**Exercise**

**Perform Fourier transform of signals**

Let the function f(x) be given with a period of 2π.

It is represented by the Fourier series converging in a given function in the interval (-π,π):



The coefficients of the series can be calculated using the formulas:

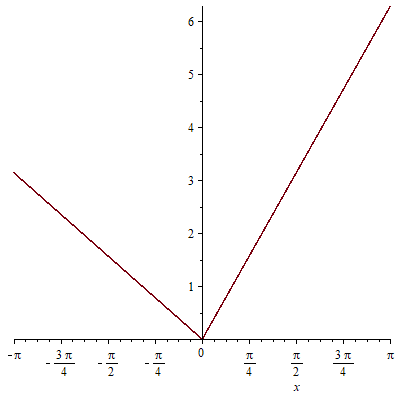






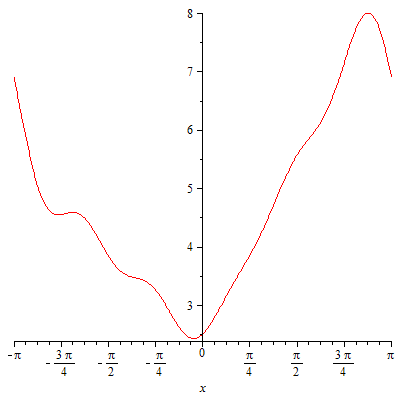
**Example 4.1.**

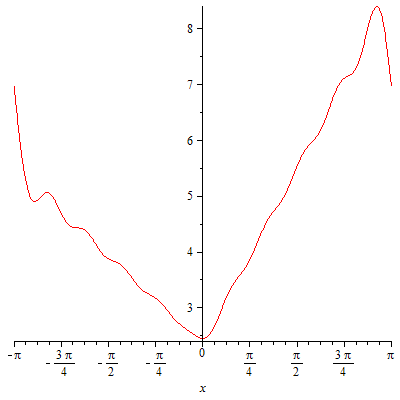
Expand the signal into a Fourier series with the number of terms 5, 10, 50, 100 and 150.

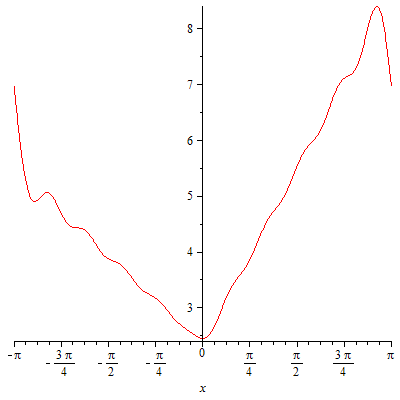


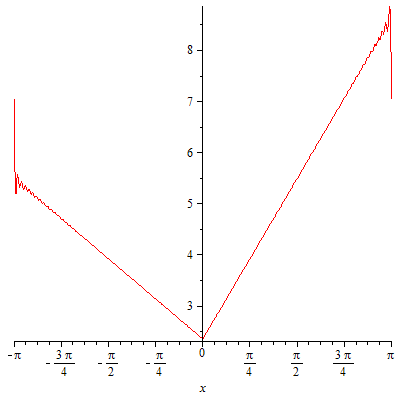


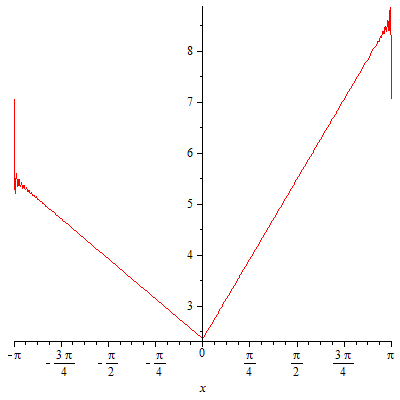
Determine the number of terms at which the signal shape is modeled satisfactorily.

N=5 

N=10 

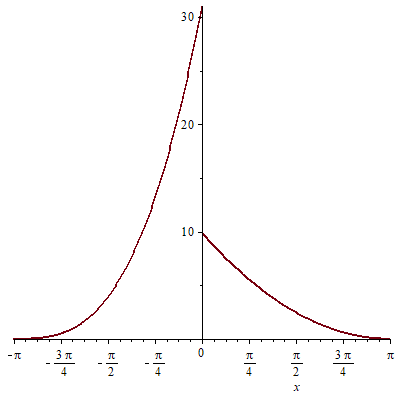
N=50 

N=100 

N=150 

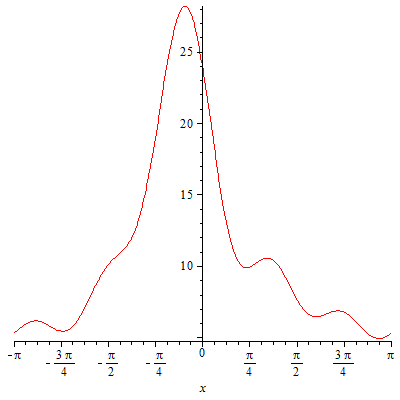
**Example 4.2.**

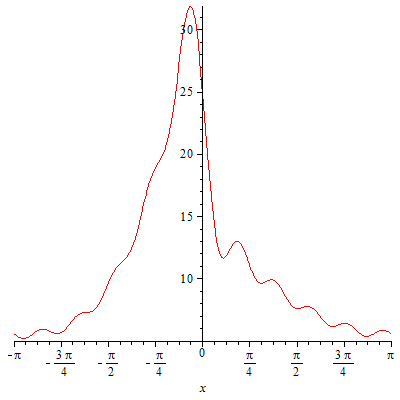
Expand the signal into a Fourier series with the number of terms 5, 10, 50, 100 and 150.

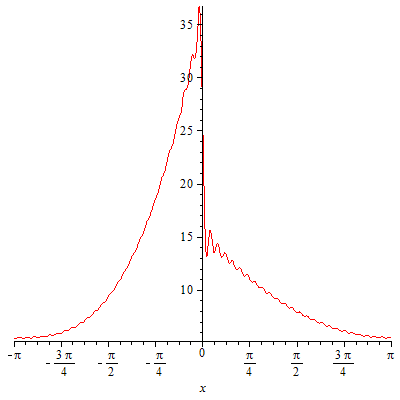


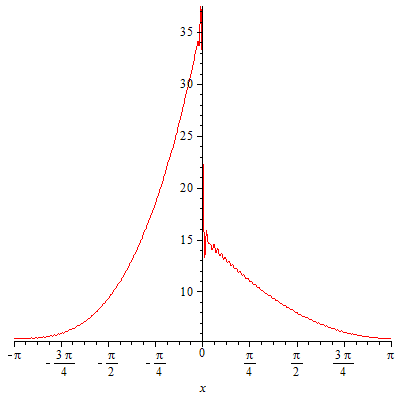


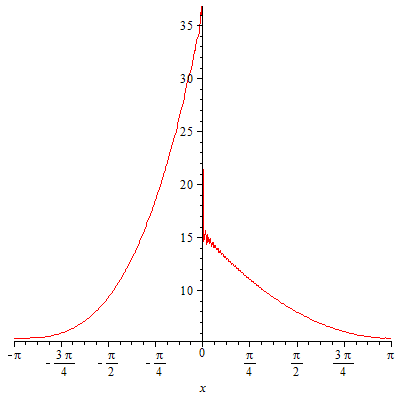
Determine the number of terms at which the signal shape is modeled satisfactorily.

N=5 

N=10 

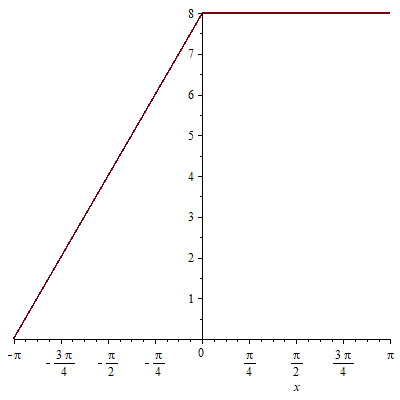
N=50 

N=100 

N=150 

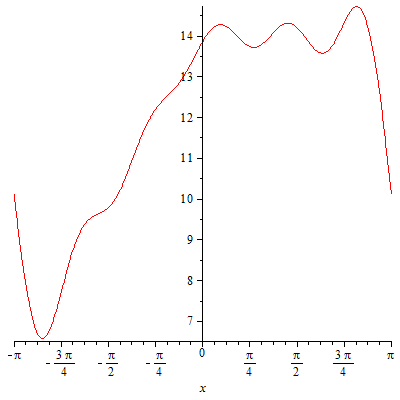
**Example 4.3.**

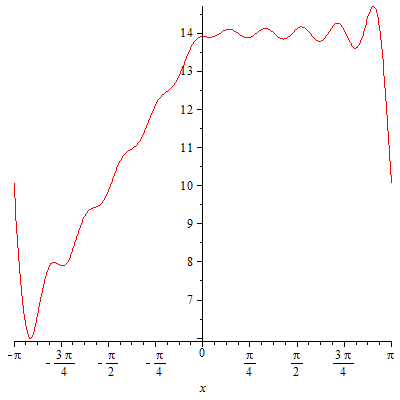
Expand the signal into a Fourier series with the number of terms 5, 10, 50, 100 and 150.

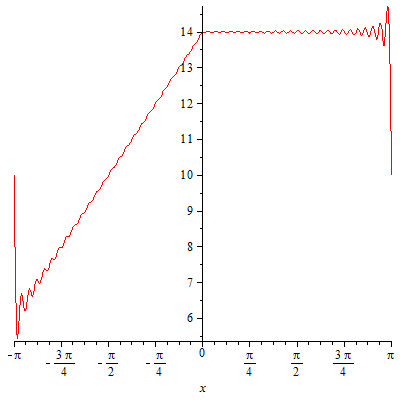
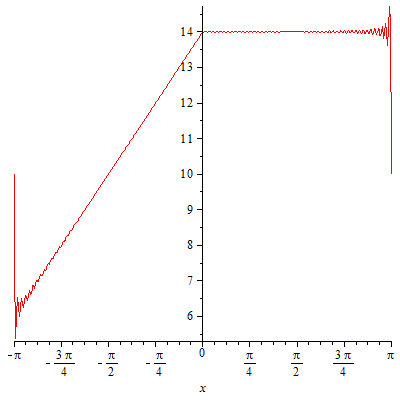


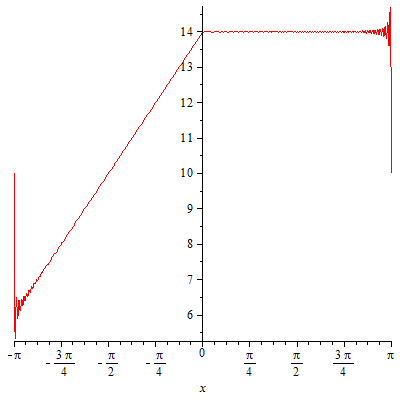


Determine the number of terms at which the signal shape is modeled satisfactorily.

N=5 

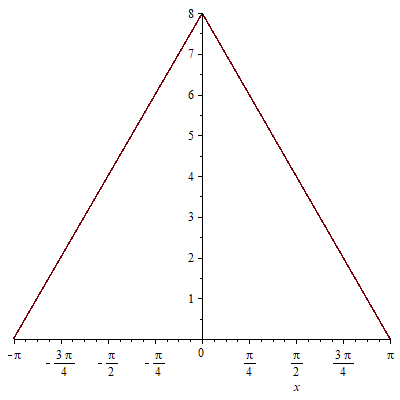
N=10 

N=50   
N=100 

N=150 

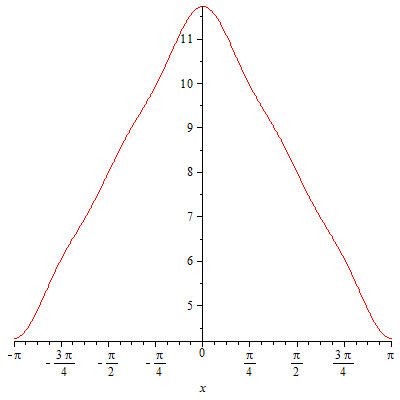
**Example 4.4.**

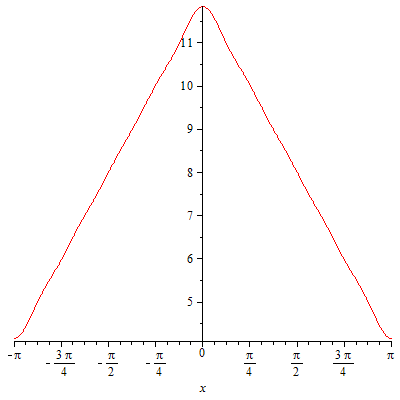
Expand the signal into a Fourier series with the number of terms 5, 10, 50, 100 and 150.

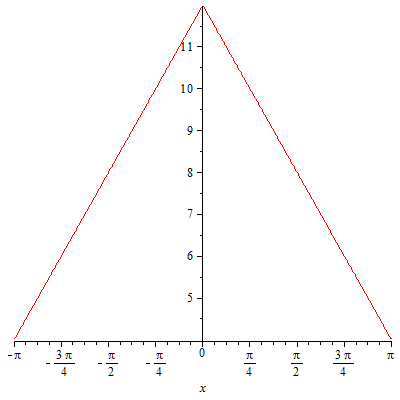
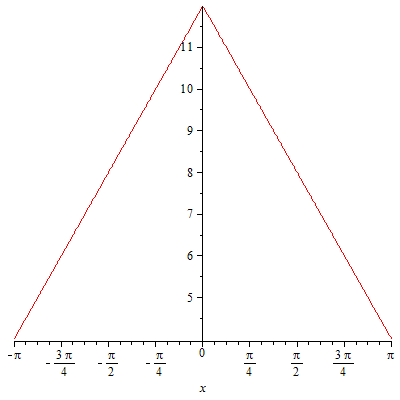


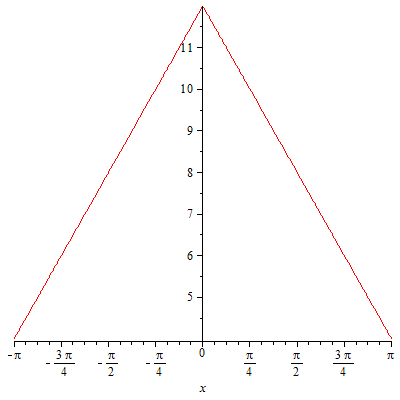


Determine the number of terms at which the signal shape is modeled satisfactorily.

N=5 

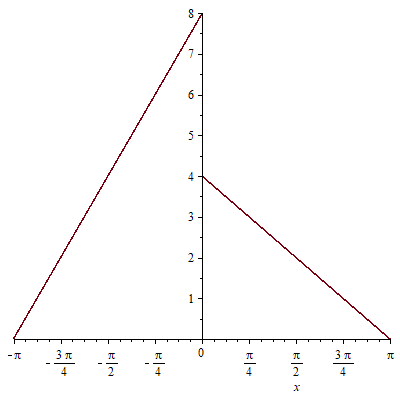
N=10 

N=50   
N=100 

N=150 

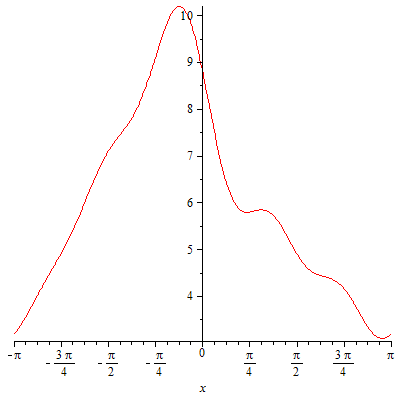
**Example 4.5.**

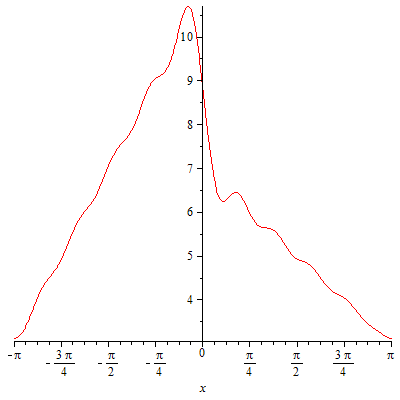
Expand the signal into a Fourier series with the number of terms 5, 10, 50, 100 and 150.

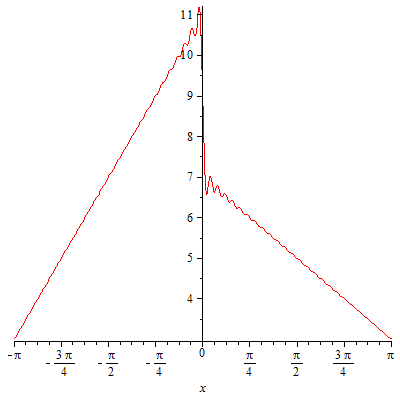
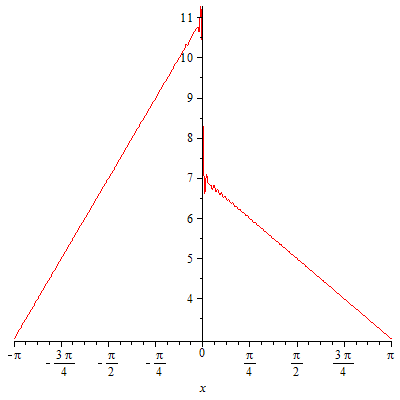




Determine the number of terms at which the signal shape is modeled satisfactorily.

N=5 

N=10 

N=50   
N=100 

N=150 