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The Most Comprehensive Review of Algebra I

By

Reza Nazari

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computer algebra system. (i.e. rewriting a rational expression as the quotient plus the remainder over divisor). A.APR.F.7 Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.

CREATING EQUATIONS
Create equations that describe numbers or relationships.
A.CED.G.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions. A.CED.G.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. A.CED.G.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. A.CED.G.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.

REASONING WITH EQUATIONS AND INEQUALITIES
Understand solving equations as a process of reasoning and explain the reasoning.
A.REI.H.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method. A.REI.H.2 Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.
Solve equations and inequalities in one variable.
A.REI.I.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. A.REI.I.4 Solve quadratic equations in one variable. • A.REI.I.4A Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(n - p)^2 = q$ that has the same solutions • A.REI.I.4B Solve quadratic equations by inspection (e.g., for $n^2 = 49$), taking square roots, completing the square, 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 $a \pm bi$ for real numbers a and b. • A.REI.I.4C Derive the quadratic formula from the general form of a quadratic equation.

Solve systems of equations.
A.REI.J.5 Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions. A.REI.J.6 Estimate solutions graphically and determine algebraic solutions to linear systems, focusing on pairs of linear equations in two variables. A.REI.J.7 Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. A.REI.J.8 Represent a system of linear equations as a single matrix equation in a vector variable. A.REI.J.9 Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension 3×3 or greater).
Represent and solve equations and inequalities graphically.
A.REI.K.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane. A.REI.K.11 Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions. A.REI.K.12 Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

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Multiplying and Dividing Integers

Solve.

1) $(-6) \times (-7) =$ _____

2) $8 \times (-5) =$ _____

3) $48 \div (-8) =$ _____

4) $(-72) \div 9 =$ _____

5) $(4) \times (-6) =$ _____

6) $(-9) \times (-11) =$ _____

7) $(10) \div (-5) =$ _____

8) $144 \div (-12) =$ _____

9) $(10) \times (-2) =$ _____

10) $(-8) \times (-2) \times 5 =$ _____

11) $(8) \div (-2) =$ _____

12) $45 \div (-15) =$ _____

13) $(5) \times (-7) =$ _____

14) $(-6) \times (-5) \times 4 =$ _____

15) $(12) \div (-6) =$ _____

16) $(14) \div (-7) =$ _____

17) $196 \div (-14) =$ _____

18) $(27 - 13) \times (-2) =$ _____

19) $125 \div (-5) =$ _____

20) $66 \div (-6) =$ _____

21) $(-6) \times (-5) \times 3 =$ _____

22) $(15 - 6) \times (-3) =$ _____

23) $(32 - 24) \div (-4) =$ _____

24) $72 \div (-6) =$ _____

25) $(-14 + 8) \times (-7) =$ _____

26) $(-3) \times (-9) \times 3 =$ _____

27) $84 \div (-12) =$ _____

28) $(-12) \times (-10) =$ _____

29) $22 \times (-3) =$ _____

30) $(-2) \times (-6) \times 5 =$ _____

31) $(24) \div (-3) =$ _____

32) $(-15) \div (3) =$ _____



Translate Phrases into an Algebraic Statement

Translate each phrase into an algebraic statement.

1) Seven more than a number is 18. _____

2) 12 times the sum of 5 and x. _____

3) The square of 12. _____

4) Nine less than a number is 11. _____

5) Six more than a number is 14. _____

6) 10 times the sum of 7 and x. _____

7) 25 multiplied by x. _____

8) Two less than a number is 12. _____

9) 8 times the sum of 8 and x. _____

10) Three more than a number is 10. _____

11) The difference between forty–eight and y. _____

12) 27 divided by x. _____

13) 17 multiplied by x. _____

14) The difference between x and 29 is 14. _____

15) 56 divided by x. _____



Order of Operations

Calculate.

1) $16 + (30 \div 5) =$ _____

2) $(3 \times 9) \div (-3) =$ _____

3) $57 - (3 \times 8) =$ _____

4) $(-12) \times (7 - 3) =$ _____

5) $(18 - 7) \times (6) =$ _____

6) $(6 \times 10) \div (12 + 3) =$ _____

7) $(13 \times 2) - (24 \div 6) =$ _____

8) $(-5) + (4 \times 3) + 8 =$ _____

9) $(4 \times 2^3) + (16 - 9) =$ _____

10) $(3^2 \times 7) \div (-2 + 1) =$ _____

11) $[-2(48 \div 2^3)] - 6 =$ _____

12) $(-4) + (7 \times 8) + 18 =$ _____

13) $(3 \times 7) + (16 - 7) =$ _____

14) $[3^3 \times (48 \div 2^3)] \div (-2) =$ _

15) $(14 \times 3) - (3^4 \div 9) =$ _____

16) $(96 \div 12) \times (-3) =$ _____

17) $(48 \div 2^2) \times (-2) =$ _____

18) $(56 \div 7) \times (-5) =$ _____

19) $(-2^2) + (7 \times 9) - 21 =$ ___

20) $(2^4 - 9) \times (-6) =$ _____

21) $[4^3 \times (50 \div 5^2)] \div (-16) =$

22) $(3^2 \times 4^2) \div (-4 + 2) =$ ____

23) $6^2 - (-6 \times 4) + 3 =$ _____

24) $4^2 - (5^2 \times 3) =$ _____

25) $(-4) + (12^2 \div 3^2) - 7^2 =$ __

26) $(3^2 \times 5) + (-5^2 - 9) =$ ____

27) $2[(3^2 \times 5) \times (-6)] =$ _____

28) $(11^2 - 2^2) - (-7^2) =$ _____

29) $(2^2 \times 5) - (64 \div 8) =$ _____

30) $2[(3^2 \times 4) + (35 \div 5)] =$ ___

31) $(4^2 \times 3) \div (-6) =$ _____

32) $3^2[(4^3 \div 16) - (3^3 \div 27)] =$