RADICAL'S LEAP DAYS

Although he is only 17 years old, Radical was born on Febrary 29, 1968, which was a leap day. The day he traveled through time to our current year was on his 16th birthday, February 29th, 1984; also a leap day!

What's a leap day? Using the Gregorian Calendar, we add an extra day to the calendar to make up for the fact that the amount of time that it takes the Earth to make a complete orbit of the sun (one solar year) does not divide evenly by the amount of time it takes the Earth to make a complete rotation (one day).

In fact, it takes 365 days, 5 hours, 48 minutes, and 45.51 seconds for the Earth to complete its orbit around the sun. How do we know all this? Science! You can look up this information later. As a decimal, we can express this length of time as 365.24219 days.

What that means, is that, rounded off, it takes the Earth about 365.25, or 365 ¼ days to make a complete trip around the sun. So, when we use an ordiary calendar of 365 days, we haven't quite arrived back at our starting point in the orbit when we change our calendars over. And after four years, how far are we off? About four fourths, or one full day! We're about a full day behind in our orbit around the sun, so we add a day to the calendar (on February 29) to make up for it. That's called a leap day!

Now, the problem with this is, a year is not exactly 365.25 days as you read above. It's only 365.24219 days. What's the big deal about being 0.00781 days off? Nothing, in the short term. But imagine that little difference being miscalculated every year for 1,000 years. Our calendar would be off by 1000 • 0.00781 = 7.81 days! We'd be off by more than a week! A few more millenia and summer vacation would be held when snow is on the ground!

The Gregorian Calendar has a way for calculating leap years to compensate, or make up for this roundoff error. Most people think that we have leap year (a year in which we add a leap day) every four years. This is not the case. Here's how it goes:

If a year divides by 4 evenly, that is to say that there is no remainder when you divide, it is a leap year. UNLESS the year also divides evenly by 100, then it is not a leap year. UNLESS the year also divides evenly by 400, then it is a leap year again.

Clear as mud? The rule has an exception, and the exception has an exception. Let's look at an example:

1900 divides by 4 → leap year
1900 divides by 100 → NOT a leap year
1900 does not divide by 400 → still not a leap year

1900 was not a leap year.

2000 divides by 4 → leap year
2000 divides by 100 → NOT a leap year
2000 divides by 400 → back to being a leap year again

2000 was a leap year. Check your calendar. It's true!

One last example:

2020 divides by 4 → leap year
2020 does not divide by 100 → still a leap year
You don't have to check if it divides by 400 if it doesn't divide by 100.

So, here are some questions for you to answer. Let's see if you can figure these out:

1. In what year were you born?
2. Was it a leap year?
3. When was the first leap year you lived in?
4. Were you alive when the leap day occurred on February 29?
5. How many leap years have you experienced in your whole life?
6. How many leap days have you experienced in your whole life?
7. How many leap years have happened since Radical was born, including the year he was born?
8. How many leap days have happened since Radical was born, including his birthday?
9. If Radical hadn't time traveled, how old would he be today?
10. When do you think Radical celebrates his birthday during non-leap years?
11. When would you celebrate your birthday if it was actually February 29?