Token,

The bit time in CAN is a "fixed" value that determines the bus rate (fixed in the sense that it must be 1 us for a 1 Mbps bus, or 10 us for a 100 Kbps bus, etc.). The bit time is set via a combination of the number of time quanta per bit (n * tq) and the baud rate prescaler.

As stated in 15.2.16, the bit time consists of 4 to 25 time quanta (tq). So, n must be a value between 4 and 25 (inclusive).

Looking at the two examples, a choice was made in each case to select n and the prescaler in order to achieve the desired bit time. Looking specifically at each:

- High Baud Rate case: it is 1 us per bit, so the 8 MHz peripheral clock must be divided by 8 in order to achieve 1 us. This can actually occur in two ways; a prescale of 1 and n of 8 (as given in the example), or a prescale of 2 and n of 4. Note that it is preferable to have a higher n value and a lower prescale value; this provides more flexibility in the Phase1/Phase2 timing (which effectively define how the bus's propagation delays are handled, and if it is even possible to properly deal with the propagation delay).
- Low Baud Rate case: it is 10 us per bit, so the 8 MHz peripheral clock must be divided by 80 in order to achieve 10 us. This can actually occur in six ways; a prescale of 8 and n of 10 (as given in the example), a prescale of 10 and n of 8, a prescale of 16 and n of 5, a prescale of 5 and n of 16, a prescale of 20 and n of 4, or a prescale of 4 and n of 20.

To determine the possibilities, take the factors of the overall divider and assign them into prescale and n. In the low baud rate case, the factors of 80 are 2 * 2 * 2 * 2 * 5. By assigning them into prescale and n such that 4 <= n <= 25 is maintained, you have the possible choices. Is prescale of 4 and n of 20 better than prescale of 8 and n of 10? It might be if you need that extra bit of granularity in the Phase1/Phase2 setting for handling bus propagation delay. Or it might not be...that determination goes well beyond the data that is used for these examples (it depends on the characteristics of the CAN transceiver that you use and the network to which you attach).

--Brian