Subtraction

Go over borrowing, explaining that a 1 in the hundreds place becomes a 10 in the tens place. Demonstrate with money. You can have 1 one hundred dollar bill, which is the same as 10 ten-dollar bills. Borrowing during subtraction works the same way.

Practice problems:

- $6,782 - 5,291$
- $879,000,038 - 247,936,261$

Word problems (addition and subtraction)

Use students in class to create word problems about. For example, the first practice problem is about buying a car. Ask the class who wants to buy a car and select a student. Then ask what kind of car they want to buy and how much they think it will cost (if a student says $20,000 change the price to something like $21,765 explaining briefly about taxes and fees). Then use that information to create the word problem.

Practice problems:

- Jake buys a car for $79,382. He sells it to Chris 3 years later for $59,396. How much money did he lose?
- Sam has $350. Erica has $89. Joy has $29 less than Sam and Erica have together. How much money do they have combined?
- You checking account currently has $437 and you make deposits of $312, $72, and $92 and then you write checks for $21, $123, $298, and $186, what is your final balance?

Review concepts from homework #1

Practice review problems:

- $-3+2-4-1+3-1-1+2-5$
- Say 365,452 correctly, then round it to the ten thousands place.

You should have extra time because of how easy this lesson is so take the opportunity to start introducing material they will need in the near future. At this time, we will introduce trees and monsters.

Trees

Use our "The Key is the Tree" concept to quickly and efficiently construct factor trees to solve or simplify problems. Deconstructing whole numbers into the product of their prime factors is foundational to understanding most mathematical concepts. Factor trees form the basis for many of our mathematical games and stories. Being proficient at constructing trees in your

head is analogous to the benefits of knowing the meaning of Latin root words on an English vocabulary test. The better you are at trees, the better you will be at math. You should be able to construct trees on most numbers, especially the smaller ones, in your head. For example, a tree on 72 is $2 \cdot 2 \cdot 2 \cdot 3 \cdot 3$ because two times two times two times three times three is seventy-two.

- How to "do" a tree

  Let's take 64 as an example. Ask students which two numbers multiple to 64. Any combination is fine as long as it doesn't involve 1. Most students will say 8 and 8. Then continue to ask them if that number can be "broken up" any more. You are finished when I number can't be broken up anymore.

Practice tree problems:

- Break up 72
- Break up 48
- Break up 28

Monsters

Use our proprietary monster method to simplify radicals quickly and easily. Make sure that you fully understand the story of how radical monsters attack and eat their prey and that you thoroughly practice this technique before you take the SAT test.

For example, if you are asked to simplify $\sqrt[3]{686x^4y^6}$, use your imagination to morph the radical into a terrifying monster that looks something like this:

The monster pounces on the poor unsuspecting $686x^4y^6$, capturing it under its belly, and breaks it apart as it prepares to devour its next tasty meal. The $686x^4y^6$ breaks up into $2\cdot 7\cdot 7\cdot 7\cdot x\cdot x\cdot x\cdot x\cdot y\cdot y\cdot y\cdot y\cdot y\cdot y$. The reason this radical monster is called a cube root is the 3 in the hook, and it is this 3 that tells the monster what it is allowed to eat. This monster can only eat things in triplets. This means that it can grab and eat the three 7's, the three x's and two groups of three y's. However, when the monster shoves them in its mouth and goes to eat them, one from each group tastes bad and gets spit out in front of the monster. This results in one 7, one x, and two y's being spit out in front of the monster. Keep in mind that some of the pieces could not be eaten at all. There is still a 2 and an x trapped under the belly of the beast. These guys can never escape and can never be eaten, trapped there forever. This results in the final, simplified answer of $7xy^2\sqrt[3]{2x}$.

686 is too big of number to start out with. So start with $\sqrt{12}$ and remind students that when there is "nothing" in the hook there is an always an invisible 2 and have them write it in. Then take the students through the monster story.

Practice monster problems:

- $\sqrt[3]{54}$
- $\sqrt[3]{81x^4y^3a^{10}}$ *Remind students that letters are even easier than numbers.
- $\sqrt[5]{64x^7y^{12}a^3}$