**A3 Unit Exam – Solving Quadratic Equations and Simple Radical Equations**

Topics Covered

* Solve quadratic equations using the zero product property
* Solve quadratic equations by factoring
* Solve quadratic equations using the quadratic formula
* Solve quadratic equations by completing the square
* Solve quadratic equations graphically
* Solve simple radical equations (square root)

Standards

A.REI.2: Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

* Low Emphasis
* Ex. What is the solution to the equation  ?

A.REI.4a: Use the method of completing the square to transform any quadratic equation in *x* into an equation of the form (x – p)2 = q that has the same solutions. Derive the quadratic formula from this form.

* High Emphasis
* Ex. Which of these quadratic equations can easily be solved by completing the square?
* Ex. Derive the quadratic formula by completing the square for .

A.REI.4b: Solve quadratic equations by inspection (e.g., for x2 = 49), taking square roots, completing the square, using the quadratic formula, and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as *a* ± *bi* for real numbers *a* and *b*.

* High Emphasis
* Ex. Solve the following quadratic equation (by factoring, completing the square, using square roots, using the quadratic formula).

A.REI.7: Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line and the circle .

* Medium Emphasis
* Ex. What are the solutions for the system of  and ?

A.APR.3: Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.

* High Emphasis
* Ex. Which equation can be used to find the zeroes of ?
* Ex. What are the zeroes of the function defined by the equation?
* Ex. What are the zeroes of the function shown in the graph?

A.SSE.3: Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

* Low Emphasis
* Ex. What is the meaning of the zeroes of a quadratic function?
* Ex. Select two equations with equivalent zeros.
* Ex. At what point(s) does the graph of the quadratic function cross the *x*-axis?

**Answer Key**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **#** | **Correct** |  | **#** | **Correct** |  | **#** | **Correct** |  | **#** | **Correct** |  | **#** | **Correct** |  | **#** | **Correct** |
| 1 | 190 |  | 4 | D |  | 7 | C |  | 10 | A |  | 13 | ½  |  | 16 | 50 |
| 2 | A |  | 5 | 9 |  | 8 | D |  | 11 | D |  | 14 | C |  | 17 | A |
| 3 | B |  | 6 | C |  | 9 | 9 |  | 12 | A |  | 15 | A |  | 18 | B |

19. Rubric

 2-Points Examinee finds both solutions AND .

 1-Point Examinee finds one solution, eitherOR .

 0-Point Examinee does not attempt item or the response is completely irrelevant or completely incorrect.

20. Rubric

 2-Points Examinee finds the correct solution, , AND 

 1-Point Examinee finds the correct value OR the correctvalue.

 0-Point Examinee does not attempt item or the response is completely irrelevant or completely incorrect.

EXTRA CREDIT

21. C

22. D

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**A3 Unit Exam – Solving Quadratic Equations and Simple Radical Equations**

|  |  |
| --- | --- |
| 1. Solve for :  |  |

2. Consider this equation.

 

 What is the value of *x*?

 A. 5

 B. 3

 C. −5

 D. −3

3. Which equation can be used to find the solutions of ?

 A. 

 B. 

 C. 

 D. 

4. Which quadratic equation will have solutions  and ?

 A. 

 B. 

 C. 

 D. 

|  |  |
| --- | --- |
| 5. Consider the equation . For , what is the value of *x*? |  |

6. If , the roots of the equation are

 A.  and 

 B.  only

 C.  and 

 D.  only

7. The solution of the equation  is

 A. 

 B. 

 C. 

 D. 

8. Which of these shows an equivalent form of  by completing the square?

 A. 

 B. 

 C. 

 D. 

|  |  |
| --- | --- |
| 9. A student was given the equation  to solve by completing the square. The first step that was written is shown below.   The next step in the student’s process was . State the value of *c* that creates a perfect square trinomial.  |  |

10. What are the solutions of ?

 A. 

 B. 

 C. 

 D. 

11. If the quadratic formula is used to find the roots of the equation , the correct roots are

 A. 

 B. 

 C. 

 D. 

12. Solve for: 2*x*2 – 3*x* – 2 = 0

 A. {-0.5, 2}

 B. {-0.5, -2}

 C. {0.5, -2}

 D. {2.5, 2}

|  |  |
| --- | --- |
| 13. Find the positive value of *x* that solves this quadratic equation:   |  |

14. An object is launched at  meters per second  from a -meter tall platform. The equation for the object's height s at time  seconds after launch is , where  is in meters. When does the object strike the ground?

 A. 1 second

 B. 2 seconds

 C. 5 seconds

 D. 10 seconds

15. A small rocket is launched from a height of 72 feet. The height of the rocket in feet, *h*, is represented by the equation  where *t* = time, in seconds. When will the rocket reach a height of exactly 120 feet?

 A. 1 second

 B. 2 seconds

 C. 5 seconds

 D. 10 seconds

|  |  |
| --- | --- |
| 16. An economist has recorded the stock price of Company A after the initial stock sale. What was the value of the stock price of Company A 10 months after the initial stock sale? |  |

|  |  |
| --- | --- |
|  |  |

17. For the graph shown above, in what month was the stock price at its maximum after the initial stock sale?

 A. 5th month

 B. 50th month

 C. 75th month

 D. 12th month

18. Find the solution to the system below.

 

 A.  and 

 B.  and 

 C.  and 

 D.  and 

19. Find the roots of the equation.

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20. Solve the system below:

 

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**Extra Credit**

21. If the quadratic formula is used to find the roots of the equation, the correct roots are

 A. 

 B. 

 C. 

 D. 

22. Consider this system of equations.

 

 What values of are solutions to the system of equations?

 A  and 

 B  and 

 C  and 

 D  and 

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**Score Sheet and Report**

|  |  |  |  |
| --- | --- | --- | --- |
| # | Answer | Subdomain Performance | Subdomain |
| 1 |  |  /2 % | Solving Radical Equations |
| 2 |  |
| 3 |  |  /2 % | Rewriting Quadratic Solutions |
| 4 |  |
| 5 |  |  /3 % | Solving Quadratic Equations by Square Roots |
| 6 |  |
| 7 |  |
| 8 |  |  /2 % | Solving Quadratic Equations by Completing the Square |
| 9 |  |
| 10 |  |  /2 % | Solving Quadratic Equations by Quadratic Formula |
| 11 |  |
| 12 |  |  /2 % | Solving Quadratic Equation Using Any Method |
| 13 |  |
| 14 |  |  /4 % | Quadratic Modeling |
| 15 |  |
| 16 |  |
| 17 |  |
| 18 |  |  /1 % | Linear-Quadratic System of Equation |
| 19 |  |  /2 | Solving Quadratic Equations |
|  |
|  |
| 20 |  | Constructed Response – Record Your Answer Below |  |
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|  /2 |
| 21 |  |  +  | Extra Credit |
| 22 |  |
|  |  |  |  |
| Total |  /22 % |