

R.5 – The Basics of Equation Solving

Skills

- R.5a - Use the addition and multiplication principle to solve first-degree(linear) equations.
- R.5b - Use the principle of zero products to solve second-degree(quadratic) equations.
- R.5c - Use the principle of square roots to solve second-degree(quadratic) equations.
- R.5d - Solve formulas for a specified variable.

Introduction

A **linear equation in one variable** is an equation that is equivalent to one of the form $ax + b = 0$, where a and b are real numbers and $a \neq 0$.

A **quadratic equation** is an equation that is equivalent to one of the form $ax^2 + bx + c = 0$, where a , b , and c are real numbers and $a \neq 0$.

Equation-Solving Principles

For any real numbers a , b , and c ,

The Addition Principle: If $a = b$ is true, then $a + c = b + c$ is true.

The Multiplication Principle: If $a = b$ is true, then $ac = bc$ is true.

The Principle of Zero Products: If $ab = 0$ is true, then $a = 0$ or $b = 0$, and if $a = 0$ or $b = 0$, then $ab = 0$.

The Principle of Square Roots: If $x^2 = k$, then $x = \sqrt{k}$ or $x = -\sqrt{k}$.

Linear Equation

vs

Quadratic Equation

Properties of equality → Addition and Multiplication

Principle of Zero Product

Principle of Square Roots

Example 1

13)

Example 2

35)

Example 3

53)

Example 4

63)

Example 5

77)

Example 6

65)

R.5 - EXTRA PRACTICE

Extra Practice R.5a on p.35 #1-34,81-84 - Follow the instructions in the book and complete the problems.

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Extra Practice R.5b on p.35 #35-52, 85-88 - Follow the instructions in the book and complete the problems.

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Extra Practice R.5c on p.35 #53-60 - Follow the instructions in the book and complete the problems.

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Extra Practice R.5d on p.35 #61-80 - Follow the instructions in the book and complete the problems.

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R.5 - IXL PRACTICE

IXL - A1-C.7 [Solve one-step linear equations](#)

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R.5a

IXL - A1-C.8 [Solve two-step linear equations](#)

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R.5a

IXL - A1-C.10 [Solve multi-step linear equations](#)

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R.5a

IXL - A1-C.12 [Solve linear equations with variables on both sides](#)

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R.5a

IXL - A1-C.17 [Solve linear equations: mixed review](#)

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R.5a

IXL - A1-Z.2 [Solve a quadratic equation using the zero product property](#)

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R.5b

IXL - A1-Z.3 [Solve a quadratic equation by factoring](#)

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R.5b

IXL - A1-Z.1 [Solve a quadratic equation using square roots](#)

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R.5c

IXL - A1-C.18 [Rearrange multi-variable equations](#)

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R.5d

Closing Reflection: