

Just In Time Quick Check
Standard of Learning (SOL) A.2a

Strand: Expressions and Operations

Standard of Learning (SOL) A.2a

The student will perform operations on polynomials, including applying the laws of exponents to perform operations on expressions.

Grade Level Skills:

- Simplify monomial expressions and ratios of monomial expressions in which the exponents are integers, using the laws of exponents.

Just in Time Quick Check

Just in Time Quick Check Teacher Notes

Supporting Resources:

- VDOE Mathematics Instructional Plans (MIPS)
 - [A.2a - Laws of Exponents](#) (Word) / [PDF Version](#)
 - [A.2a - Operations with Expressions Written in Scientific Notation](#) (Word) / [PDF Version](#)
- VDOE Co-Teaching Mathematics Instruction Plans (MIPS)
 - [A.2a - Laws of Exponents](#) (Word) / [PDF Version](#)
- VDOE Algebra Readiness Formative Assessments
 - [A.2 a,b,c](#) (Word) / [PDF](#)
- VDOE Word Wall Cards: Algebra I ([Word](#)) | ([PDF](#))
 - Exponential Form
 - Negative Exponent
 - Zero Exponent
 - Product of Powers Property
 - Power of a Power Property
 - Power of a Product Property
 - Quotient of Powers Property
 - Power of a Quotient Property
- Desmos Activity
 - [Exploring Zero and Negative Exponents](#)

Supporting and Prerequisite SOL: [7.1a](#)

SOL A.2a - Just in Time Quick Check

1. Simplify the following expression. Write your answers using only positive exponents. Show your work/thinking.

$$\left(\frac{(12x^{-2})^2}{6x^4y^{-3}} \right)$$

2. Simplify the following expression. Write your answers using only positive exponents. Show your work/thinking.

$$(2x^3)^2(3x)^4$$

3. Student A was asked to simplify the following expression:

$$\left(\frac{30x^5y^2}{6xy^3} \right)^2$$

Student A obtained the following result:

$$\frac{30^2x^8y^2}{6^2}$$

Determine if the two expressions are equivalent. Justify your thinking.

SOL A.2a - Just in Time Quick Check Teacher Notes

Common Errors/Misconceptions and their Possible Indications

1. Simplify the following expression. Write your answers using only positive exponents. Show your work/thinking.

$$\left(\frac{(12x^{-2})^2}{6x^4y^{-3}}\right)$$

A common misconception that students may have is to simplify the integer coefficient before applying the power rule. This may indicate the student does not understand the order of applying the laws of exponents when raising a power and fraction bars are included. The teacher may want to make sure students understand the fraction bar serves as a grouping symbol and the numerator must be simplified separately from the denominator. It may help to have students highlight or color the fraction bar.

2. Simplify the following expression. Write your answers using only positive exponents. Show your work/thinking.

$$(2x^3)^2(3x)^4$$

A common misconception is that after students apply the power rule they may multiply the exponents instead of adding them. This indicates that students may not conceptually understand the difference between “raising to a power” and the product rule. The teacher may want to model simpler problems in expanded form to help students develop an understanding of exponents and why the product rule works. (Example: $(x^4)(x^2) = x \cdot x \cdot x \cdot x \cdot x \cdot x$).

3. Student A was asked to simplify the following expression:

$$\left(\frac{30x^5y^2}{6xy^3}\right)^2$$

Student A obtained the following result:

$$\frac{30^2x^8y^2}{6^2}$$

Determine if the two expressions are equivalent. Justify your thinking.

A common mistake that occurs in division of exponent is students will incorrectly apply the Quotient of Powers Property. They may subtract correctly, but then place the result in the wrong place. For example, they may apply the power rule and get

$$\frac{30^2x^{10}y^4}{6^2x^2y^6}$$

But then simplify and get

$$\frac{30^2x^8y^2}{6^2}$$

If this occurs, the teacher may need to model the Quotient of Powers Property using the expanded form so that students see why their answer is incorrect.