Date: Sept. 15, 2016 Title: Finding the Unknown

Learning Goals

By the end of this lesson I should be able to:

- Find an unknown value using multiplication, division, addition and subtraction, given an equation

Before We Begin...

Reminder, for every class you should have:

- Pencil
- Paper
- Binder
- Scientific Calculator

Homework Take Up (10 minutes)

Minds On (5-10 minutes)

Unfinished Shapes

- 3 partial shapes are constructed of linking cubes.
- Each shape is a specific percentage complete:
    - Cube is 75% (¾) complete
    - Larger rectangular prism is 50% (½) complete
    - Smaller rectangular prism is 33.3% (⅓) complete
- Determine how many cubes are missing.
- You may:
    - Count the length, width and height of the shapes.
    - Use manipulatives.
- You may not:
    - Count the individual blocks.
    - Modify the existing shapes.

Action

Debrief: Unfinished Shapes

- ¾ of 64 = 48

Discussion: Opposite Operations

- + and -
- Mult. and division.
- Exponents and roots
    - Explain exponents as repeated multiplication

Explain difference between an expression and an equation

- Expression is a collection of terms separated by operators
- Equation is 2 expressions separated by an =
    - Equations must always be balanced
    - Anything done to the left side must also be done to the right
    - Equations can be solved by applying opposite operations until the variable is alone

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Examples of One Step Equations and solving

- $x + 4 = 7$
- $x - 2 = 8$
- $8x = 40$
- $\frac{x}{-3} = 5$

Two (or More) Step Equations

- More complicated equations require that we isolate the term with the variable in it first
  - $5x - 7 = 13$
  - If we divide by 5, we must divide all 3 terms by 5 first!
  - Instead isolate 5x first, then divide by 5
- When isolating use SAMDEB (BEDMAS in reverse)
  - Do any addition or subtraction first followed by multiplication and division
  - Don't forget about brackets!
- Examples:
  - $\frac{x}{2} + 5 = -3$
  - $6x + 1 = 6$
  - $6(x + 1) = 6$ (Note the difference!)

Isolating When the Variable is on Both Sides (if time permits)

- Variables terms can be added or subtracted from either side to move them to the other side:
  - $12x + 3 = 4x - 21$
  - You MUST subtract the whole term (4x) from the right, not just the x

Review (15 minutes)

Gallery Walk

- Sheets of equations are posted around the room.
- Take an answer sheet
- With a partner, rotate between sheets, choosing 1 equation to solve.
- Try to choose the "most difficult" question from each page.

Homework

Algebra Worksheet "Solving For the Unknown"