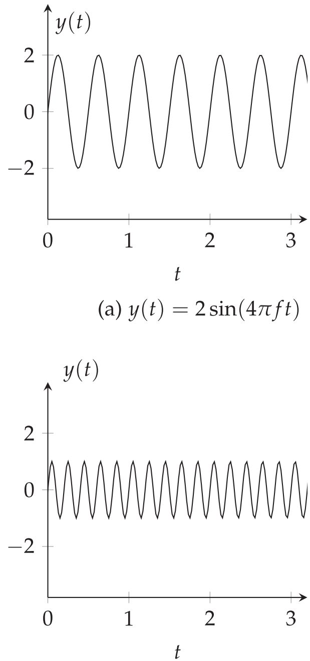


(b) $y(t) = \sin(10\pi f t)$

Figure 2.1: Plots of $y(t) = A\ \sin(2\pi ft)$ on [0, 5] for $f = 2$ Hz and $f = 5$ Hz.

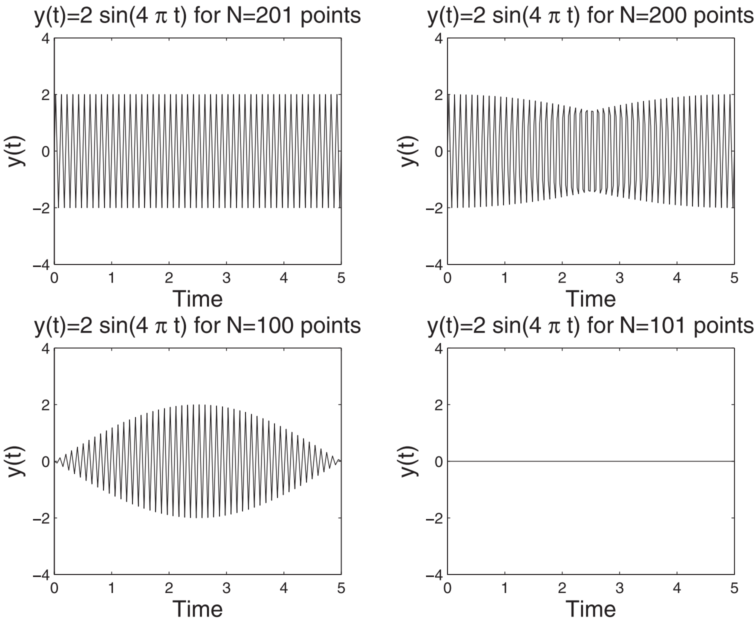
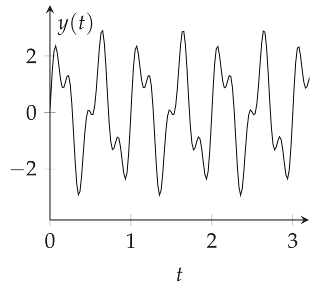
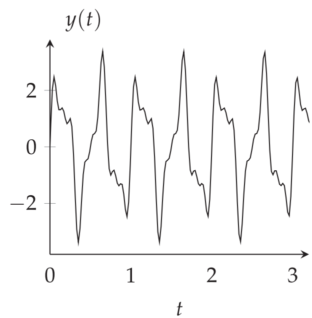


Figure 2.2: Problems can occur while plotting. Here we plot the function $y(t) = 2 \sin 4\pi t$ using $N = 201, 200, 100, 101$ points.

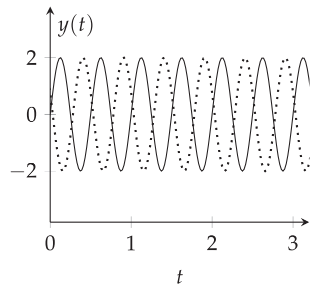


(a) Sum of signals with frequencies
$f = 2$ Hz and $f = 5$ Hz.

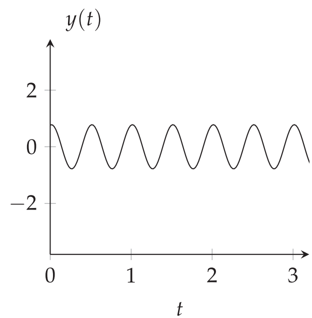


(b) Sum of signals with frequencies
$f = 2$ Hz, $f = 5$ Hz, and $f = 8$ Hz.

Figure 2.3: Superposition of several sinusoids.



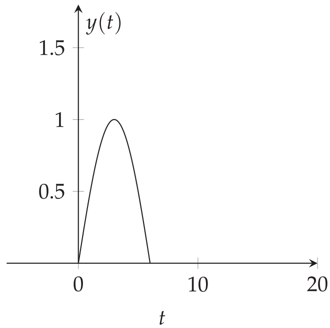
(a) Plot of each function.



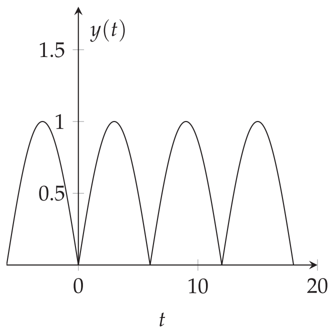
(b) Plot of the sum of the functions.

Figure 2.4: Plot of the functions $y(t) = 2\sin(4\pi t)$ and $y(t) = 2\sin(4\pi t + 7\pi/8)$ and their sum.

002x004.eps



(a) Plot of function $f(t)$.



(b) Periodic extension of $f(t)$.

Figure 2.5: Plot of the function $f(t)$ defined on $[0, 2\pi]$ and its periodic extension.

002x005.eps

Courtesy of CRC Press/Taylor & Francis Group

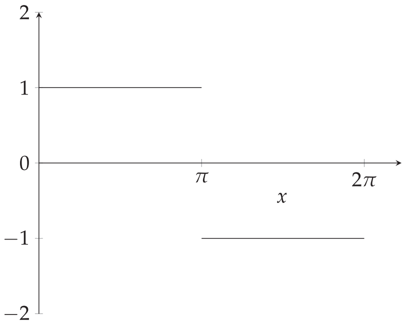


Figure 2.6: Plot of discontinuous function in Example 2.3.

002x006.eps

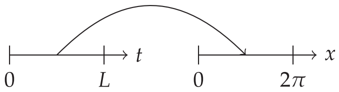


Figure 2.7: A sketch of the transformation between intervals $x \in [0, 2\pi]$ and $t \in [0, L]$.

002x007.eps

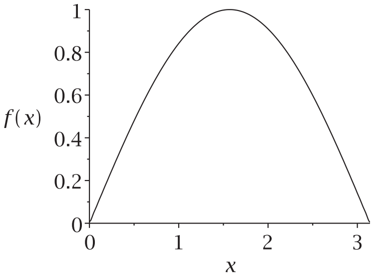


Figure 2.8: Plot of the first fifty terms of the Fourier series representation for $f(x) = \sin x$, $x \in [0, \pi]$.

002x008.eps

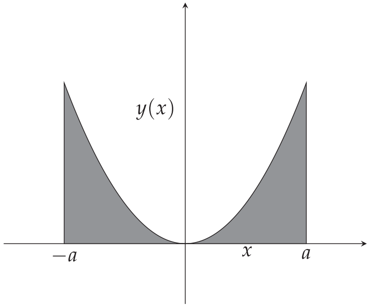


Figure 2.9: Area under an even function on a symmetric interval, $[-a, a]$.

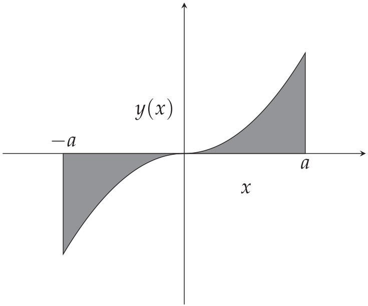


Figure 2.10: Area under an odd function on a symmetric interval, $[-a, a]$.

002x010.eps

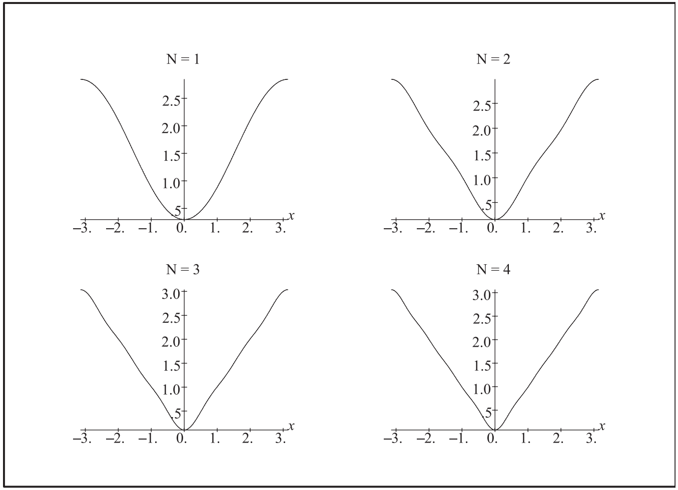


Figure 2.11: Plot of the first partial sums of the Fourier series representation for $f(x) = |x|$ on the interval $x \in [-\pi, \pi]$.

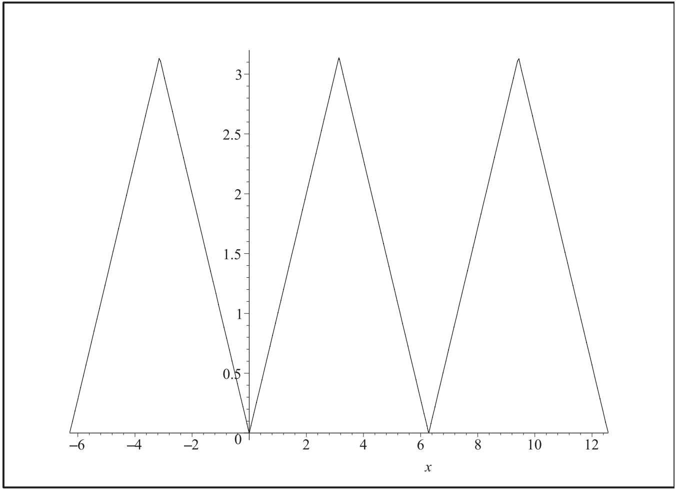


Figure 2.12: Plot of the first 10 terms of the Fourier series representation for $f(x) = |x|$ on the interval $x \in [-2\pi, 4\pi]$.

002x012.eps

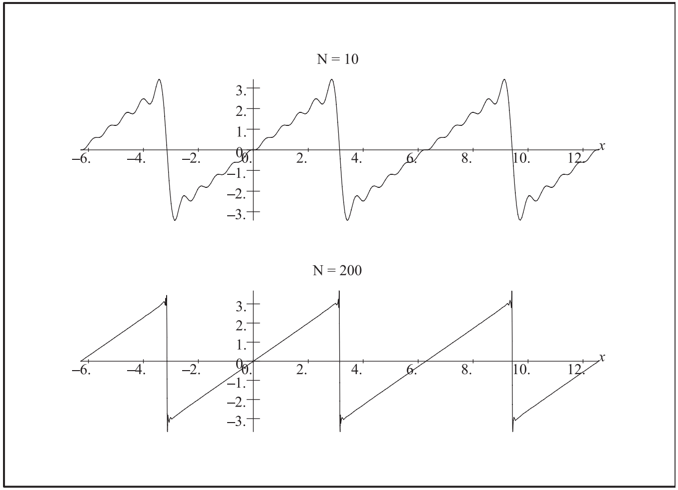


Figure 2.13: Plot of the first 10 terms and 200 terms of the Fourier series representation for $f(x) = x$ on the interval $x \in [-2\pi, 4\pi]$.

002x013.eps

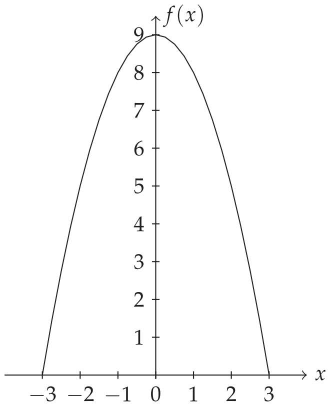


Figure 2.14: Plot of $f(x) = 9 - x^2$ for $x \in [-3, 3]$.

002x014.eps

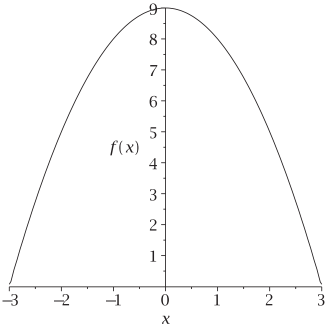


Figure 2.15: Plot of the first fifty terms of the Fourier series representation of $f(x) = 9 - x^2$ for $x \in [-3,3]$.

002x015.eps

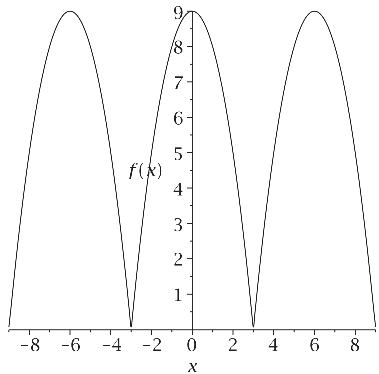


Figure 2.16: Plot of the periodic extension of the Fourier series representation of $f(x) = 9 - x^2$ for $x \in [-3,3]$.

002x016.eps

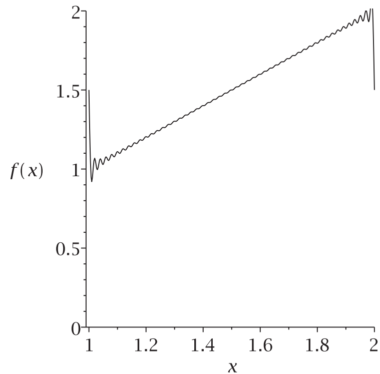


Figure 2.17: Plot of the first fifty terms of the Fourier series representation for $f(x) = x$, $x \in [1, 2]$.

002x017.eps

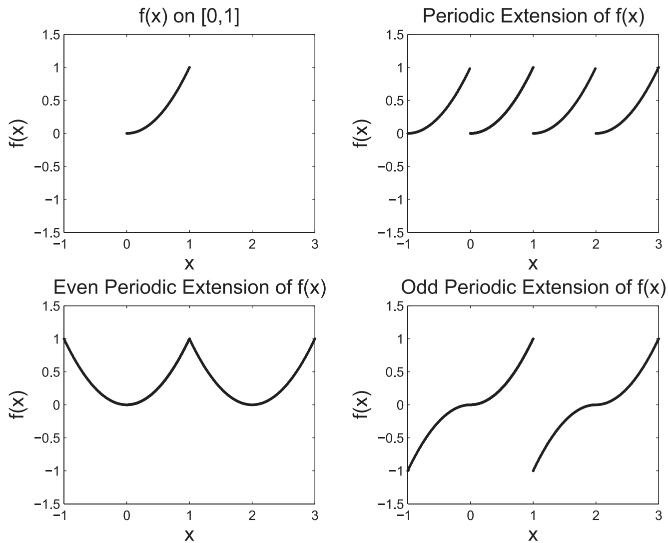


Figure 2.18: This is a sketch of a function and its various extensions. The original function $f(x)$ is defined on $[0, 1]$ and graphed in the upper left corner. To its right is the periodic extension, obtained by adding replicas. The two lower plots are obtained by first making the original function even or odd and then creating the periodic extensions of the new function.

002x018.eps

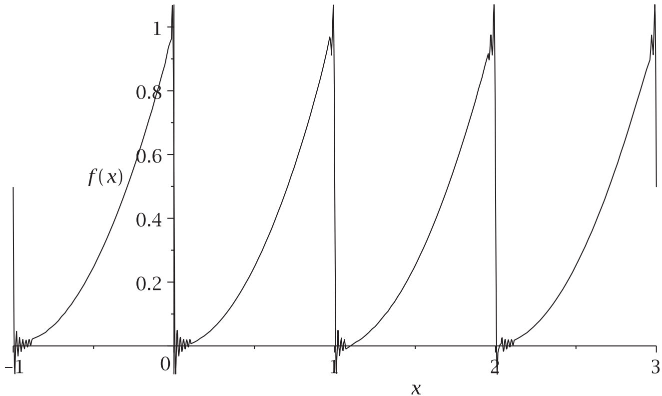


Figure 2.19: The periodic extension of $f(x) = x^2$ on [0, 1].

002x019.eps

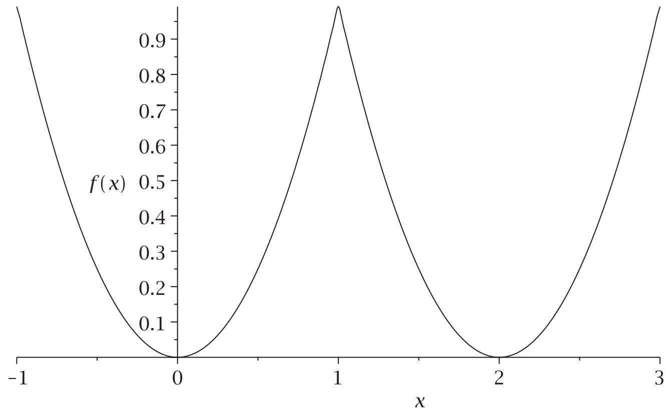


Figure 2.20: The even periodic extension of $f(x) = x^2$ on $[0, 1]$.

002x020.eps

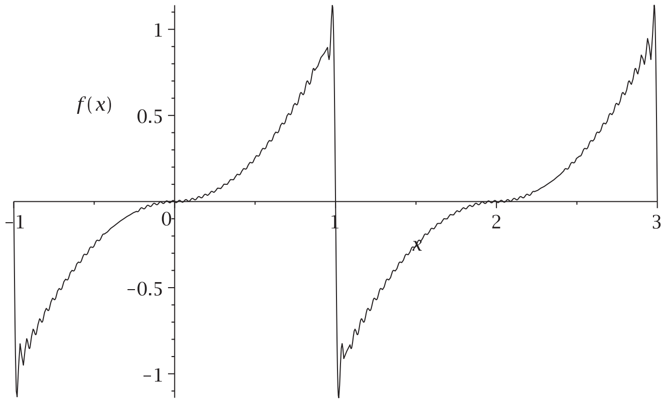


Figure 2.21: The odd periodic extension of $f(x) = x^2$ on [0, 1].

002x021.eps

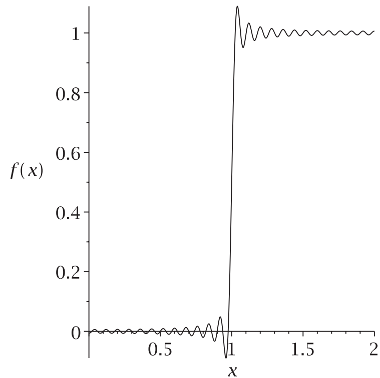


Figure 2.22: Plot of the first fifty terms of the Fourier Cosine Series representation for Example 2.14.

002x022.eps

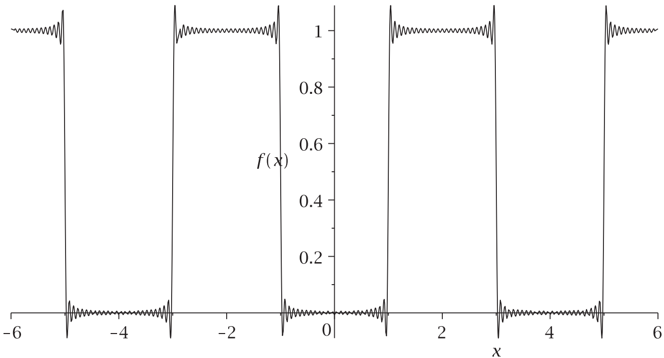


Figure 2.23: Plot of the first fifty terms of the Fourier Cosine Series representation for Example 2.14 for $x \in [-6, 6]$..

002x023.eps

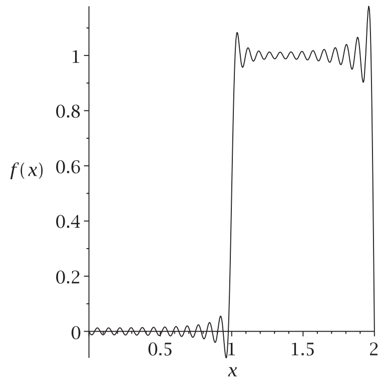


Figure 2.24: Plot of the first fifty terms of the Fourier Sine Series representation for Example 2.15.

002x024.eps

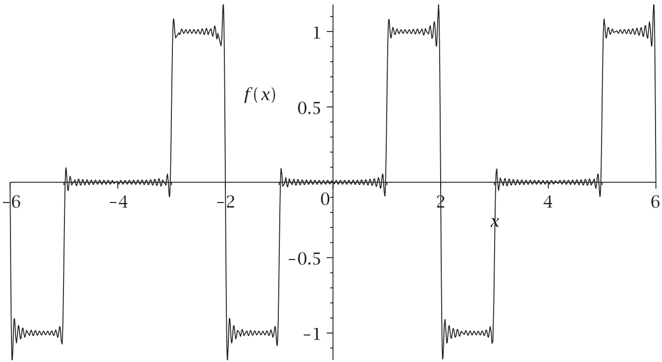


Figure 2.25: Plot of the first fifty terms of the Fourier Sine Series representation for Example 2.15 for $x \in [-6, 6]$.

002x025.eps

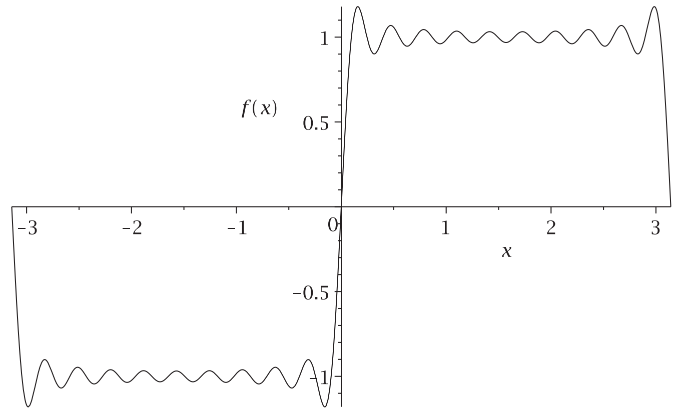


Figure 2.26: The Fourier series representation of a step function on $[\pi, \pi]$ for $N = 10$.

002x026.eps

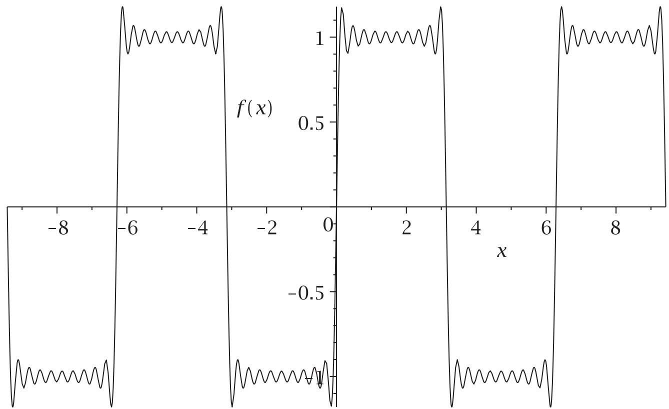


Figure 2.27: The Fourier series representation of a step function on $[-\pi, \pi]$ for $N = 10$ plotted on $[-3\pi, 3\pi]$ displaying the periodicity.

002x027.eps

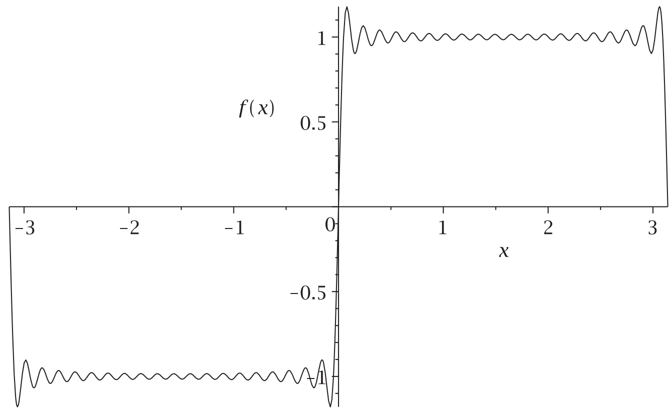


Figure 2.28: The Fourier series representation of a step function on $[-\pi, \pi]$ for $N = 20$.

002x028.eps

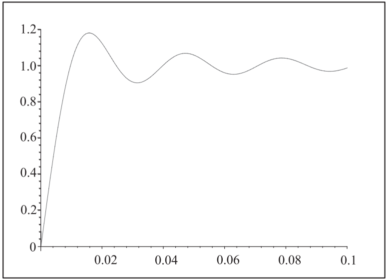


Figure 2.29: The Fourier series representation of a step function on $[-\pi, \pi]$ for $N = 100$.

002x029.eps

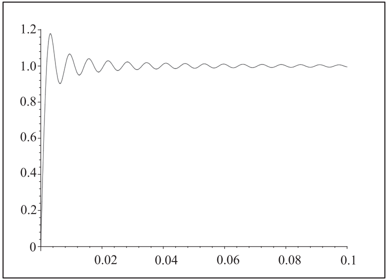


Figure 2.30: The Fourier series representation of a step function on $[-\pi, \pi]$ for $N = 500$.

002x030.eps

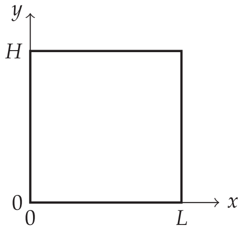


Figure 2.31: The rectangular membrane of length L and width H. There are fixed boundary conditions along the edges.

002x031.eps

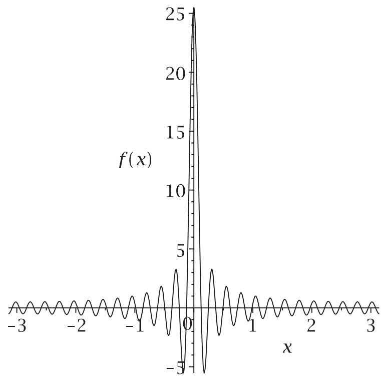


Figure 2.32: *N*th Dirichlet Kernel for N=25.

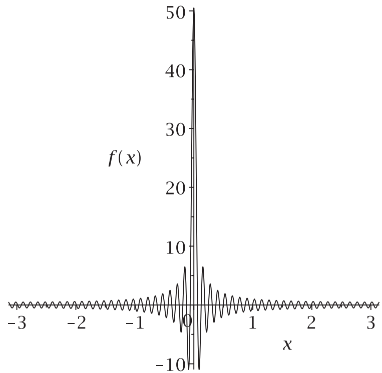


Figure 2.33: *N*th Dirichlet Kernel for *N*=50.

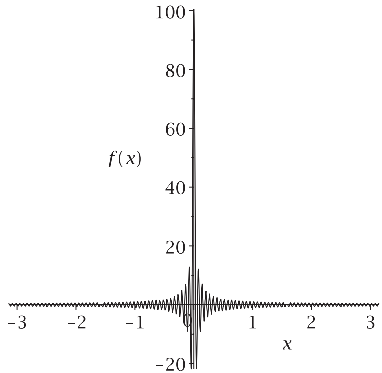


Figure 2.34: *N*th Dirichlet Kernel for N=100.

002x034.eps

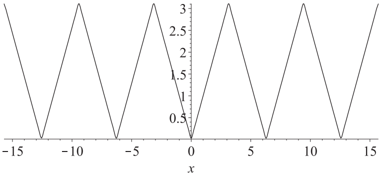


Figure 2.35: *N*th Partial Sum in Maple.

002x035.eps

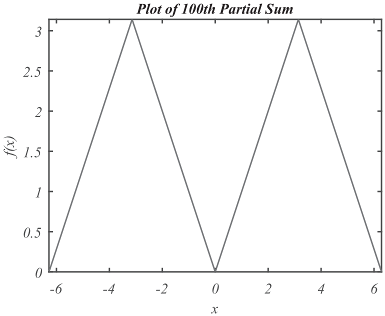


Figure 2.36: Nth Partial Sum done in MATLAB.

002x036.eps

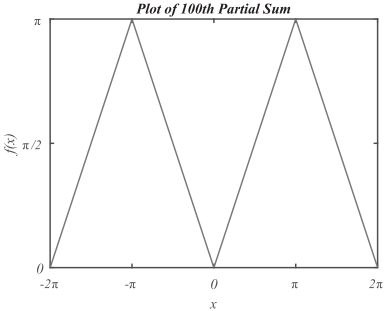


Figure 2.37: *N*th Partial Sum.

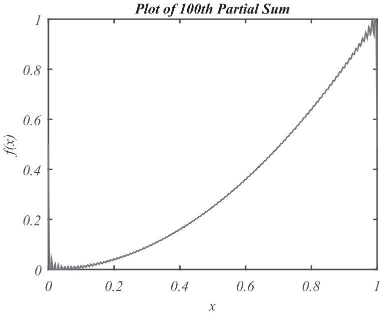


Figure 2.38: Nth Partial Sum for $f(x) = x^2$ on $x \in [0,1]$ as found in MATLAB using symbolic computation of the Fourier coefficients.

002x038.eps