AGE PROBLEMS

No, I'm not talking about how you can't drive until you're 16, or all the freedom you can't wait to have when you finally turn 18...

 I'm talking about those oh-so-fabulous "age" problems like this:

If you were twice as old as your sister 3 years ago, and you are 5 years older than her, how old are you today?

Okay, these look really confusing to start out with. Even I, a veteran word problem solver, get a slightly dizzy feeling when first reading a problem like this. But Algebra's a great tool, and honestly, I don't know how anyone solves these kinds of problems without it (although some people do!)

Since they can be sort of scary sometimes, I thought I would do one for you guys and explain everything…

Here we go: The first thing to do is to start **labeling everything.** We start with the number we're trying to find. We want to find your age now, so let's call that, oh let's see, how about "*a*" for "age." Well, then in terms of "*a*", what was your age 3 years ago? Your age was $a - 3$, right?

So far so good. What about your sister? The problem says that she's 5 years younger than you. And that never changes, right? She'll always be 5 years younger, no matter how old you guys are. So your sister's age *today* is: $a - 5$

What about your sister's age 3 years ago? That would be exactly 3 less than her current age, right? So: $a - 8$.

Let's list what we know so far:

Your age today: **a**

Your sister's age today: **a – 5**

Your age 3 years ago: **a – 3**

Your sister's age 3 years ago: **a – 8**

Now that we've labeled some things, let's look at the problem again and see if we can translate the English into math.

If you were twice as old as your sister 3 years ago

In other words: "Your age 3 years ago, was twice your sister's age 3 years ago."

(Your age 3 years ago) IS twice (your sister's age 3 years ago)

→   (a-3) = 2(a-8)

Let's simplify this expression (multiplying across the parenthesis uses the **distributive property**, which should be listed in your school's textbook, if you don't know it.)

$$a - 3 = 2a - 16$$

Now let's get all the numbers on one side, by adding **16** to each side:

$$a - 3 + \underline{\textbf{16}} = 2a - 16 + \underline{\textbf{16}}$$

$$a + 13 = 2a$$

Now we subtract **a** from both sides, to get all the a's on one side:

$$a - \underline{\textbf{a}} + 13 = 2a - \underline{\textbf{a}}$$

$$13 = a$$

So you are 13 years old! (Well, maybe not, but you know what I mean.) Let's check that answer to see if it makes sense: Three years ago, you were 10. If your sister is 5 years younger, that means she was 5 back then, and yep, you were twice her age, because 5×2 = 10!   **Answer: Today you are 13 years old.**

Age problems are all about labeling things in relationship to each other (your sister's age was written in terms of your age "*a'*", etc.), and then writing a math sentence to express whatever "truth" was written in English. In this case, that "truth" was the fact that you were twice your sister's age 3 years ago.

It takes some time to get used to, but it all comes down to labeling and translating, that's it!