

ie. $12 = 4 \times 3$ Therefore, 4 and 3 are factors of 12

$12 = 6 \times 2$ Therefore, 6 and 2 are also factors of 12

Prime Factors - Prime factors consist of the "prime" numbers; numbers that are divisible by themselves and "1" only

Prime Numbers

1, 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41,....

ie. $12 = 2 \times 2 \times 3$ (broken down into its Prime Factors)

ie. $36 = 2 \times 2 \times 3 \times 3$ (broken down into its Prime Factors)

Finding the Greatest Common Factor

The Greatest Common Factor (GCF) is the largest factor (number/building block) that is shared between two or more terms.

ie. The GCF of the numbers 18 and 27 would be 9.

We can see this by writing each number in a factored form.

$18 = 9 \times 2$ and $27 = 9 \times 3$

The difficulty in finding the GCF arrises when we have more challenging numbers and when unknowns are introduced.

Finding the Greatest Common Factor

Find the Greatest Common Factor (GCF) between the following three terms: 24, 48, 60

24	48	60
24 = 12 x 2	48 = 12 x 4	60 = 10 x 6
24 = 6 x 2 x 2	48 = 6 x 2 x 2 x 2	60 = 5 x 2 x 3 x 2
24 = 3 x 2 x 2 x 2	48 = 3 x 2 x 2 x 2 x 2	60 = 5 x 3 x 2 x 2

What factors do ALL of the terms have in common?

24 = **3** x **2** x **2** x 2 48 = **3** x **2** x **2** x 2 x 2 60 = 5 x **3** x **2** x **2**

All of the terms have a "2 x 2 x 3" in common, when
this is multiplied out it is a product of "12".

Therefore the GCF for 24, 48 and 60, is "12".

24 = **12** x 2 48 = **12** x 4 60 = 5 x **12**

Finding the Greatest Common Factor

Find the Greatest Common Factor (GCF) between the following three terms: $8a^2$, 16a, $12a^3$

$8a^2$	16a	$12a^3$
$8a^2 = (4)(2)(a)(a)$	$16a = (4)(4)(a)$	$12a^3 = (4)(3)(a)(a)(a)$
$8a^2 = (2)(2)(2)(a)(a)$	$16a = (2)(2)(2)(2)(a)$	$12a^3 = (2)(2)(3)(a)(a)(a)$

What factors do ALL of the terms have in common?

$8a^2 = (2)$ **(2) (2) (a)** (a) $16a = (2)(2)$ **(2) (2) (a)** $12a^3 =$ **(2) (2)** (3) **(a)** $(a)(a)$

All of the terms have a "2 x 2 x a" in common, when this is multiplied out it is a product of "4a".

Therefore the GCF for $8a^2$, 16a and $12a^3$, is "4a".

$8a^2 =$ **(4a)** $(2a)$ $16a =$ **(4a)** (4) $12a^3 =$ **(4a)** $(3a^2)$

Self Check

Find the Greatest Common Factor (GCF) between the following three terms:16, 24, 40

16 24 40

What factors do ALL of the terms have in common?

Self Check

Find the Greatest Common Factor (GCF) between the following three terms: $18a^2$, $27a$, $45a^3$

$18a^2$ $27a$ $45a^3$

What factors do ALL of the terms have in common?

Factor (find the dimensions) of the following:

$4x + 6 = (\quad)(\quad)$

$2x^2 + 6x = (\quad)(\quad)$

$4x^2 - 10x = (\quad)(\quad)$

Task - Factoring handout