Just In Time Quick Check
Standard of Learning (SOL) 7.11

Strand: Patterns, Functions and Algebra

Standard of Learning (SOL) 7.11 *The student will evaluate algebraic expressions for given replacement values of the variables.*

Grade Level Skills:
- Represent algebraic expressions using concrete materials and pictorial representations. Concrete materials may include colored chips or algebra tiles.
- Use the order of operations and apply the properties of real numbers to evaluate expressions for given replacement values of the variables. Exponents are limited to 1, 2, 3, or 4 and bases are limited to positive integers. Expressions should not include braces { } but may include brackets [ ] and absolute value | |. Square roots are limited to perfect squares. Limit the number of replacements to no more than three per expression.

Just in Time Quick Check

Just in Time Quick Check Teacher Notes

Supporting Resources:
- VDOE Mathematics Instructional Plans (MIPS)
    - 7.11 - Evaluating Algebraic Expressions (Word) / PDF Version
- VDOE Co-Teaching Mathematics Instruction Plans (MIPS)
    - 7.11 - Evaluating Expressions (Word) / PDF Version
- VDOE Algebra Readiness Formative Assessments
    - SOL 7.11 (Word) / PDF
- VDOE Algebra Readiness Remediation Plans
    - Evaluating Algebraic Expressions (Word) / PDF
    - Evaluating Expressions (Word) / PDF
- VDOE Word Wall Cards: Grade 7 (Word) | (PDF)
    - Order of Operations

Supporting and Prerequisite SOL: 7.1d, 7.1e, 6.5a, 6.6a, 6.6c, 5.5a, 5.6a, 5.6b, 5.7, 5.19a, 5.19c

SOL 7.11 - Just in Time Quick Check

Use the key below to answer question 1.

Key: □ = 1   ■ = −1   ▭ = x ▬ = $-x$

1. Draw a model to represent the expressions.

    a. $2x + 3$

    b. $x - 5$

2. Evaluate the expression.

    $x^3 + 4w - z$ for $x = 3$, $w = 2$ and $z = 5$

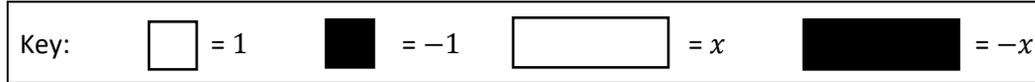3. If $p = 2$, what is the value of the expression $|4p - 10| + 3p$?

4. Evaluate the expression $bc + \sqrt{4a}$ when $a = 4$, $b = -2$ and $c = 9$.

5. Evaluate the expression $\frac{1}{2}(2x - y)$ when $x = 4$ and $y = -2$.

SOL 7.11 - Just in Time Quick Check Teacher Notes
Common Errors/Misconceptions and their Possible Indications

Use the key below to answer question 1.

Key: ☐ = 1   ■ = −1   ☐ = x   ■ = −x

1. Draw a model for the expressions.

   a. $2x + 3$

   A common misconception is that some students may incorrectly represent two x as two positive square tiles and one x-tile along with three positive square tiles. Another misconception is that some students may model two x as two positive square tiles along with three positive square tiles. In either scenario, a student may need more experiences modeling single term expressions or numbers before modeling expressions with multiple terms.

   b. $x + (-5)$

   A student may incorrectly model the expression using only positive tiles, ignoring the negative five. The student may need more experiences modeling positive and negative values. In both of the examples, a student may need opportunities to identify the terms in the expression and model each one separately.

2. Evaluate the expression.

   $x^3 + 4w - z$ for $x = 3$, $w = 2$ and $z = 5$

   A student incorrectly calculated 3^3 as 9 resulting in a value of 12 for the expression. This may indicate that a student believes the base and exponent should be multiplied. A student may benefit from additional opportunities to practice simplifying exponents. (See SOL 6.4) Refer to the Grade 6 Curriculum Framework for examples.

3. *If $p = 2$, what is the value of the expression $|4p - 10| + 3p$?*

   A student may incorrectly take the absolute value of 4p and -10 separately and then subtract the results. This may indicate that a student believes that the absolute value of each term of the expression should occur before the difference of 4p – 10. A student may need to review grouping symbols and additional practice simplifying operations within absolute value bars. Refer to the Grade 6 Curriculum Framework for examples.

   Another common misconception is a student may simplify 4p – 10 + 3p before finding the absolute value of 4p – 10 resulting in a value of four. A student may benefit from translating the symbolic form to a verbal expression, such as find the absolute value of 4p – 10, then add three times p. A student may benefit from reviewing grouping symbols and applying the order of operations to expressions contained in the grouping symbols.

4. Evaluate the expression $bc + \sqrt{4a}$ when $a = 4$, $b = -2$ and $c = 9$.

   Students may substitute the incorrect value for the variable when there are multiple variables in the algebraic expression, especially when the variables in the expression are not in alpha order but the replacement values are. For example, if a student substitutes the values as they appear, the expression would be $4(-2) + \sqrt{4(4)}$

5. Evaluate the expression $\frac{1}{2}(2x - y)$ when $x = 4$ and $y = -2$.