# **Algebra 1 Unit Test Guide**

## Rational & Irrational Numbers Unit Test

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| **Item** | **Lesson Coverage** | **Objective** | **Mathematical Practice Standard** | **Assessment Item** |
| 1 | Lesson 2: Sums & Products of Rational Numbers | In this section, you will prove that the sum of any two rational numbers is rational. | Construct viable arguments and critique the reasoning of others. | Evaluate the two sums and determine which statement is true. Enter the correct number associated with your response.   | **Column A** | **Column B** | | --- | --- | |  |  |   Statement #1: Only Column A has a rational sum.  Statement #2: Only Column B has a rational sum.  Statement #3: Column A and Column B both have rational sums.  The simplified values of both columns indicate that Statement #\_\_\_ is true.  **Answer: 1** |
| 2 | Lesson 2: Sums & Products of Rational Numbers | In this section, you will prove that the product of any two rational numbers is rational. | Construct viable arguments and critique the reasoning of others. | The product of a multiplication problem is . What do you know about the factors?  **Answer: It cannot be predicted based on the information given.** |
| 3 | Lesson 3: Sums & Products of Rational & Irrational Numbers | In this section, you will prove that the sum of any rational number and any irrational number is irrational. | Construct viable arguments and critique the reasoning of others. | Put the steps to the proof that the sum  is irrational if r is a rational and s is rational in the correct sequence.  Step 1. Subtract, writing s as a fraction.  Step 2. For a contradiction, assume that t is rational, and write r and t as fractions.  Step 3. Realize a contradiction.  Step 4. Find a common denominator.  Answer: Step 2, Step 4, Step 1, Step 3 |
| 4 | Lesson 3: Sums & Products of Rational & Irrational Numbers | In this section, you will prove that the product of any nonzero rational number and any irrational number is irrational. | Construct viable arguments and critique the reasoning of others. | What type of number will the product of and be?  Answer: an irrational number |
| 5 | Lesson 4: Rational Exponents | In this section, you will relate the meaning of a rational exponent to the frequency with which a number is used as a factor. | Reason abstractly and quantitatively. | Charles, Zayeer, and Kali are trying to simplify .  Charles says the correct simplification is 10 because  and .  Zayeer says the correct simplification is 1,000 because 1,000=10⋅10⋅10→=10⋅10⋅10=1,000.  Kali says the correct simplification is 100 because 1,000=10⋅10⋅10→=10⋅10=100.  Who has the correct value?  Answer: Kali  [Rational & Irrational Numbers Unit Test Item #5 - GeoGebra](https://www.geogebra.org/calculator/v9hp59dk) |
| 6 | Lesson 4: Rational Exponents | In this section, you will relate the meaning of a rational exponent to the frequency with which a number is used as a factor. | Reason abstractly and quantitatively. | What is the correct simplification of ?  Answer: 27  [Rational & Irrational Numbers Unit Test Item #6 - GeoGebra](https://www.geogebra.org/calculator/j6vmv5zt) |
| 7 | Lesson 4: Rational Exponents | In this section, you will connect the meaning of a rational exponent to the meaning of a root. | Reason abstractly and quantitatively. | How can you rewrite using a root?  Answer: |
| 8 | Lesson 4: Rational Exponents | In this section, you will connect the meaning of a rational exponent to the meaning of a root. | Reason abstractly and quantitatively. | What is the simplest form of ?  Answer: 5  [Rational & Irrational Numbers Unit Test Item #8 - GeoGebra](https://www.geogebra.org/calculator/ea6mghs4) |
| 9 | Lesson 5: Properties of Rational Exponents | In this section, you will use the properties of exponents to generate equivalent expressions involving rational exponents. | Look for and make use of structure. | Rewrite the expressions: .  Answer: |
| 10 | Lesson 5: Properties of Rational Exponents | In this section, you will use the properties of exponents to generate equivalent expressions involving rational exponents. | Look for and make use of structure. | What is an equivalent expression for ?  Answer: |
| 11 | Lesson 5: Properties of Rational Exponents | In this section, you will solve equations involving rational exponents. | Look for and make use of structure. | Select the correct answer to the following equation: .  Answer: 9 |
| 12 | Lesson 5: Properties of Rational Exponents | In this section, you will solve equations involving rational exponents. | Look for and make use of structure. | Select the correct answer to the following equation: .  Answer: 1 |
| 13 | Lesson 6:  Radicals & Rational Exponents | In this section, you will use the properties of exponents to generate equivalent expressions involving radicals and rational exponents. | Look for and make use of structure. | Using the exponent properties, which of the following expressions is equivalent to ?  Answer: 2 |
| 14 | Lesson 6:  Radicals & Rational Exponents | In this section, you will use the properties of exponents to generate equivalent expressions involving radicals and rational exponents. | Look for and make use of structure. | Which of the following expressions is equivalent to when applying the exponent properties?  Answer: 2 |
| 15 | Lesson 6:  Radicals & Rational Exponents | In this section, you will use the properties of exponents to determine whether equations involving radicals and rational exponents are true or false. | Look for and make use of structure. | Is the equation true or false? Select the response that correctly answers the question and provides the appropriate justification.  Answer: False, because the exponents should be added rather than multiplied. |
| 16 | Lesson 6:  Radicals & Rational Exponents | In this section, you will use the properties of exponents to determine whether equations involving radicals and rational exponents are true or false. | Look for and make use of structure. | Is the equation true or false? Select the response that correctly answers the question and provides the appropriate justification.  Answer: False. When applying the Quotient Property, the final exponent is not 1. |
| 17 | Lesson 2: Sums & Products of Rational Numbers | In this section, you will prove that the sum of any two rational numbers is rational. | Construct viable arguments and critique the reasoning of others. | Consider the expression . Will the sum of the two rational numbers produce a rational number? Explain your reasoning in 1-2 sentences.  Answer: The sum of these two numbers is . This number is a rational number because it can be written as a fraction in form, where *a* and *b* are nonzero whole numbers. |
| 18 | Lesson 2: Sums & Products of Rational Numbers | In this section, you will prove that the product of any two rational numbers is rational. | Construct viable arguments and critique the reasoning of others. | Prove that the product of the two rational numbers and is a rational number. Find the product and explain how you know it is a rational number. Explain your reasoning in 1–2 sentences.  Answer:  10 is an integer, which is a rational number. |
| 19 | Lesson 3: Sums & Products of Rational & Irrational Numbers | In this section, you will prove that the sum of any rational number and any irrational number is irrational. | Construct viable arguments and critique the reasoning of others. | Prove that the sum of and is irrational. Show your work, and in 1-2 sentences explain why the sum is an irrational number.  Answer:  This number is an irrational number. The decimal goes to infinity and never repeats. |
| 20 | Lesson 3: Sums & Products of Rational & Irrational Numbers | In this section, you will prove that the product of any nonzero rational number and any irrational number is irrational. | Construct viable arguments and critique the reasoning of others. | Prove that the product of and is an irrational number. Find the product and explain why the value is irrational. Explain your reasoning in 1-2 sentences.  Answer:  This number is irrational. It is an infinite decimal with no consecutive repeating integers. |