Just In Time Quick Check

Standard of Learning (SOL) A.4e

Strand: Equations and Inequalities

Standard of Learning (SOL) A.4e

The student will solve practical problems involving equations and systems of equations.

Grade Level Skills:

- Write a system of two linear equations that models a practical situation.
- Interpret and determine the reasonableness of the algebraic or graphical solution of a system of two linear equations that models a practical situation.
- Solve practical problems involving equations and systems of equations.

Just in Time Quick Check

Just in Time Quick Check Teacher Notes

Supporting Resources:

- VDOE Mathematics Instructional Plans (MIPS)
  - A.4ae - Progressing Through Equations (Word) / PDF Version
  - A.4be - Solving Quadratic Equations by Factoring (Word) / PDF Version
  - A.4be - Solving Quadratic Equations Using Square Roots and the Quadratic Formula (Word) / PDF Version
  - A.4de - Road Trip: Applying Systems of Linear Equations (Word) / PDF Version
  - A.4de - Spring Fling Carnival: Applying Systems of Linear Equations (Word) / PDF Version
- VDOE Algebra Readiness Formative Assessments
  - A.4d,e (Word) / PDF
- VDOE Word Wall Cards: Algebra I (Word) | (PDF)
  - Dependent and Independent Variable
  - Dependent and Independent Variable (application)
- VDOE Rich Mathematical Tasks: Radical Rocks Task
  - A.4ae Radical Rocks Task Template (Word) / PDF Version
- VDOE Rich Mathematical Tasks: Full Parking Lot Task
  - A.4 Full Parking Lot Task Template (Word) / PDF Version
- Desmos Activities
  - Playing Catch-up
  - Racing Cars
  - Solutions to Systems of Linear Equations
  - Wafers and Crème

Supporting and Prerequisite SOL: A.1a, A.4a, A.4d, 8.16c, 8.17, 7.12

SOL A.4e - Just in Time Quick Check

1) Pam bought 20 pieces of fruit for her class.
   - Each piece of fruit was either an apple or an orange.
   - She spent $1.25 on each apple.
   - She spent $0.95 on each orange.
   - Pam spent a total of $22.60.

   Write a system of equations that can be used to find the number of apples Pam bought. Make sure to define your variables.

2) A high school drama department sold 238 tickets for their performance.
   - An adult ticket cost $6.75.
   - A student ticket cost $3.50.
   - The high school drama department collected $1,252.25 in ticket sales.

   How many student tickets were sold? Show your work/thinking.

3) Chris threw a ball into the air vertically. The height of the ball above the ground can be modeled by the equation $h(t) = -16t^2 + 30t + 4$, where *h* is the height in feet and *t* is the time in seconds. When will the ball hit the ground? Show your work/thinking.

4) Suzi's brother has ten more than twice as many sports cards as Suzi does. Together, they have 70 sports cards. How many sports cards does Suzi have? Show your work/thinking.

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

Common Errors/Misconceptions and their Possible Indications

1) Pam bought 20 pieces of fruit for her class.
   - Each piece of fruit was either an apple or an orange.
   - She spent $1.25 on each apple.
   - She spent $0.95 on each orange.
   - Pam spent a total of $22.60.

   Write a system of equations that can be used to find the number of apples Pam bought. Make sure to define your variables.

   A common mistake students may make on this problem is setting up the system of equations incorrectly. Students may set up one side of the equation correctly (x + y and 1.25x + 0.95y) but place the wrong total with each equation. This may indicate that students are following a procedure rather than reading for understanding (ex. students read the problem, identify the totals, and write two equations). Teachers may consider encouraging students to use a problem-solving strategy such as the three-reads protocol or the teacher may want to model a think-aloud strategy to help students learn how to read a situation and understand the context of the problem. Included in the problem-solving strategy or think-aloud modeling is labeling units for all variables and values (ex: x apples + y oranges = 20 pieces of fruit NOT 22.60 dollars).

2) A high school drama department sold 238 tickets for their performance.
   - An adult ticket cost $6.75.
   - A student ticket cost $3.50.
   - The high school drama department collected $1,252.25 in ticket sales.

   How many student tickets were sold? Show your work/thinking.

   A common mistake students may make on this problem is to assign x and y to represent the number of adult and student tickets in their equations, but they answer with the wrong variable (i.e. the question asks for the number of student tickets sold, but students answer with the number of adult tickets sold). This may indicate that students have not carefully defined their variables. Teachers may consider encouraging students to write out their variable definitions (e.g. x = number of student tickets, y = number of adult tickets) and/or label their x- and y-axes if solving by graphing.

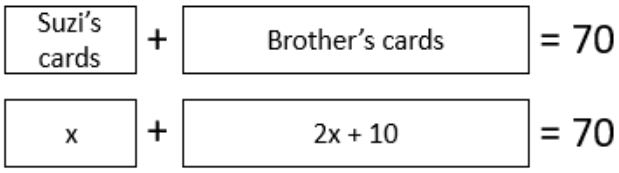
3) Chris threw a ball into the air vertically. The height of the ball above the ground can be modeled by the equation $h(t) = -16t^2 + 30t + 4$, where *h* is the height in feet and *t* is the time in seconds. When will the ball hit the ground? Show your work/thinking.

   Students may make the mistake of substituting zero for t instead of for h(t). This may indicate a lack of understanding of the definitions of the variables in the equation. Teachers may encourage students to use a three-reads protocol to ensure they have an understanding of the situation, equation, and variable definitions. Teachers may also engage students in experiments in which students collect data that can be modeled with parabolic equations. Using Desmos to create these models will allow students to visualize the path of the object and may lead to greater understanding of what the variables and critical points on the graph represent in the context of the problem (e.g. maximum/minimum, x-intercepts, y-intercept).

4) Suzi's brother has ten more than twice as many sports cards as Suzi does. Together, they have 70 sports cards. How many sports cards does Suzi have? Show your work/thinking.

A common mistake students make when writing the equation for this situation is to leave out the variable expression that represents Suzi's cards (i.e. they write the equation 2x + 10 = 70 rather than x + 2x + 10 = 70). This may indicate that students do not have a complete understanding of the problem. Teachers may want to consider encouraging students to draw a visual representation of the problem. Two examples are shown.

Example 1:



Example 2: