Qualitative Fourier Analysis

Even functions: $f(t) = f(-t)$
Odd functions: $f(t) = -f(-t)$

- The average value of the function over a period is equal to $a_0/2$.
- For even functions (and even functions displaced from 0 zero by a constant offset), the Fourier coefficients of the sine terms (the b_m's) are all zero.
- For odd functions (and even functions displaced from 0 zero by a constant offset), the Fourier coefficients of the cosine terms (the a_n's) are all zero. (This is also true for functions that would be odd except that they are shifted up or down by a constant value.)

You should be able to look at a graph of a periodic even or odd function (or a function defined on some finite interval) and be able to give reasonable numerical estimates for a_0, a_1, and b_1. You can often determine by inspection the sign of the next non-zero coefficient.