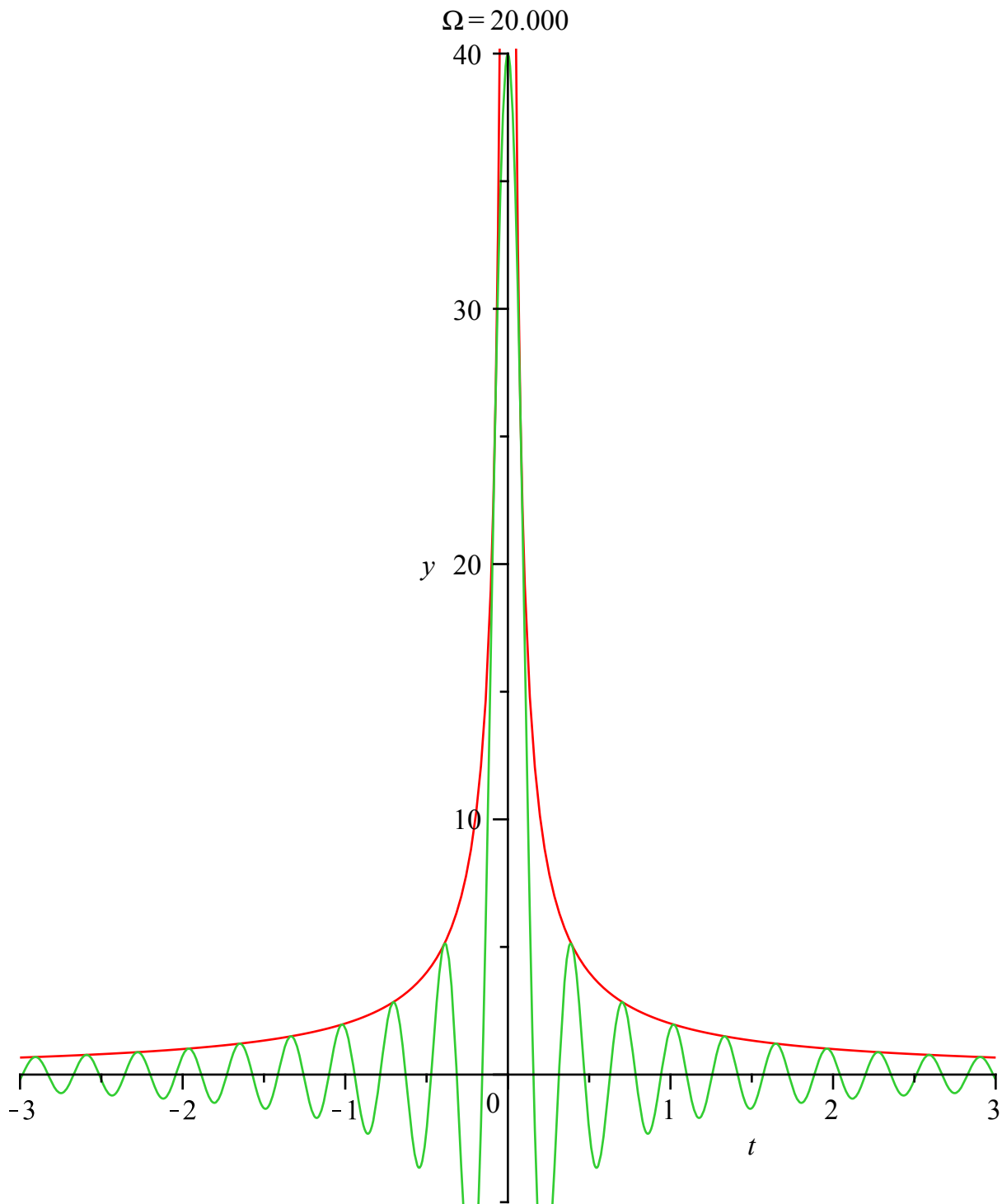


```
> with(plots);
```

```
[animate, animate3d, animatecurve, arrow, changecoords, complexplot, complexplot3d,  
conformal, conformal3d, contourplot, contourplot3d, coordplot, coordplot3d, densityplot,  
display, dualaxisplot, fieldplot, fieldplot3d, gradplot, gradplot3d, implicitplot,  
implicitplot3d, inequal, interactive, interactiveparams, intersectplot, listcontplot,  
listcontplot3d, listdensityplot, listplot, listplot3d, loglogplot, logplot, matrixplot, multiple,  
odeplot, pareto, plotcompare, pointplot, pointplot3d, polarplot, polygonplot, polygonplot3d,  
polyhedra_supported, polyhedraplot, rootlocus, semilogplot, setcolors, setoptions,  
setoptions3d, spacecurve, sparsematrixplot, surfdata, textplot, textplot3d, tubeplot]
```

```
> animate(plot, [[2/(abs(t)), 2*sin(Omega*t)/t], t=-3..3, y=-5.  
.40], Omega=1..20);
```



```

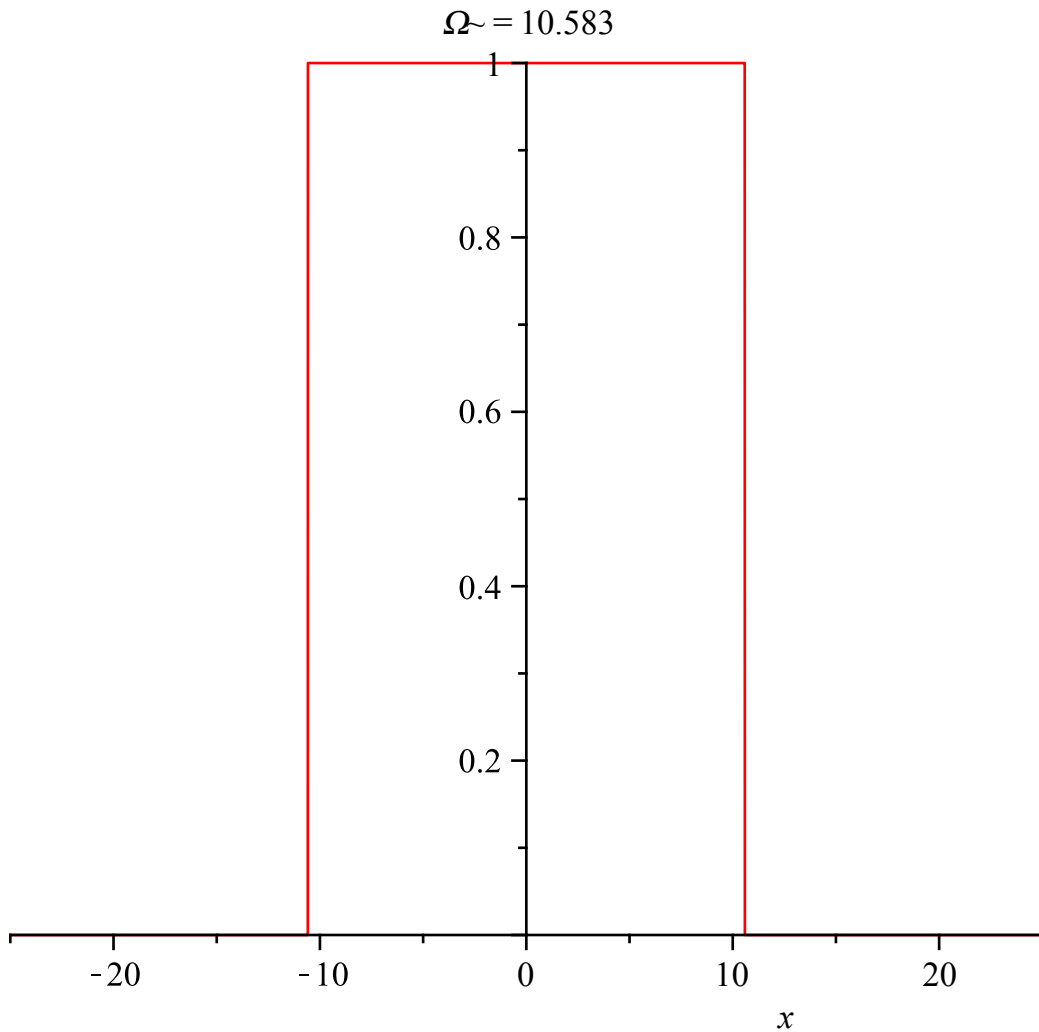
> with(inttrans);
[adddtable, fourier, fouriercos, fouriersin, hankel, hilbert, invfourier, invhilbert, invlaplace,
 invmellin, laplace, mellin, savetable]
> fourier(1,x,omega);
2  $\pi$  Dirac( $\omega$ )
> h:= proc(Omega) Heaviside(x+Omega) - Heaviside(x-Omega) end

```

(1)

```
proc;
  h := proc(Omega) Heaviside(x + Omega) - Heaviside(x - Omega) end proc
```

```
> animate(plot,[h(Omega), x=-25..25], Omega=1..24);
```



```
> G:=fourier(h(Omega), x, omega);
```

$$G := \frac{2 \sin(\Omega \omega)}{\omega}$$

```
> assume(Omega>0); limit(G, omega=0); int(G, omega = 0..infinity);
```

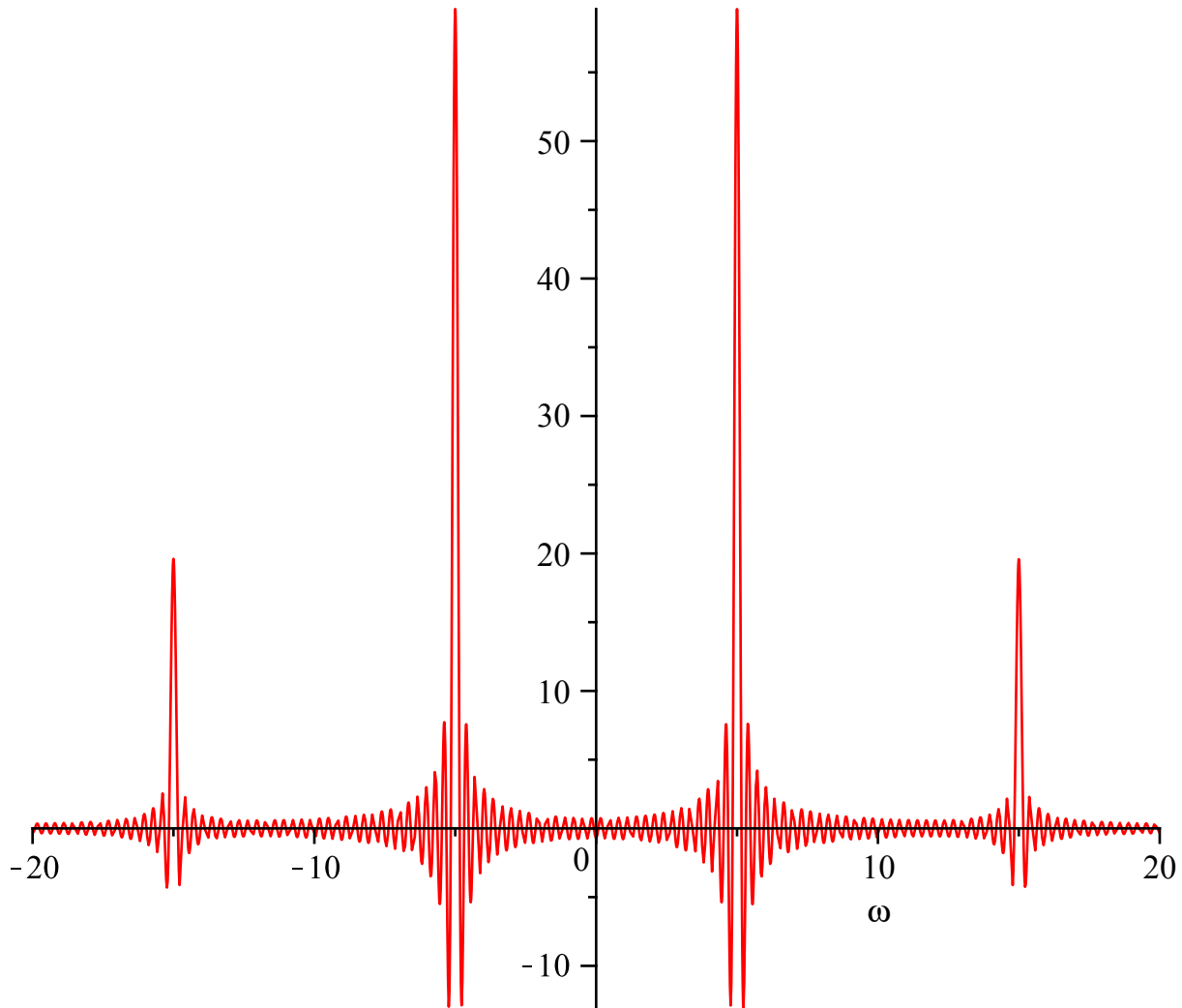
$$\frac{2 \Omega}{\pi}$$

(2)

```
> assume(n>0); B:= fourier(h(20)*(3*cos(5*x)+cos(15*x)),x,omega);
```

$$B := \frac{\sin(-300 + 20 \omega)}{\omega - 15} + \frac{3 \sin(-100 + 20 \omega)}{\omega - 5} + \frac{3 \sin(100 + 20 \omega)}{\omega + 5} + \frac{\sin(300 + 20 \omega)}{\omega + 15}$$

```
> plot(fourier(h(20)*(3*cos(5*x) + cos(15*x)),x,omega), omega=-20.
.20);
```



```
> C:= fourier(h(Omega)*cos(n*x),x,omega); X:= fourier(h(Omega)*x,
x, omega);
```

$$C := \frac{\sin(\Omega(-\omega + n))}{-\omega + n} + \frac{\sin(\Omega(\omega + n))}{\omega + n}$$

$$X := \frac{2 \int (-\sin(\Omega \omega) + \Omega \cos(\Omega \omega) \omega)}{\omega^2}$$

```
> assume(Omega, real); assume(omega, real); Re(X); Im(X);
```

$$\frac{2(-\sin(\Omega \omega) + \Omega \cos(\Omega \omega) \omega)}{\omega^2}$$

```
> with(DiscreteTransforms);
```

```
[DiscreteWaveletTransform, FourierTransform, InverseDiscreteWaveletTransform,
InverseFourierTransform, WaveletCoefficients, WaveletPlot]
```

(3)

```
[> ?FourierTransform  
[>
```