Just In Time Quick Check
Standard of Learning (SOL) AII.1c

Strand: Expressions and Operations

Standard of Learning (SOL) AII.1c *The student will factor polynomials completely in one or two variables.*

Grade Level Skills:
- Factor polynomials in one or two variables with no more than four terms completely over the set of integers. Factors of the polynomial should be constant, linear, or quadratic.
- Verify polynomial identities including the difference of squares, sum and difference of cubes, and perfect square trinomials.

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Just in Time Quick Check Teacher Notes

Supporting Resources:
- VDOE Mathematics Instructional Plans (MIPS)
  - AII.1c - Factoring (Word) / PDF Version
- VDOE Word Wall Cards: Algebra II (Word) | (PDF)
  - Factors of a Monomial
  - Factoring (greatest common factor)
  - Factoring (perfect square trinomials)
  - Factoring (difference of squares)
  - Difference of Squares (model)
  - Factoring (sum and difference of cubes)
  - Factor by Grouping
  - Prime Polynomial

Supporting and Prerequisite SOL: A.2a, A.2b, A.2c, 8.14b

SOL AII.1c - Just in Time Quick Check

1. Factor the expression completely. Show your work/thinking.

$$36x^2 - 6xy - 20y^2$$

2. Factor the expression completely. Show your work/thinking.

$$8x^6 - 125y^3$$

3. What is the complete factorization of $x^4 - 12x^2 + 32$? Show your work/thinking.

4. Factor the expression completely. Show your work/thinking.
$$-11x^2 + 24xy - 4y^2$$

5. Student A factored the expression $8x^2 - 30x + 7$. Their work is shown below. Is their answer correct? If yes, state it is correct. If not, find the error and factor correctly.

<div align="center">

Student A

$8x^2 - 30x + 7$

$(8x^2 - 2x)(-28x - 7)$

$2x(4x - 1) + 7(4x - 1)$

$(4x - 1)(2x + 7)$

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1. Factor the expression completely. Show your work/thinking.

$$36x^2 - 6xy - 20y^2$$

A common error is students may not factor out the greatest common factor (GCF). This may indicate the student does not understand how to find the GCF. The teacher should make sure the student understands what factor "completely" means and revisit finding the GCF. It might be beneficial to have students find numerical and variable GCF's of binomial expressions to solidify their understanding of finding the greatest common factor. Students may benefit from creating a graphic organizer outlining the process of factoring so they remember to check for a GCF. Students should be encouraged to check the resulting binomial factors for additional common factors.

2. Factor the expression completely. Show your work/thinking.

$$8x^6 - 125y^3$$

A common error when factoring the difference of two perfect cubes $a^3 - b^3 = (a-b)(a^2 + ab + b^2)$ is that students may not completely square the a or b term resulting in $(2x^2 - 5y)(4x^2 + 10x^2y + 25y)$. This may indicate that the student squares the coefficient but neglects to square the variable portion of a and b. The teacher may want to spend time reviewing laws of exponents. Another strategy is to have students multiply their factors to verify the product is equivalent to the original expression given.

3. What is the complete factorization of $x^4 - 12x^2 + 32$? Show your work/thinking.

A common error students may make is to only factor this expression into the product of two binomials. This may indicate students do not recognize that after obtaining $(x^2 - 8)(x^2 - 4)$ the binomial expression $x^2 - 4$ can be factored further. Students may benefit from creating a graphic organizer outlining the process of factoring to reference as they verify they have factored completely. Teachers may want to provide students with questions where they have to select all factors to help students understand that expressions can have more than two factors.

4. Factor the expression completely. Show your work/thinking.

$$-11x^2 + 24xy - 4y^2$$

A common error students may make is to express their answers without the y variable. This may indicate the student does not understand how to factor expressions with two variables. Highlighting the variables may help students keep track of the variables throughout their work. Teachers may encourage students to multiply their factors to verify their expression is equivalent to the initial problem.

5. Student A factored the expression $8x^2 - 30x + 7$. Their work is shown below. Is their answer correct? If yes, state it is correct. If not, find the error and factor correctly.

<div align="center">

Student A

$$8x^2 - 30x + 7$$
$$(8x^2 - 2x)(-28x - 7)$$
$$2x(4x - 1) + 7(4x - 1)$$
$$(4x - 1)(2x + 7)$$

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A common error students may make it to state the answer is correct. This may indicate the student does not recognize that the GCF of the second binomial has to be negative. Circling the negatives with any leading coefficient may help students identify the GCF should be negative. Teachers may want to encourage students to multiply their factors to verify the expression is equivalent to the initial problem.