Practice – V

1. Factor each of the following expressions.

   a. $7x^2 + 21x + 14$

   $7x^2 + 21x + 14 = 7(x^2 + 3x + 2)$

   $b = 3$ and $c = 2$

   The integers 2 and 1 have a sum of 3 and a product of 2.

   $7(x^2 + 3x + 2) = 7(x + 2)(x + 1)$

   b. $6r^2 + 12rs + 6s^2$

   $6r^2 + 12rs + 6s^2 = 6(r^2 + 2rs + s^2)$

   $b = 2$ and $c = 1$

   The integers 1 and 1 have a sum of 2 and a product of 1.

   $6(r^2 + 2rs + s^2) = 6(r + s)(r + s)$

   c. $4x^2 - 4xy - 8y^2$

   $4x^2 - 4xy - 8y^2 = 4(x^2 - xy - 2y^2)$

   $b = -1$ and $c = -2$

   The integers –2 and 1 have a sum of –1 and a product of –2.

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

d. $-6x^2 + 10xy + 4y^2$

$-6x^2 + 10xy + 4y^2 = 2(-3x^2 + 5xy + 2y^2)$

$ac = -6$ and $b = 5$

The integers 6 and –1 have a product of –6 and a sum of 5.

$$\begin{aligned} 2(-3x^2 + 5xy + 2y^2) &= 2(-3x^2 + (6-1)xy + 2y^2) \\ &= 2(-3x^2 + 6xy - xy + 2y^2) \\ &= 2((-3x^2 + 6xy) + (-xy + 2y^2)) \\ &= 2(3x(-x + 2y) + y(-x + 2y)) \\ &= 2(-x + 2y)(3x + y) \end{aligned}$$

OR

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

2. Using an example, explain why factoring a GCF out of a trinomial can make factoring the trinomial easier.

Examples will vary. A sample is shown.

To factor the trinomial $12x^2 - 84x + 120$ without first removing a GCF, you would need to determine two integers that have a product of $12 \times 120 = 1440$ and a sum of -84. These are large numbers, and determining the integers could take a long time.

By factoring out the GCF of 12, you have smaller numbers to work with.

$12x^2 - 84x + 120 = 12(x^2 - 7x + 10)$

Now, you only need to determine integers that add to –7 and multiply to 10. This is a much easier task.

Please complete *Lesson 5.3 Explore Your Understanding Assignment* located in *Workbook 5.3* before proceeding to *Lesson 5.4*.