

**Just In Time Quick Check**  
**Standard of Learning (SOL) A.4c**

**Strand:** Equations and Inequalities

**Standard of Learning (SOL) A.4c**

*The student will solve literal equations for a specified variable.*

**Grade Level Skills:**

- Solve a literal equation for a specified variable.

**[Just in Time Quick Check](#)**

**[Just in Time Quick Check Teacher Notes](#)**

**Supporting Resources:**

- VDOE Mathematics Instructional Plans (MIPS)
  - [A.4c - Literal Equations and Formulas](#) (Word) / [PDF Version](#)
- VDOE Algebra Readiness Formative Assessments
  - [A.4c](#) (Word) / [PDF](#)
- VDOE Word Wall Cards: Algebra I ([Word](#)) | ([PDF](#))
  - Literal Equation
- Desmos Activity
  - [Solving Literal Equations](#)

**Supporting and Prerequisite SOL:** [A.4a](#), [8.14b](#), [8.17](#), [7.12](#)

### SOL A.4c - Just in Time Quick Check

- 1) Solve the equation for  $x$ . Show your work/thinking.

$$Ax + By = C$$

- 2) Solve the equation for  $b$ . Show your work/thinking.

$$y - b = mx$$

- 3) Solve the equation for  $V$ . Show your work/thinking.

$$D = \frac{M}{V}$$

- 4)  $P = C + Cr$  is a formula which can be used to find the retail price of an item ( $P$ ) in which  $C$  represents the buyer's cost of the item and  $r$  represents the rate of markup. Using algebraic properties, solve the formula for cost ( $C$ ).

## SOL A.4c - Just in Time Quick Check Teacher Notes

### Common Errors/Misconceptions and their Possible Indications

- 1) Solve the equation for  $x$ . Show your work/thinking.

$$Ax + By = C$$

*When solving for  $x$ , students may use inverse operations without applying them to all terms in the equation (ex. not dividing every term by  $A$  resulting in the solution  $x = \frac{C}{A} - By$ ). This may indicate that students do not have a complete understanding of using inverse operations appropriately to create equivalent equations. Teachers may find it beneficial to help students see how the equation was built around  $x$  (multiply by  $A$  then add  $By$  to equal  $C$ ) in order to determine how to isolate  $x$  by taking the inverse operations in the reverse order (often called a “Do - Undo” chart). An organizational strategy teachers may want to encourage students to use is to circle or highlight the variable they are solving for first to bring attention to the location of the variable.*

- 2) Solve the equation for  $b$ . Show your work/thinking.

$$y - b = mx$$

*When solving for  $b$ , a common error students make is not considering  $b$  to have a negative coefficient. Students may either write  $b = mx + y$  (adding  $y$  to both sides to “undo” the subtraction they see) or they may write  $b = mx - y$ . This may indicate that students do not understand that the subtraction sign applies to  $b$ , leaving  $b$  with a coefficient of  $-1$  once  $y$  has been subtracted from both sides. A strategy teachers can recommend to students is to multiply both sides of the equation by  $-1$  first in order to make the variable they are solving for positive or they can add  $b$  to both sides first for the same reason.*

- 3) Solve the equation for  $V$ . Show your work/thinking.

$$D = \frac{M}{V}$$

*A common error students make is solving for the specified variable without regard to its position within the fraction, which often leads them to write the reciprocal of the solution. In the given example, students may write the solution as  $V = \frac{D}{M}$  rather than  $V = \frac{M}{D}$ . This may indicate that students do not understand what steps must be taken to remove a variable from a denominator. It may be beneficial for teachers to ask students to solve similar equations side-by-side and compare/contrast them to help students recognize how to use inverse operations correctly. For example, solving for  $z$  in each of the equations  $x = \frac{y}{z}$  and  $x = yz$  may help students recognize that the resulting equations should not be the same even if they use the same first step (dividing both sides by  $y$ ).*

- 4)  $P = C + Cr$  is a formula which can be used to find the retail price of an item ( $P$ ) in which  $C$  represents the buyer’s cost of the item and  $r$  represents the rate of markup. Using algebraic properties, solve the formula for cost ( $C$ ).

A common error students make is not using the GCF when solving this equation for  $C$ . Some students will divide both sides by  $r$ , add the remaining terms to yield  $2C$ , and after dividing by 2, end up with the result  $C = \frac{P}{2r}$ . This may indicate that students do not understand that when the variable they are solving for is in multiple terms, they must use the GCF in order to rewrite the equation. Teachers may want to review the distributive property with students to assist them in identifying the first step they need to take. In the distributive property example  $a(b + c) = ab + ac$ , teachers can draw students' attention to the fact that they see the  $a$  in two terms on the right side of the equation, but only once on the left side. Asking students to rewrite expressions that have common factors by using the distributive property may be a good first step for teachers to take before asking them to solve equations with the needed variable in multiple terms. If students are familiar with area models for the distributive property, that may be another way to help them visualize how to rewrite an expression with the GCF factored out.

$$C \begin{array}{|c|c|} \hline \mathbf{1} & \mathbf{+} & \mathbf{r} \\ \hline C & & Cr \\ \hline \end{array}$$