

### 3. Real Numbers

Let's start by combining real numbers. We know how to add numbers and basic subtraction, but sometimes when the signs are different, it gets a little trickier.

$8-5=3$  This is pretty standard, but what if we had the reverse?

$3-8$  Some would try to rewrite this as  $3+(-8)$ . But I try to avoid that step since it is something you would stop doing later anyhow. I treat it like money. I have three dollars and I owe you eight. After our transaction do I have money left or do I owe you? I still owe you 5 which makes my answer negative.

$$3-8=-5$$

How about this one:  $8-22$

Again, I have eight dollars but I owe you twenty two. Since the signs are different, I subtract them and get 14. But is the answer positive or negative? Since I still owe you, the answer is negative.  $8-22=-14$

Go ahead and try some of the practice problems, [1-7](#). When you are comfortable with them come back and we'll continue.

Now let's start combining two negative numbers.

$-3-4$  Again, we are going to view this in terms of money. You owe me three dollars and you owe me four dollars. How much do you owe me in total? Seven dollars. But since you owe, we will keep the negative.

$$-3-4=-7$$

When the numbers are both negative, you add them but keep the sign.

How about this one?  $-15+(-8)$  Again, I don't like writing it this way.

So I'll change it to:  $-15-8$ . Since they are both negative its like owing fifteen dollars and then owing an additional eight. So, in all I owe 23 which makes it negative 23.

$$-15-8=-23$$

Go ahead and try the next set of problems: 8-14. You will be using this skill through all of algebra, so you want to make sure you are really comfortable with it.

One last step to add to these. Sometimes we have double negatives.

$4-(-2)$  To understand this we need to know the rules for multiplying and dividing. When we multiply or divide, here are the rules:

$4 \times 4 = 16$  When we multiply two positive numbers, the answer is positive

$4 \times -4 = -16$  A positive times a negative and vice versa is negative

$$-4 \times 4 = -16$$

$-4 \times -4 = 16$  When two negatives are multiplied the result is positive.

The same rules apply for division.

So, if we have  $2-(-4)$  we can look at it like it is  $2-1(-4)$ . It is the same as multiplying negative one times negative four. Two negatives make a positive. Therefore, this equals  $2+4=6$ . Whenever two negatives are next to each other, they become positive.

$$-15 - (-6)$$

$$-15 + (+6)$$

$$-15 + 6$$

$$-9$$

But, make note that this is different from  $-15-6$ . These are both negatives but the negatives are not directly next to each other.

$-15-6=-23$ . I owe fifteen and I owe six which means I owe a total of 23 leaving it negative.

Go ahead and try the next set of problems (15-20) to put all of these together. Contact me if you need help with any of these.

The next set of problems are fractions for review. If you need more help on these, let me know.