Technology Integrated Mathematics
Class Notes
Pre-Algebra: Addition of Signed Numbers and Absolute Value (Section 6.1)

We will need to add (and later subtract, multiply, and divide) signed numbers. **Signed numbers** are those that have a positive or negative value, so pretty much all numbers. We will want a picture of the real number line in our heads.

Draw a real number line with the **integers** {…, –4, –3, –2, –1, 0, 1, 2, 3, 4, …} marked with tick marks.

Notice that we place zero in the middle with **negative** numbers to the left and **positive** numbers to the right.

Remember how the fractions or rational numbers (like –2.5, ½, and $3\frac{2}{3}$) fall somewhere in between these tick marks. Return to the real number line above and place these numbers.

expl 1: For each quantity, would you assign a negative or a positive number? Represent each with a signed number.
a.) A temperature of 30 degrees (Fahrenheit) below zero.

b.) A debt of $50.

c.) Earnings of $450.

d.) A car decelerating by 20 mph.

Less Than and Greater Than:
We will be asked for the relationship between two numbers. Which number is bigger? For that, we will use the < (less than) and > (greater than) symbols.
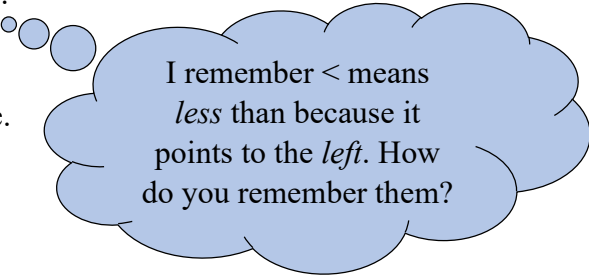
expl 2: Fill in either < or > to make each statement true.
a.) 75 ☐ 85   b.) –10 ☐ 10
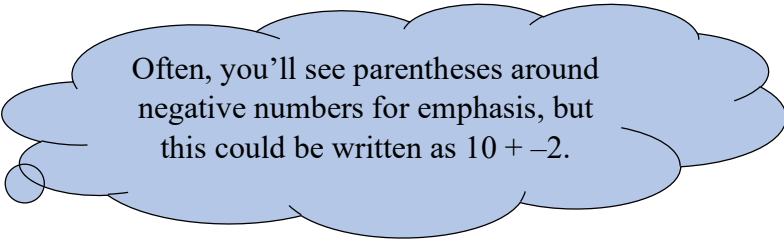
c.) –12 ☐ –25   d.) 0 ☐ –5

I remember < means less *than because it points to the* left*. How do you remember them?*

Later in algebra, we will also see ≤ to mean "less than or equal to" and ≥ to mean "greater than or equal to".

Often, you'll see parentheses around negative numbers for emphasis, but this could be written as 10 + –2.

Addition of Signed Numbers:
How do we add 10 + (–2)?

Below, draw the real number line to focus on the number 10. When we **add** a positive number to another number, we move right that many spaces. When we **subtract** a positive number from another number, we move left. We *reverse* the direction if we add or subtract a *negative* number.

On your number line, show adding (–2) to 10. The book shows subtraction and addition with arrows drawn from the beginning number along the number line. You can use some other notation of your choosing.

Making a long story short, it turns out that we can treat this problem 10 + (–2) as a **subtraction**. I think about it as simply 10 – 2. You can enter it into the calculator either way, but you want to practice so you get the syntax right for your calculator.

Try to think through some of these problems in your head or on paper but feel free to work harder ones on a calculator. You can enter a negative number as you'd write it by using the (–) button.

expl 3: Add the following.

a.) 35 + (–8)

b.) –236 + 150

c.) 0.05 + (–0.15)

d.) $4\frac{3}{4} + \left(-3\frac{1}{4}\right)$

e.) –65 + (–20) + 55 + 120 + (–56) + 34
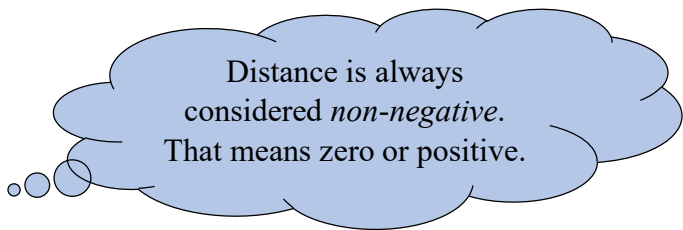
Absolute Value:

Again, let's start with a number line. Draw one out from –5 to 5.

The **absolute value** of a number is simply its **distance to 0 on the number line**. We will use the symbol | |. On your number line above, plot the numbers – 4, 0, and 4.

expl 4: Find the following.
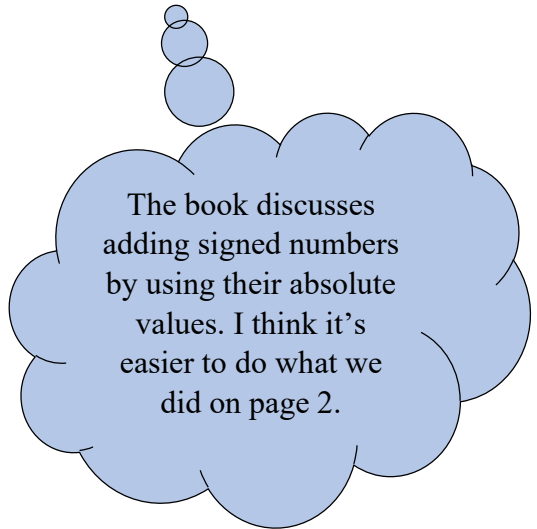
a.) |– 4|

Distance is always considered *non-negative*. That means zero or positive.

b.) |0|

c.) |4|

The book discusses adding signed numbers by using their absolute values. I think it's easier to do what we did on page 2.

expl 5: I woke up at 6:00 am and it was 30 °F. Over the next six hours, the temperature rose 5 degrees, fell 4 degrees, rose 3 degrees, and fell 2 degrees. What was the temperature at noon? Include units.

expl 6: Maggie has $450 in her bank account. She was paid $30 and withdrew $25 for a babysitter. She paid a bill for $40 and then deposited $100 birthday money. How much is her balance now?