

MATH 191 FUNDAMENTALS OF MATHEMATICS II
9.4 SOLVING EQUATIONS AND 9.5 STRIP DIAGRAM
APRIL 23, 2014

We saw before that equations can be _____ or _____. What we mean when we say we want to _____ is we want to _____ that _____.

Example:

In elementary school, students might see equations like

$$3 + 5 = \square + 2$$

Note: At this point, it is important that students have not been conditioned to think that the equals sign means “calculate the answer” because they might fill in the blank like:

Instead, remind students that the equals sign means:

Visually (or concretely, with manipulatives), we can think of equations as a _____ where each side of the equation corresponds to _____. This could be a good way to introduce students to solving equations.

We can solve equations by _____.
For example, when we see

$$2x = 6 \quad \text{or} \quad 2 \times \square = 6$$

we can think:

The solution is:

Another example is:

To solve more complicated equations, we use _____. However, these strategies are based on the reasoning we did before.

Solving Equations with Algebra

When we solve equations using algebra, we can change the equation into a new one by

- Using _____ to change the expression on either side of the equation into an _____.

For example:

- _____ or _____ the _____ to both sides of the equation.

For example:

- _____ or _____ both sides of the equation by _____, so long as that number is _____.

For example:

If we do any of these three things to our equation, we get a _____ with _____ . Why?

We can think about these operations algebraically and visually using a balance scale. Example:
Solve $x + 3 + 3x = 5 + 2x + 2$.

Note: The balance scale visual is not good for equations with _____.

Solving Algebra Word Problems with Strip Diagrams

We can use strip diagrams to solve word problems without _____. However, we can also use strip diagrams to support the algebraic approach.

Example: After making four equal payments, Lisa still owes \$400 on her \$1300 TV. How much was each payment?

Strip diagram:

Strip diagram to support algebra:

Algebra alone:

Use a strip diagram and algebra to solve the following problem:

Markus took $\frac{1}{3}$ of the money out of his bank account last week and put \$200 back in his account this week. He has \$500 in his account now. How much did Markus have in his account to start with?

Strip diagram:

Algebra: