

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

**Strand: Equations and Inequalities**

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

*The student will solve quadratic equations in one variable algebraically.*

**Grade Level Skills:**

- Apply the properties of real numbers and properties of equality to simplify expressions and solve equations.
- Solve quadratic equations in one variable algebraically. Solutions may be rational or irrational.

**Just in Time Quick Check**

**Just in Time Quick Check Teacher Notes**

**Supporting Resources:**

- VDOE Mathematics Instructional Plans (MIPS)
  - [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](#)
- VDOE Algebra Readiness Formative Assessments
  - [A.4b](#) (Word) / [PDF](#)
- VDOE Word Wall Cards: Algebra I [\(Word\)](#) | [\(PDF\)](#)
  - Zero Product Property
  - Solutions or Roots
  - Zeros
  - x-Intercepts
  - Quadratic Equation (solve by factoring)
  - Quadratic Equation (solve by graphing)
  - Quadratic Equation (number of real solutions)
- Desmos Activity
  - [Visual of Quadratic Formula](#)

**Supporting and Prerequisite SOL:** [A.2b](#), [A.2c](#), [A.3a](#), [A.4a](#), [8.3a](#), [8.3b](#), [8.9b](#), [7.1d](#)

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

- 1) Emile and Andrea solved the given quadratic equation in different ways and got different answers. Determine which student made an error. Explain the mistake and how to correct it.

Emile:

$$8x^2 = 72$$

$$x^2 = 9$$

$$\sqrt{x^2} = \sqrt{9}$$

$$x = 3$$

Andrea:

$$8x^2 = 72$$

$$8x^2 - 72 = 0$$

$$8(x^2 - 9) = 0$$

$$8(x - 3)(x + 3) = 0$$

$$x = 3, \quad x = -3$$

- 2) What are the solutions to the equation shown? Show your work/thinking.

$$2x^2 - 3x = 4$$

- 3) Solve the equation. Show your work/thinking and write the solutions in set notation.

$$3x^2 - 8x + 5 = 0$$

- 4) What values of  $x$  are solutions to the equation? Show your work/thinking.

$$\frac{1}{2}x^2 - \frac{1}{4}x - 2 = 0$$

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

### Common Errors/Misconceptions and their Possible Indications

- 1) Emile and Andrea solved the given quadratic equation in different ways and got different answers. Determine which student made an error. Explain the mistake and how to correct it.

Emile:

$$8x^2 = 72$$

$$x^2 = 9$$

$$\sqrt{x^2} = \sqrt{9}$$

$$x = 3$$

Andrea:

$$8x^2 = 72$$

$$8x^2 - 72 = 0$$

$$8(x^2 - 9) = 0$$

$$8(x - 3)(x + 3) = 0$$

$$x = 3, \quad x = -3$$

*A common mistake students may make is to only provide the positive square root as the solution (e.g.  $x = 3$  rather than  $x = 3, x = -3$ ), thus identifying Emile's answer as correct. This could indicate that students do not have a well-developed understanding of positive numbers having two square roots. Teachers may want to ask follow-up questions such as "Is three the only number that when squared results in 9?" and "What is the sign of the product of two negative numbers?"*

- 2) What are the solutions to the equation shown? Show your work/thinking.

$$2x^2 - 3x = 4$$

*A common mistake students make is to substitute values into the quadratic formula without having set the equation equal to zero first (e.g.  $c = 4$  rather than  $c = -4$ ). This may indicate that students have not connected the solutions to the zeros of an equation. Reinforcing that vocabulary could help students realize that in order to find the zeros (solutions), the equation must be set equal to zero first. It might be helpful for a teacher to have students use Desmos to visually represent the function and make connections between the graph and the solutions to the quadratic.*

- 3) Solve the equation. Show your work/thinking and write the solutions in set notation.

$$3x^2 - 8x + 5 = 0$$

*A common mistake students may make when solving a quadratic equation by factoring is not setting each factor equal to zero. This might indicate that students think the solutions are equal to the constant term within each binomial factor,  $(3x - 5)(x - 1)$ , resulting in solutions of  $x = -5$  and  $x = -1$ . Reviewing the Zero Product Property may help students recall that at least one of the two factors must equal zero in order for the product to be zero. If they substitute the solutions they calculated into the factors, they can verify that neither solution will produce a factor of 0. Verifying their solutions with a graph of the related function on Desmos may also help students recognize their errors. [If students solve this equation using the quadratic formula, teachers may wish to ask students a follow-up question to see if they can identify another way to solve the equation algebraically and how they know it will work.]*

- 4) What values of  $x$  are solutions to the equation? Show your work/thinking.

$$\frac{1}{2}x^2 - \frac{1}{4}x - 2 = 0$$

*Students may make errors substituting rational values for  $a$ ,  $b$ , and  $c$  when using the quadratic equation. This may indicate that students lack proficiency with operations with rational numbers. A strategy teachers can use is to encourage students to write an equivalent equation by multiplying all of the terms of the equation by a scalar value that will produce integer coefficients before using the quadratic formula. Care must be taken to multiply each term of the equation by the selected scalar in order to create an equivalent equation. Verifying solutions with a graphing utility could also help students identify when a mistake has been made and allow them the opportunity to review their work to find the error.*