Name: _____ Date: _____

Learning Goal 1.1	Given a polynomial expression, identify the GCF and use it to find factored form.

When finding factored form of an expression, the question is **really asking** for you to find the GCF.

1. Numbers - the factors that the numbers have in common — greatest common factor
2. Variable(s) - counting.

Consider $8x + 4$. Using the appropriate algebra tiles:

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Arrange the tiles into rectangles (there's more than one possibility). Draw the rectangles here. Please leave lots of space between your drawings.

$8x+4 = 4(2x+1)$

$GCF(8,4) = 4$

$= 2(4x+2) = 2\times 2(2x+1)$

$= 4(2x+1)$

Use algebra tiles to help you find different factored forms of the following expressions. Write down the factored expression next to each diagram.

a. $4x + 12$

$GCF(4x, 12) = 4$

$4 = 2^2$

$12 = 2^2 \times 3$

$4x+12 = 4(x+3)$

b. $6m + 9$

$GCF(6m, 9) = 3$

$= 3(2m+3)$

c. $6c + 4c^2$

$GCF(6c, 4c^2) = 2c$

$= 2c(3+2c)$

Algebra tiles are a useful model to get started with – but not sustainable.

- positive / negative is inconsistent
- take a long time to use.
- only good for up to quadratics.

So, to factor a polynomial (or any expression for that matter):

1. Find the GCF of both numbers & variables
2. Divide the GCF out of the expression
3. Write it as a product.

Example

a. $8q^3p^5 - 12q^2p^{10}$

GCF $(8q^3p^5, -12q^2p^{10})$

$= 4q^2p^5$

$= 4q^2p^5(2q - 3p^5)$

b. $12ab^2c^3 - 16a^3b^2c + 24a^4b^4c^4$

GCF $(12ab^2c^3, -16a^3b^2c, 24a^4b^4c^4)$

$= 4ab^2c$

$= 4ab^2c(3c^2 - 4a^2 + 6a^3b^2c^3)$

c. $-18w^4x^5yz^2 - 54xy^9z^6 - 72w^{12}x^9y^3 - 7w^2x^8z$

GCF $(-18w^4x^5yz^2, -54xy^9z^6, -72w^{12}x^9y^3, -7w^2x^8z)$

$= -x$

$= -x(18w^4x^4yz^2 + 54y^9z^6 + 72w^{12}x^8y^3 + 7w^2x^7z)$