Fourier series from Test A, Fall 2007

$$b := n \to \left(\frac{2}{\mathrm{Pi}}\right) \cdot \left(\left(\frac{(-1)^{(n-1)}}{n}\right) + \left(\frac{\sin(n)}{n^2}\right)\right);$$

$$n \to \frac{2\left(\frac{(-1)^{n-1}}{n} + \frac{\sin(n)}{n^2}\right)}{\pi} \tag{1}$$

$$b(2);$$

$$\frac{2\left(-\frac{1}{2} + \frac{1}{4}\sin(2)\right)}{\pi} \tag{2}$$

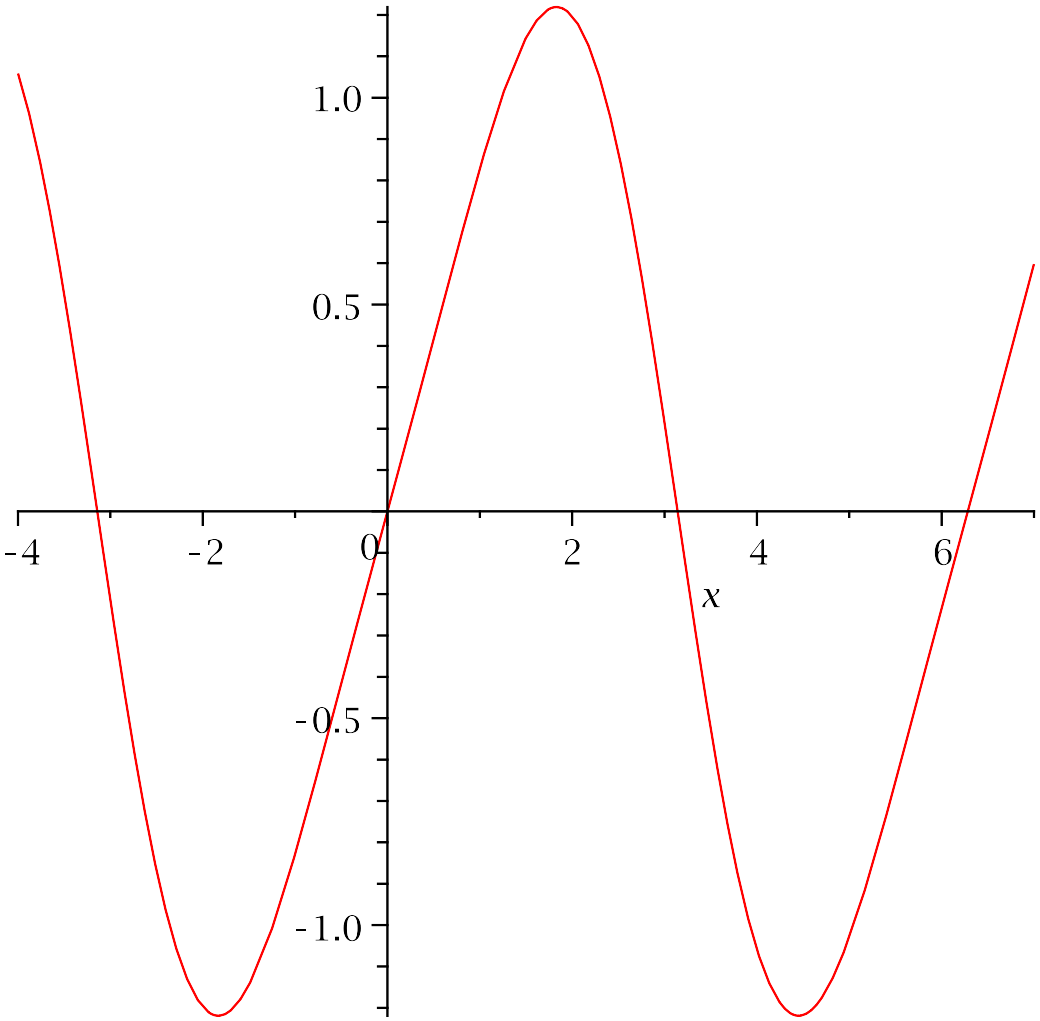
$$F := (N, x) \to evalf(sum(b(n) \cdot \sin(n \cdot x), n = 1..N));$$

$$(N, x) \to evalf\left(\sum_{n=1}^{N} b(n)\sin(n\,x)\right) \tag{3}$$

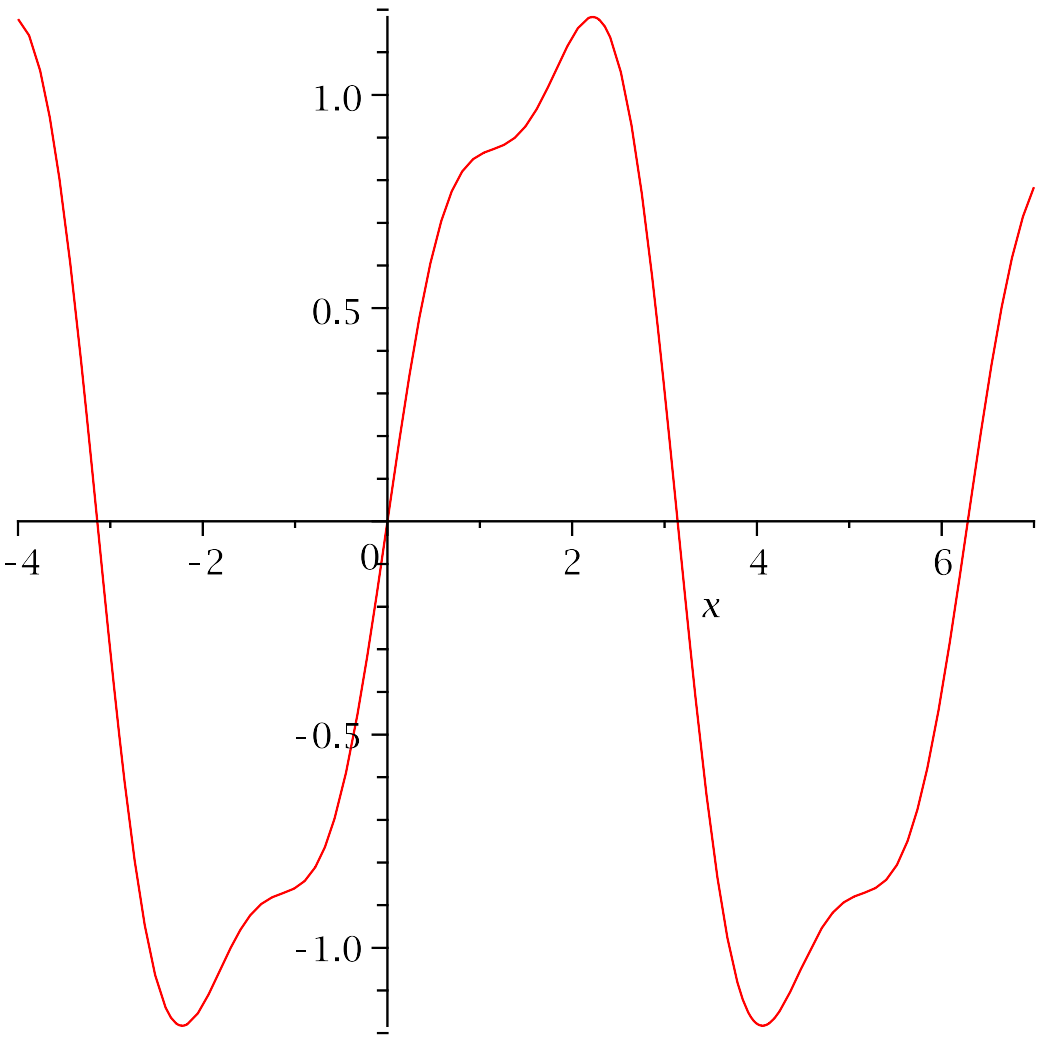
$$F(2, x);$$

$$1.172316839\sin(x) - 0.1735907059\sin(2.x) \tag{4}$$

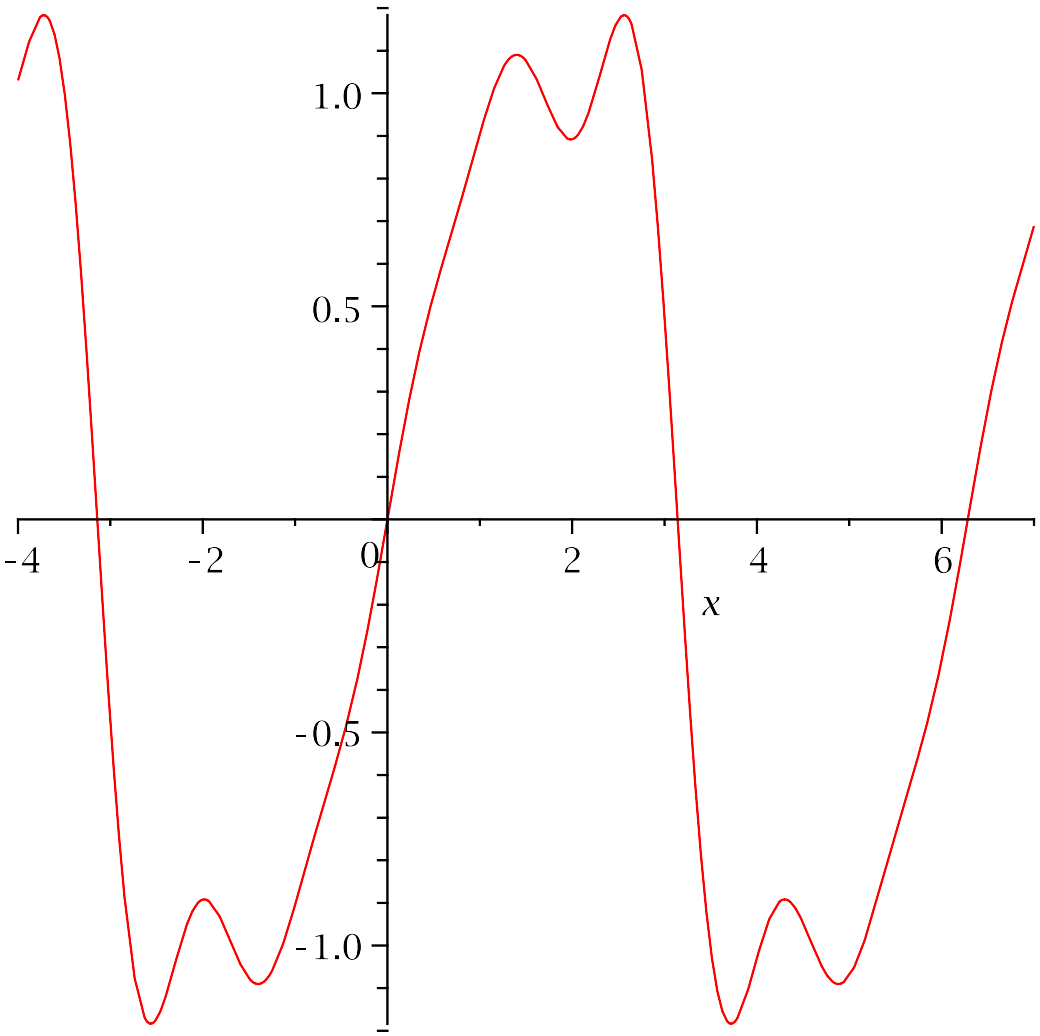
$$plot(F(2, x), x = -4..7);$$



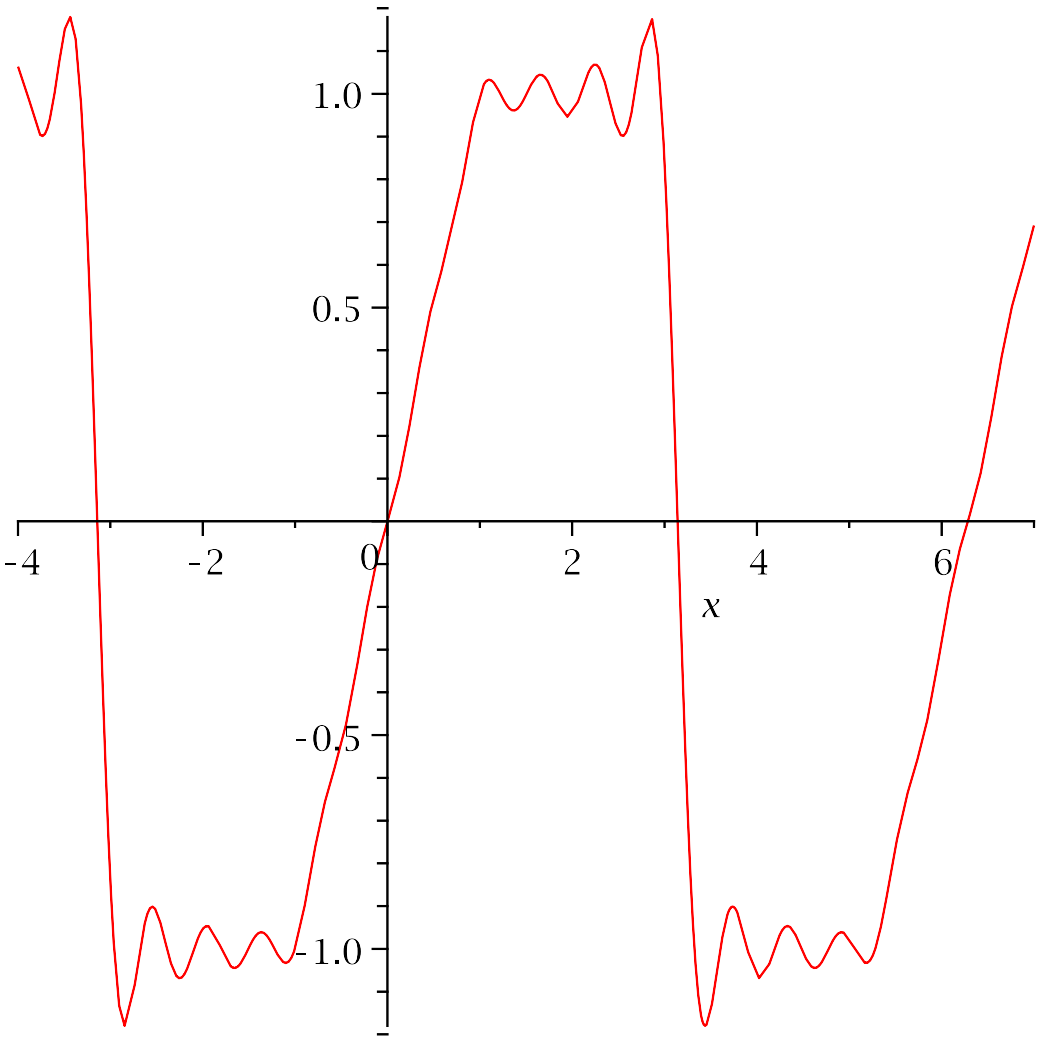

$plot(F(3, x), x = -4..7);$



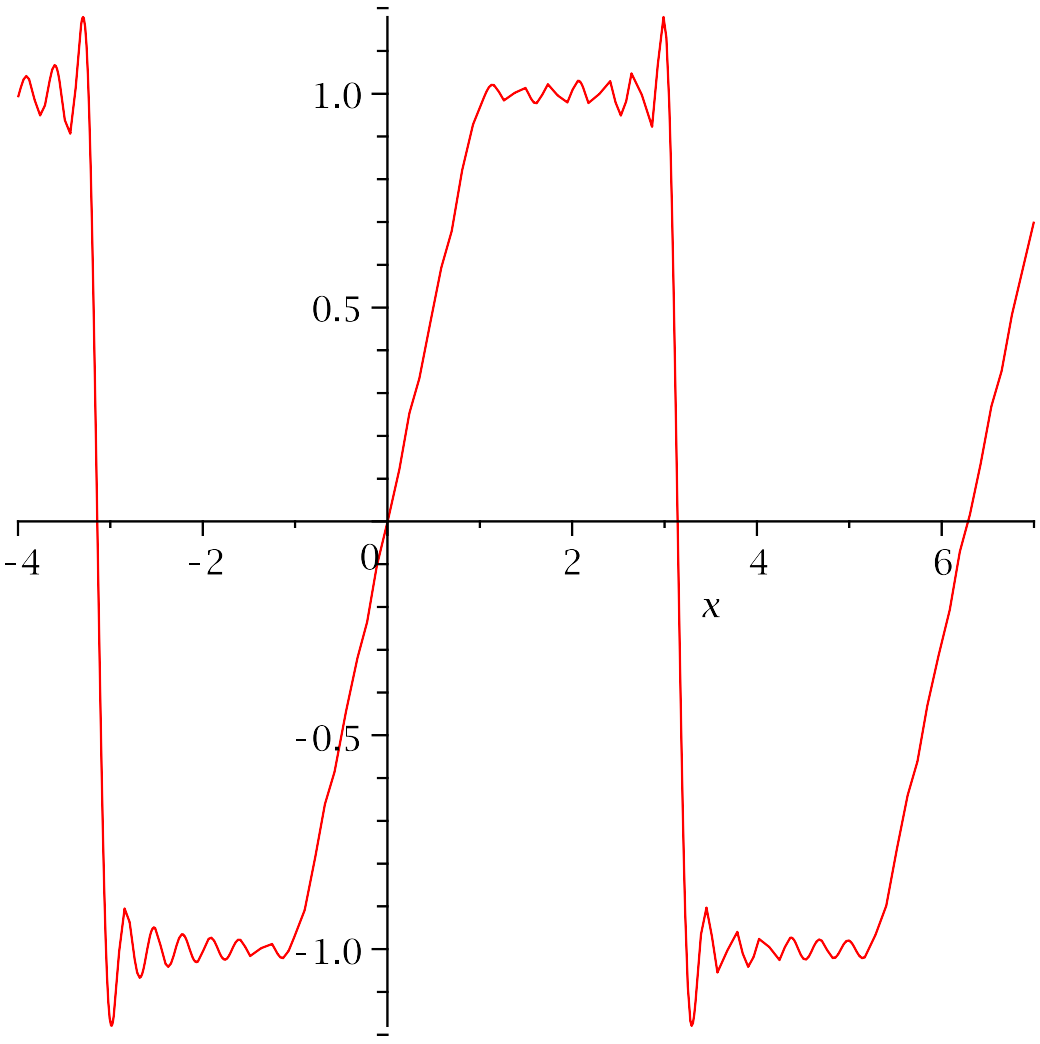

$plot(F(5, x), x = -4..7);$



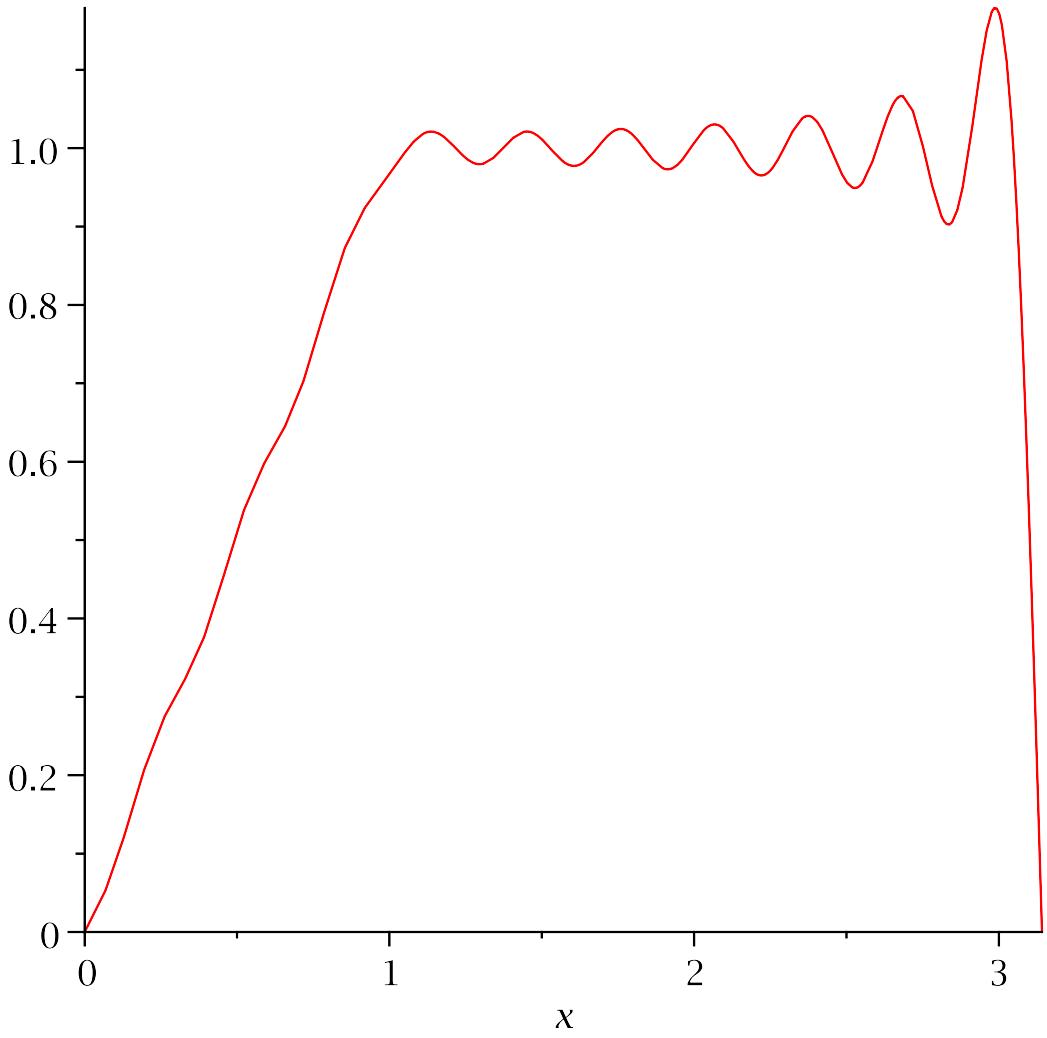

$plot(F(10, x), x = -4..7);$



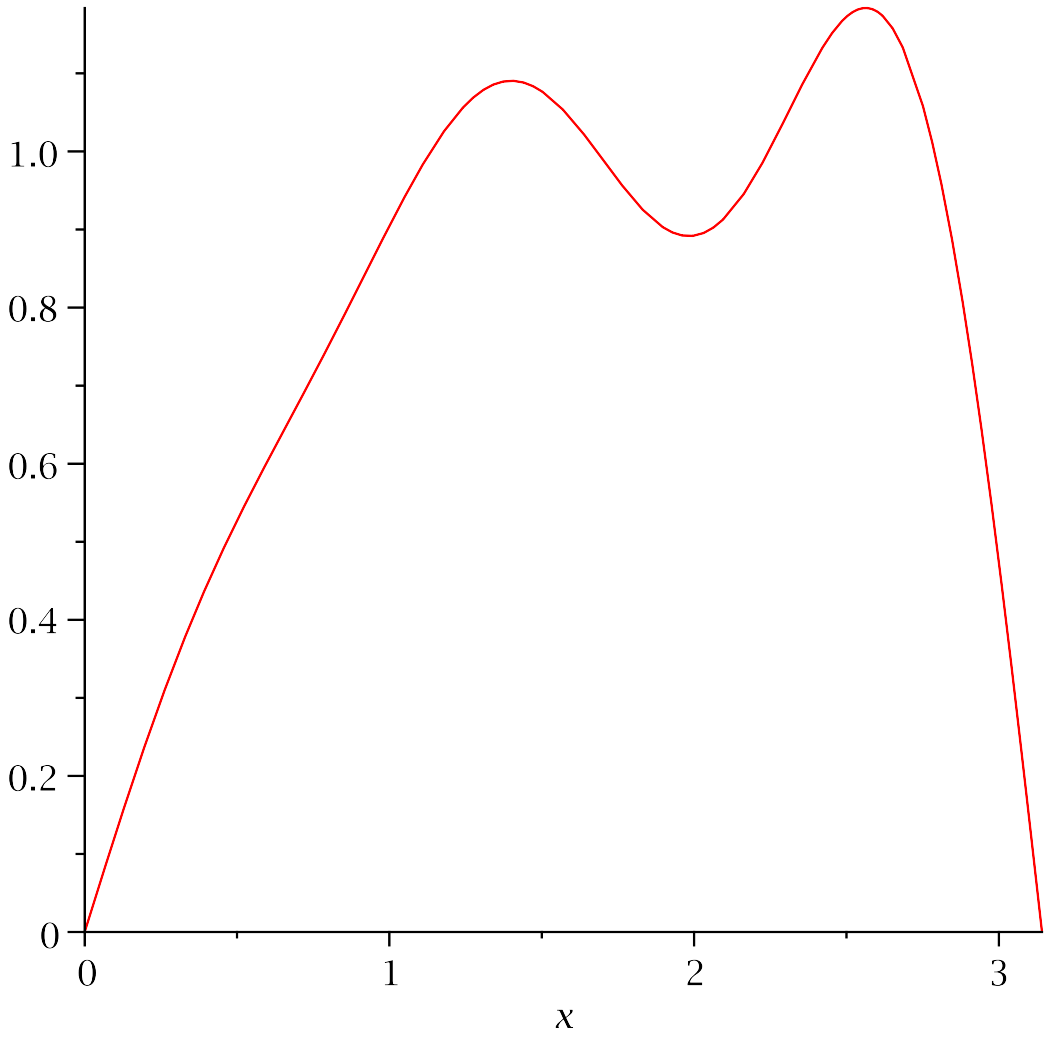

$plot(F(20, x), x = -4..7);$



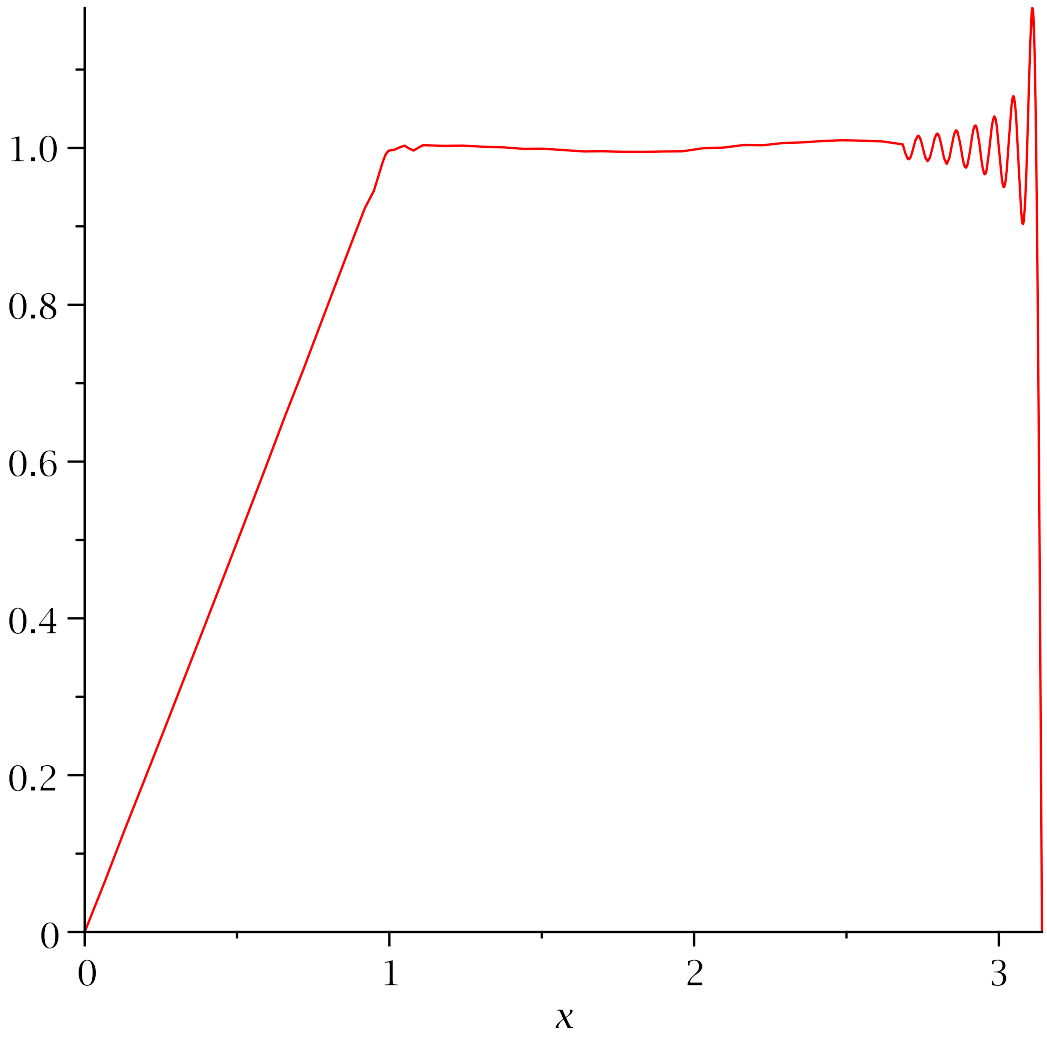

$plot(F(20, x), x = 0..Pi);$



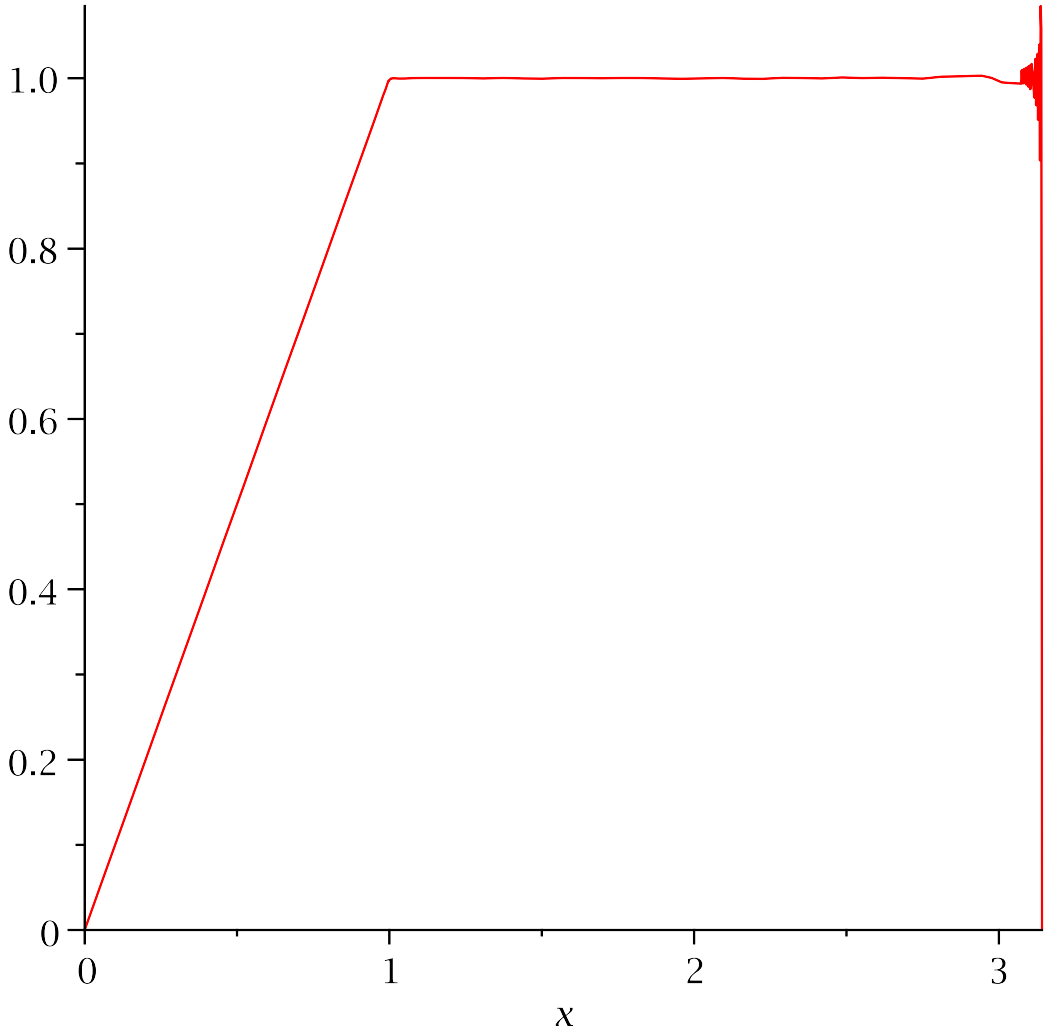

$plot(F(5, x), x = 0..Pi);$



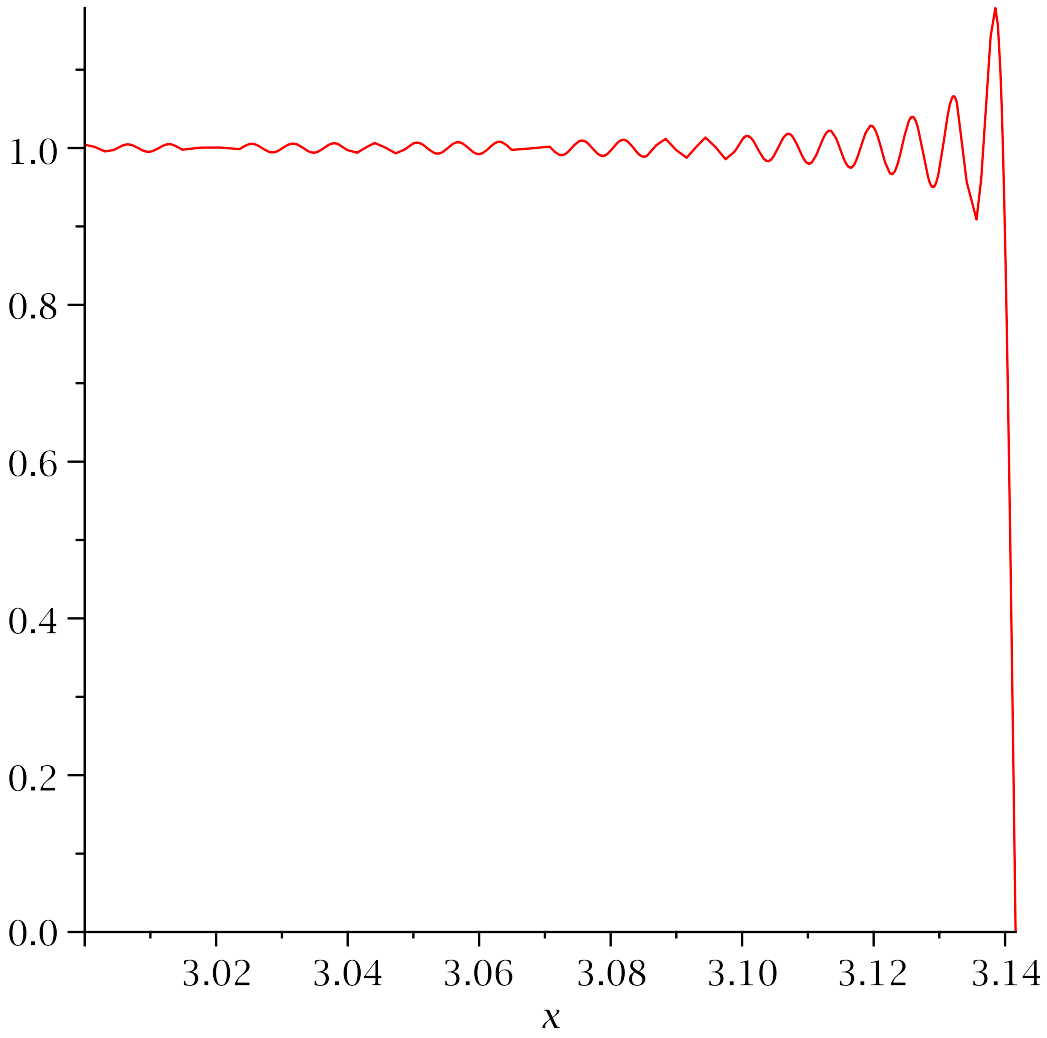

*plot*(*F*(100, *x*), *x* = 0 ..Pi);




*plot*(*F*(1000, *x*), *x* = 0 ..Pi);




*plot*(*F*(1000, *x*), *x* = 3 ..Pi);


1.0
0.8
0.6
0.4
0.2
0.0
3.02
3.04
3.06
3.08
3.10
3.12
3.14
x