we can consider the error $e_m(x) = f(x) - s_m(x)$. Figure 10.2.5 shows a plot of $|e_6(x)|$ versus $x$ for $0 \leq x \leq 2$. Observe that $|e_6(x)|$ is greatest at the points $x = 0$ and $x = 2$ where the graph of $f(x)$ has corners. It is more difficult for the series to approximate the function near these points, resulting in a larger error there for a given $n$. Similar graphs are obtained for other values of $m$.

Once you realize that the maximum error always occurs at $x = 0$ or $x = 2$, you can obtain a uniform error bound for each $m$ simply by evaluating $|e_m(x)|$ at one of these points. For example, for $m = 6$ we have $e_6(2) = 0.03370$, so $|e_6(x)| < 0.034$ for $0 \leq x \leq 2$, and consequently for all $x$.

Table 10.2.1 shows corresponding data for other values of $m$; these data are plotted in Figure 10.2.6. From this information you can begin to estimate the number of terms that are needed in the series in order to achieve a given level of accuracy in the approximation. For example, to guarantee that $|e_m(x)| \leq 0.01$ we need to choose $m = 21$.

**FIGURE 10.2.4** Partial sums in the Fourier series, Eq. (20), for the triangular wave.

**FIGURE 10.2.5** Plot of $|e_6(x)|$ versus $x$ for the triangular wave.