Lesson P2 ~ Common Factors of a Polynomial

Understanding the Instructions

<table>
<thead>
<tr>
<th>In Arithmetic</th>
<th>In Algebra</th>
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<tbody>
<tr>
<td><strong>Multiply</strong> factors to form a product:</td>
<td><strong>Expand</strong> an expression to form a product:</td>
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<tr>
<td>$(2)(7) = 28$</td>
<td>$3(2 - 5a) = 6 - 15a$</td>
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<tr>
<td><strong>Factor</strong> a number by writing it as a product of factors:</td>
<td><strong>Factor</strong> a polynomial by writing it as a product of factors:</td>
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<tr>
<td>$28 = (2)(7)$</td>
<td>$6 - 15a = 3(2 - 5a)$</td>
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</table>

*Factoring and expanding are inverse processes (opposite operations) just like multiplying and dividing are inverse processes.

Example #1: Factor the following binomials. Use the distributive property to check your answer.

a) \[ \frac{6n + 9}{3} \quad \text{GCF} = 3 \]
   \[ = \frac{3(2n + 3)}{3} \]
   \[ = 3(2n + 3) \]

b) \[ \frac{8c + 4c^2}{4c} \quad \text{GCF} = 4c \]
   \[ = \frac{4c(2 + c)}{4c} \]
   \[ = 4c(2 + c) \]

Example #2: Factor the following trinomial. Use the distributive property to check your answer.

\[ 6 - 12k + 18k^2 \quad \text{GCF} = 6 \]
\[ = 6(1 - 2k + 3k^2) \]

Example #3: Factor the following polynomial. Use the distributive property to check your answer.

\[ \frac{-12x^3y - 20xy^2 + 16x^2y^2}{-4xy} \quad \text{GCF} = -4xy \]
\[ = -4xy (3x^2 + 5y - 4xy) \]