

# *Instruction matters!*

Bill Hanlon



## Homework

A newsletter for math teachers addressing best practices

Many people equate completing homework assignments with studying, the most effective teachers know this not to be the case. They know **studying includes reading, thinking, reflecting, organizing, writing, analyzing, visualizing, reviewing, remembering, and recalling.** Too many students think homework is about completion. There are those in education that think it's about completion and recalling, experienced teachers know there is more to it.

Homework that reflects and reinforces the day's instruction and the notes taken from that instruction that encourages study is the best way to check for student understanding, address instruction, and increase student achievement. All too often in schools across America, a homework assignment is nothing more than a page in the book with exercises assigned. The best homework assignments reflect what the teacher values. That is, homework that encourages studying.

A typical secondary math assignment in the United States looks like this:

### **Page 165, 1 – 33 odd**

A more appropriate homework assignment that would encourage studying would look more like this:

**Read Sec 4.2 Add/Subtract Fractions  
Define Fraction**

**Write the procedure for add/sub fractions**

**Draw a model to represent adding fractions  
Explain the relationship between the algorithms  
for adding fractions and decimals  
Page 165 - 3, 4, 6, 11, 13, 16, 17, 21, 28, and 30**

*N.B. - fewer exercises were assigned and the exercises were chosen specifically because they took into account all the nuances of the concepts and skills taught.*

That homework assignment includes components that encourage and reflect studying. Knowing standard procedures is important in learning math so having it part of the homework assignment will help students complete the exercises assigned as well as being better able to verbalize their knowledge. On subsequent nights' homework, students might be asked to write the procedure for adding fractions again. Other questions might also be included in subsequent assignments, such as, why aren't denominators added when adding fractions.

The good news about including these types of questions in the homework is that it increases the probability that students are acquiring the language, read, write & speak, and that it encourages studying. Since teachers typically address these in their instruction, the answers should be contained in student notebooks. Students would have a tough time telling a teacher the reason they did not do their homework was because they did not understand since all they had to do for most of it was revisit their notes.

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Link to USEFUL RESOURCES

## Linking to previously learned material

Many students experience little difficulty with adding/subtracting decimals. Linking that procedure to adding/subtracting fractions will lead to increased student understanding resulting in students being able to transfer that knowledge to adding/subtracting fractions. A skill identified by teachers that students experience difficulty.

### Algorithm Add/Sub Decimals

1. **Line up decimal points**
2. **Fill in zeros**
3. **Add/Sub numbers**
4. **Bring dec. pt down**

### Algorithm Add/Sub Fractions

1. **Find common denominator**
2. **Make equiv. fractions**
3. **Add/Sub numerators**
4. **Bring denominator down**
5. **Simplify**

Explain to the students that when they lined up the decimal points and filled in the zeros, they were finding a common denominator and making equivalent fractions. That when they added the numbers in the decimals problem that was the same as adding the numerators with fractions. And finally, when they brought the decimal point straight down, they were bringing down the denominator. That linkage would allow teachers the opportunity to review, reinforce and address difficulties students might be having with fractions.

## Linking to outside experiences

If the cost of one cold drink is \$0.50, two cold drinks would be \$1.00, three would cost \$1.50. Each additional cold drink would cost \$0.50, the change in price for each additional cold drink would be \$0.50, the rate of change would be \$0.50, the **slope** would be \$0.50. We do use math in our lives everyday.

Linking to outside experiences makes the math taught in the classroom come alive. Whether you are linking a parabola to flashlights, satellite dishes or amphitheatres; the concept of slope to the pitch of a roof, grade of a hill, or the additional cost of buying multiple quantities of the same item; or the circumference of a circle to pipe fitting or how changing the size of one's tires results in the odometer and speedometer being off in their car.

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And, if the students did answer those questions, there would be a much higher probability that they would be able to complete the practice exercises. ***A good homework assignment reflects and supports student notes and instruction.***

Homework assignments vary greatly from school to school. In some algebra classes, students will be routinely assigned 30 to fifty (equations) exercises each night taken directly from the textbook. In another school, students might only be assigned 15 to 20 exercises per night. In the least successful programs, there is a belief that students won't do the homework, so they don't assign any, and the students live up to that low expectation. In the most successful programs, homework appears to be assigned more thoughtfully. Those programs view homework assignments as an extension of their instruction. That suggests the time needed to complete the number of exercises assigned along with the reading, writing, thinking, and memorization that increases understanding are all taken into consideration. Nothing increases proficiency more than practice. When students compute, solve equations or graph, they initially have to think/concentrate on the procedure. As they practice the computing, solving or graphing, those skills should almost become automatic. If they are not, more practice might have to be done in class and/or more exercises might need to be assigned for homework.

The most experienced teachers know that homework assignments that encourage studying and supports their instruction is in the students' best interests.

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