Factoring using Common Factors

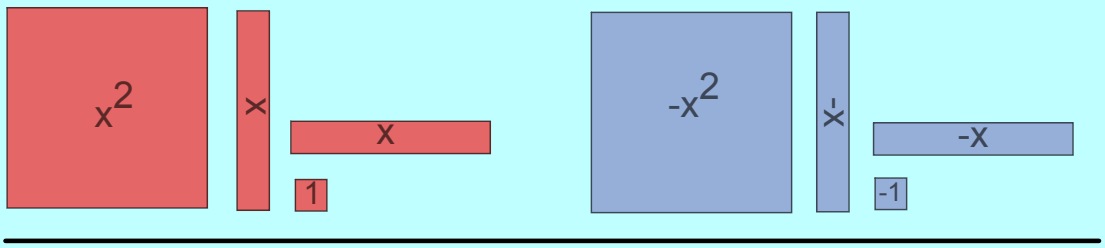
March 30/2010

1. Using a Model (e.g., alge-tiles)

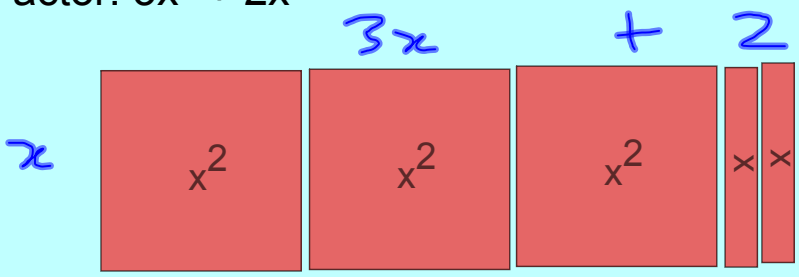
Model the expression as an area. The lengths of the sides are factors.

Some factors can be reduced further. Repeat this process until no factors can be reduced.

Mar 26-8:24 AM



Factor: $3x^2 + 2x$



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

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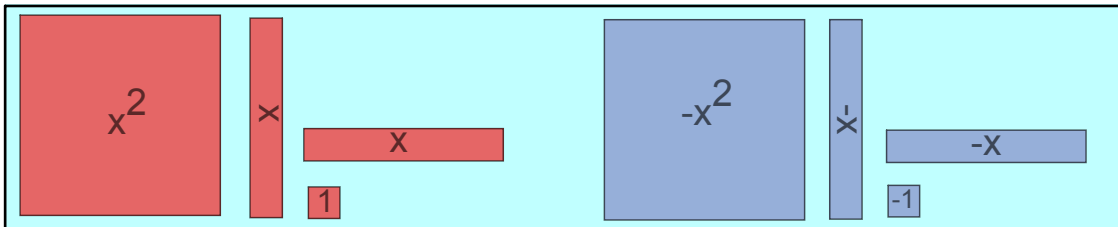
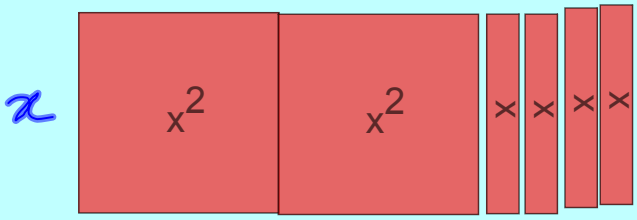


Factor: $2x^2 + 4x$ $= x(2x+4)$

2 | x | 1 | 1 |
x | 1 | 1 |

$x + 2$ $= x(2)(x+2)$

$= 2x(x+2)$



$2x+4$

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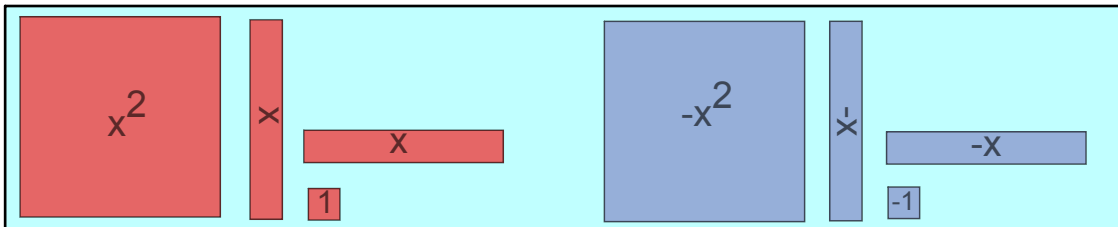
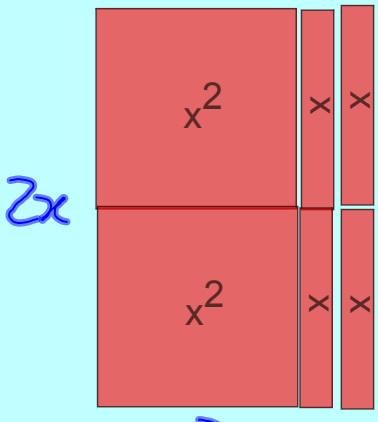


Factor: $2x^2 + 4x$ $= 2x(x+2)$



$x+2$

* can sometimes construct different rectangles for area
→ some are better than others at finding factors

Mar 25-8:02 AM

2. Factor Algebraically

Look for the greatest common factor of the coefficients and the GCF of the variables.

Ex. Factor: $8x^3 - 6x^2y^2 + 4x^2y$

$8 \leftarrow 2 \cdot 4, 8$
$6 \leftarrow 2 \cdot 3$
$4 \leftarrow 2, 4$

The GCF of 8, 6, and 4 is 2.

The GCF of x^3, x^2y^2, and x^2y is x^2.

$x^3 = x \cdot x \cdot x$
$x^2y^2 = x \cdot x \cdot y \cdot y$
$x^2y = x \cdot x \cdot y$

$8x^3 - 6x^2y^2 + 4x^2y = 2x^2(4x) - 2x^2(3y^2) + 2x^2(2y)$

$= 2x^2(4x - 3y^2 + 2y)$

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3. Factoring by Grouping

Some polynomials do not have common factors in all terms. They can sometimes be factored by grouping terms with common factors.

Ex. Factor: $\overbrace{ac}^{c} + bc + \overbrace{ad}^{d} + bd$

$= c(a+b) + d(a+b)$

$(a+b)$ is common

$= (a+b)(c+d)$

OR

$ac + bc + ad + bd$

a | b

$= a(c+d) + b(c+d)$

$= (c+d)(a+b)$

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Assigned Work:

Handout Section 3.4

1. Complete in class & submit/show:
   # (1-4)(abc)

2. Homework
   # (1-4)(rest)

$$9a^3+27b^2$$
$$=3(3a^3+9b^2)$$
$$=3(3)(a^3+3b^2)$$
$$=9(a^3+3b^2)$$

Mar 26-9:06 AM

$$5x+25$$
$$=5\left(\frac{5x}{5}+\frac{25}{5}\right)$$
$$=5(x+5)$$

$5 \leftarrow 1, 5$

$25 \leftarrow 1, 5, 25$

2(c) $12y-8y^2+24y^3$

$$=4y\left(\frac{12y}{4y}-\frac{8y^2}{4y}+\frac{24y^3}{4y}\right)$$
$$=4y(3-2y+6y^2)$$

$\frac{y \cdot y}{y}$

$\frac{y\,y\,y}{y}$

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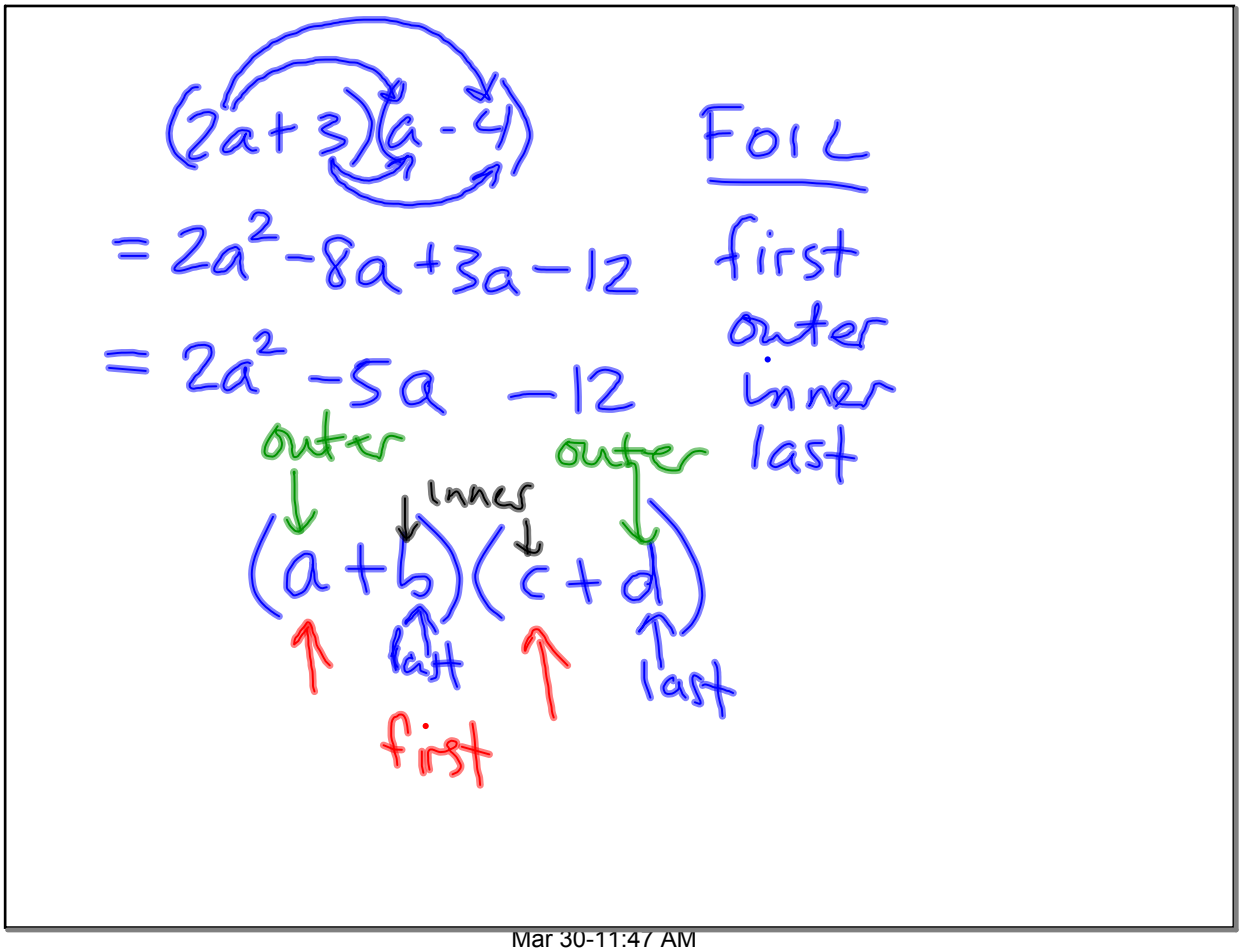

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