

8 Algebra CC

Unit 1 Review (The Real Number System)

Important Terminology

Natural	Whole	Integer	Rational	Irrational
Square Root	Cube Root	Radical	Index	Radicand
Property	Commutative	Associative	Inverse	Identity
Distributive	Equivalent			

What should I be able to do?

1. Classify numbers using all the subgroups of real numbers (natural, whole, integer, rational, irrational)
2. Determine if the sum or product of two rational numbers is rational or irrational.
3. Determine if the sum or product of two irrational numbers is rational or irrational.
4. Determine if the sum or product of a rational number and an irrational number is rational or irrational.
5. Identify the properties of real numbers.
6. Determine if expressions are equivalent using the properties of real numbers.
7. Rewrite square root radical expressions in simplest radical form.

Practice Problem Set

1. Using the words **natural**, **whole**, **integer**, **rational** and **irrational**, list all the subsets of real numbers to which each number belongs.

a) 115 _____

b) $29.\bar{2}$ _____

c) $\sqrt{10}$ _____

d) $\sqrt[3]{-27}$ _____

2. Write two numbers that fit each description. If there is no such number, write *none*.

a) negative integer _____

b) negative rational number that is not an integer _____

c) irrational integer _____

d) negative irrational number _____

True/False. If false, explain why the statement is false.

3. $-\sqrt{25}$ is a rational number. _____

4. $\sqrt[3]{9}$ is a rational number. _____

5. The sum of two irrational numbers is always an irrational number. _____

6. The product of two irrational numbers is always an irrational number. _____

7. State whether the numbers below are **rational** or **irrational**.

a) $\sqrt{144}$

b) $\sqrt[3]{-64}$

c) $\sqrt{30}$

d) $\sqrt[3]{18}$

8. Rewrite each square root radical in simplest radical form.

a) $\sqrt{24}$

b) $\sqrt{32}$

c) $\sqrt{63}$

d) $\sqrt{108}$

Identify the property shown by the statement below.

9. $14 + -15 = -15 + 14$

10. $xy + xz = x(y + z)$

11. $a + 0 = a$

12. $b \cdot \frac{1}{b} = 1$

13. $-2 + (5 + 1) = (-2 + 5) + 1$

14. $(-3)(4) = (4)(-3)$

15. $x + -x = 0$

16. $3.5 \cdot (2 \cdot 1.2) = (3.5 \cdot 2) \cdot 1.2$

17. $8 \cdot 1 = 8$

Multiple Choice

18. If **S** is a non-zero rational number and **T** is an irrational number, which expression(s) will always result in an irrational number?

I. $S + T$

II. ST

III. T^2

(1) I

(2) II

(3) I and II only

(4) I, II and III

19. Which set of numbers best describes the different amounts of ingredients that are possible to use in a recipe?

(1) whole numbers

(2) positive rational numbers

(3) integers

(4) real numbers

Extended Response

20. Ernie says that it's possible for the product of two irrational numbers to be rational. State whether or not you agree with Ernie. Provide mathematical evidence to support your statement.

21. The process of showing that $2x + 3x$ is equivalent to $5x$ is shown below. Identify the property used in each step.

Step 1: $2x + 3x$ Given expression

Step 2: $x(2 + 3)$ _____

Step 3: $x(5)$ Combine terms

Step 4: $5x$ _____

The steps above prove that the expression $2x + 3x$ is the same as $5x$. Prove the equivalence of these two expressions in another way.

22. The following flow diagram shows that $a(bc)$ is equivalent to $b(ac)$.

Fill in each circle with the appropriate symbol that represents the property used to form the equivalent expression.

C_X = commutative property of multiplication

A_X = associative property of multiplication

