

Algebra I Chapter 2

Solving Linear Equations

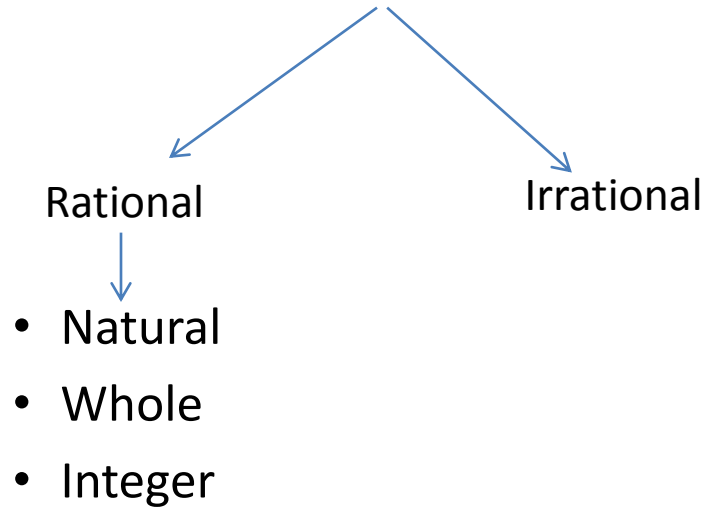
2.1 Find Square Roots and Compare Real Numbers

- Square Root: $\sqrt{\quad}$ \rightarrow radicand
- If $b^2 = 9$ then b is the square root of 9
- Some are perfect some are not.
- Sign out front determines answer
- $\sqrt{16} = 4$ $-\sqrt{16} = -4$ $\pm\sqrt{16} = \pm 4$

Groups of Real Numbers

- 1. Natural: $\{1,2,3,\dots\}$
- 2. Whole: $\{0,1,2,\dots\}$
- 3. Integers $\{\dots-3,-2,-1,0,1,2,\dots\}$
- 4. Rational: $\frac{p}{q}$ (decimal ends or repeats)
- 5. Irrational: $\sqrt{2}$ (decimal goes forever)

Real Number



- Use a number line to determine order
- $\sqrt{2}$ becomes 1.414

Conditional Statements

- If.....then.....
- No....then not
- Ex. A natural number is a rational number
 - If a number is a natural number, then it is rational.

2.2 Solve One-Step Equations

- Use inverse operations
- Start with + or –

- Ex. $x + 7 = 9$

- $$\frac{-7 \quad -7}{}$$

- $x = 2$

$$10 = 7 + x$$

$$\frac{-7 \quad -7}{}$$

$$3 = x$$

2.3 Solve Two-Step Equations

- Start with + or –
- Finish with X or /

- Ex. $2x + 7 = 9$

- $$\begin{array}{r} -7 \quad -7 \\ \hline \end{array}$$



- $$\underline{2x} = \underline{2}$$

- $$\frac{2}{2} \quad \frac{2}{2}$$

- $$x = 1$$

2.4 Solve Multi-Step Equations

- 1. Simplify Each Side

- Combine like terms ex. $7x-3x$  $4x$
- Distribute: $2(x + 3)$  $2x + 6$

- 2. Solve

- Start with + or –
- Finish with x or /

2.5 Solving Equations with Variables on Both Sides

- Steps
 - 1. Distribute: ()
 - 2. Simplify Each side: Combine any like terms
 - 3. Start to solve; use inverses + or -
 - Get variable on one side = number on other
 - 4. Divide

Example:

- $12x + 16 = 6(2x + 1) + 2x$
- $12x + 16 = 12x + 6 + 2x$
- $12x + 16 = 14x + 6$
- $$\begin{array}{r} -16 \qquad -16 \\ \hline \end{array}$$
- $12x = 14x - 10$
- $$\begin{array}{r} -14x \qquad -14x \\ \hline \end{array}$$
- $-2x = -10$
- $x = 5$

Solutions

- One Solution

ex: $X = 5$

- No Solution

- ex: $0 = 5$

- Infinite Solutions (Identity)

- ex: $0 = 0$

Fractions

- $\frac{2}{3}x = 14$ To Solve: multiply by $\frac{3}{2}$

$$14 \cdot \frac{3}{2} = \frac{42}{2} = 21 \quad \text{OR}$$

$$14 \cdot \frac{3}{2} \text{ cross cancel first} \quad 7 \cdot 3 = 21$$

- $\frac{2}{3}(x + 1) = 14$ multiply by $\frac{3}{2}$ first

Scale

- Scale drawing: 2D paper model
- Scale model: 3D image of real life
- Scale Factor: ratio comparing small version to
real life large version
- Solve: set up proportions

2.6 Ratio and Proportions

- **Ratio:** a comparison of two different things

$$\frac{a}{b} \quad a \text{ to } b \quad a:b$$

Always reduce

Proportion: ratio = ratio

$$\frac{1}{2} = \frac{5}{x}$$

so $1x = 2(5)$

Word Problems

- Proportions:
 - Set up in same order to solve
 - Ex. $\frac{in}{ft} = \frac{in}{ft}$

2.7 Solve Proportions Using Cross Products

- To Solve Proportions: Cross Multiply

- $\frac{a}{b} = \frac{c}{d}$ $ad = bc$ ad : extremes

- bc : means

- Extremes = Means

- Ex: $\frac{x+2}{5} = \frac{2x-3}{6}$ is... $6(x+2) = 5(2x-3)$