Lesson 5.2: Common Factors of Polynomials

Practice – II

1. Determine the GCF of $41nr^3$ and $17n^3r$.

   $41nr^3 = 41 \cdot n \cdot r \cdot r \cdot r$

   $17n^3r = 17 \cdot n \cdot n \cdot n \cdot r$

   $n \cdot r = nr$

   The GCF is nr.

2. Explain how to determine the GCF of x^{33}, x^{47}, and x^{25}, by inspection.

   When looking at powers with the same base, the GCF is always equal to the power with the smallest exponent. In this case, the GCF is x^{25}.

3. Write each of $28x^2$ and $42xy^2$ as a product of their GCF and another monomial factor.

   The GCF is $14x$.

   $\frac{28x^2}{14x} = 2x$ $\qquad$ $\frac{42xy^2}{14x} = 3y^2$

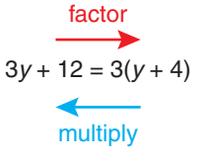
   $28x^2 = (14x)(2x)$ $\qquad$ $42xy^2 = (14x)(3y^2)$

4. Write a trinomial with a GCF of $9rs^2$.

   Examples will vary. A sample is shown.

   $(9rs^2)(2r) + (9rs^2)(4s) + (9rs^2)(rs) = 18r^2s^2 + 36rs^3 + 9r^2s^3$

5. This diagram shows that factoring and multiplying are opposite processes. Explain what that means.

   When an expression is factored, the factors can be multiplied to return to the original expression. When two factors are multiplied, the product can be factored to return to the original factors.

6. Factor each of the following polynomials using the greatest common factor.

   a. $4x^2 + 10xy - 18y^2$

   The GCF is 2.

   $\frac{4x^2}{2} = 2x^2 \qquad \frac{10xy}{2} = 5xy \qquad \frac{-18y^2}{2} = -9y^2$

   $4x^2 + 10xy - 18y^2 = 2(2x^2 + 5xy - 9y^2)$

   b. $-12a^3b^2c^2 - 18a^2b^2c^2 - 36a^2b^3c$

   The GCF is $6a^2b^2c$.

   $\frac{-12a^3b^2c^2}{6a^2b^2c} = -2ac \qquad \frac{-18a^2b^2c^2}{6a^2b^2c} = -3c \qquad \frac{-36a^2b^3c}{6a^2b^2c} = -6b$

   $-12a^3b^2c^2 - 18a^2b^2c^2 - 36a^2b^3c = 6a^2b^2c(-2ac - 3c - 6b)$

   Alternatively, $-12a^3b^2c^2 - 18a^2b^2c^2 - 36a^2b^3c = -6a^2b^2c(2ac + 3c + 6b)$.

7. The surface area formulas are shown for three objects.

Right Prism	$SA = 2lw + 2hw + 2lh$
Right Cylinder	$SA = 2\pi r^2 + 2\pi rh$
Right Cone	$SA = \pi r^2 + \pi rs$

   Write an alternative surface area formula for each object by factoring using the greatest common factor.

   $2lw + 2hw + 2lh = 2(lw + hw + lh)$

   $2\pi r^2 + 2\pi rh = 2\pi r(r + h)$

   $\pi r^2 + \pi rs = \pi r(r + s)$

8. Chaz factored $4x^2 + 12x - xy - 3y$ as follows.

$$\begin{aligned} 4x^2 + 12x - xy - 3y &= (4x^2 + 12x) + (-xy - 3y) \\ &= (4x)(x + 3) + (-y)(x + 3) \\ &= (x + 3)(4x - y) \end{aligned}$$

Explain Chaz's strategy.

Explanations will vary. A sample is shown.

Chaz began by splitting the polynomial into two separate groups. He then determined the GCF of each group using the distributive property in reverse. A factor of $x + 3$ was common to each group, leaving $4x - y$.

Please complete *Lesson 5.2 Explore Your Understanding Assignment* located in *Workbook 5.2* before proceeding to *Lesson 5.3*.