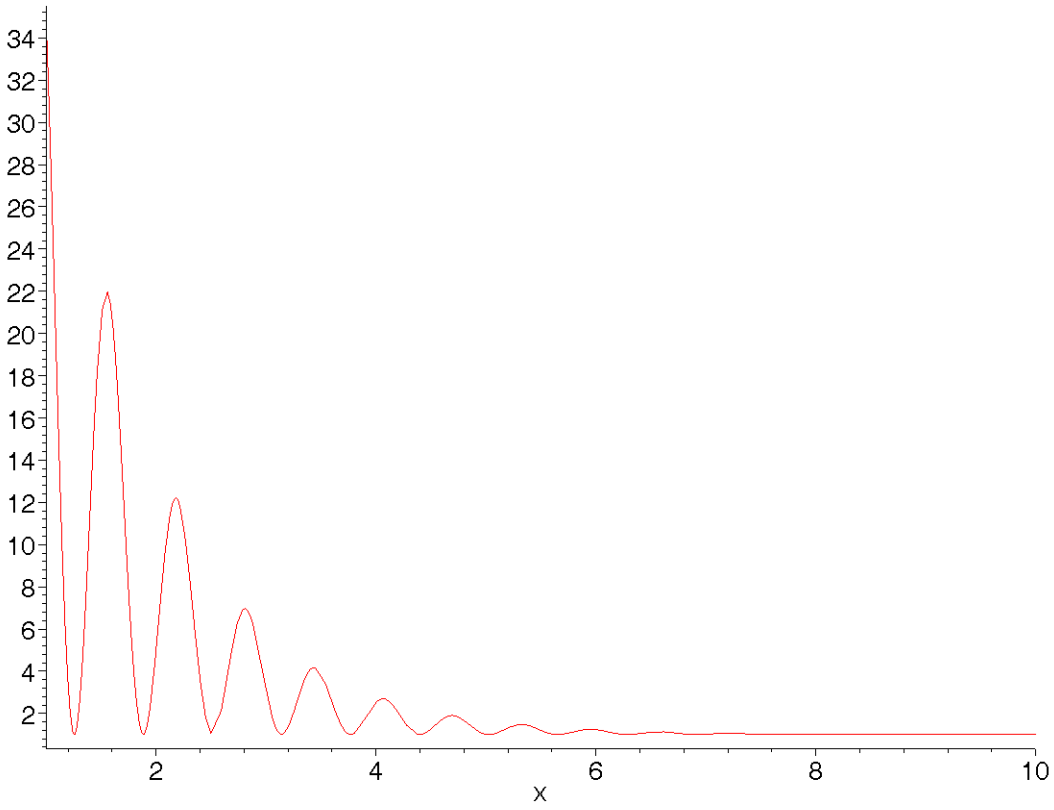
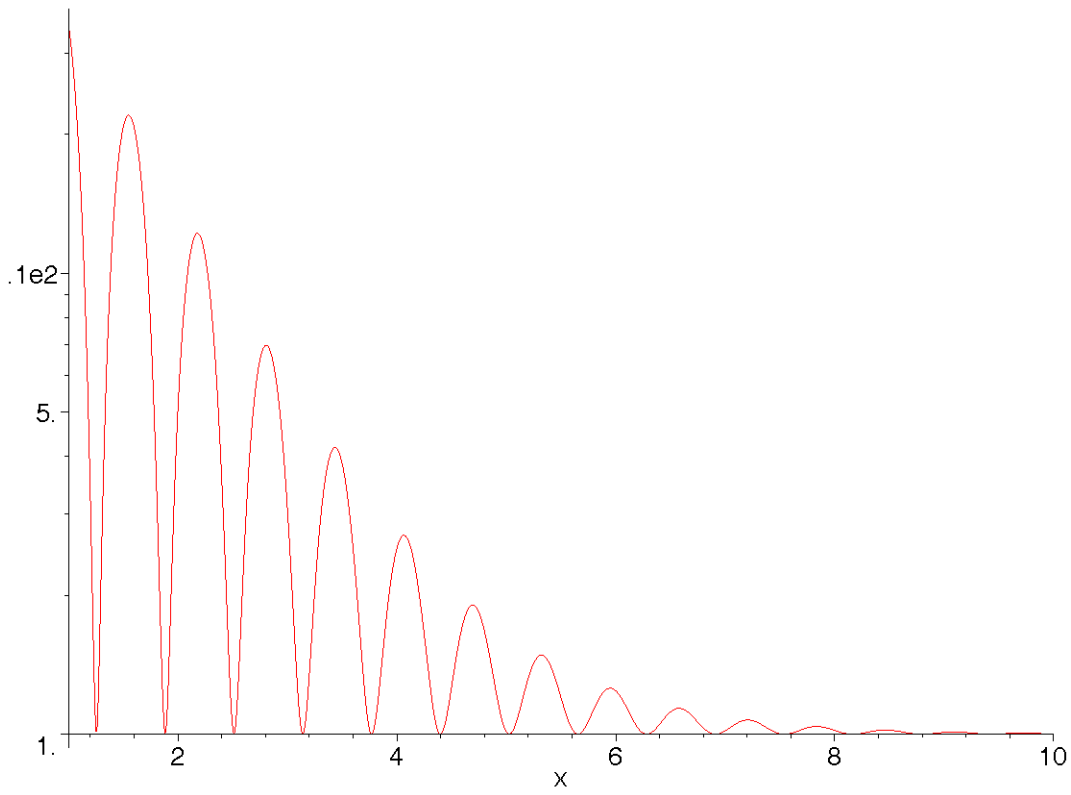
```
> restart:
> # This sample Maple program shows basic plotting and calculus of
  functions.
> with(plots):
>
> # On the next line, we define our function.
> f:=1+100*exp(-x)*(sin(5*x)^2);
```

$$f := 1 + 100\, \mathbf{e}^{(-x)} \sin(5\,x)^2$$

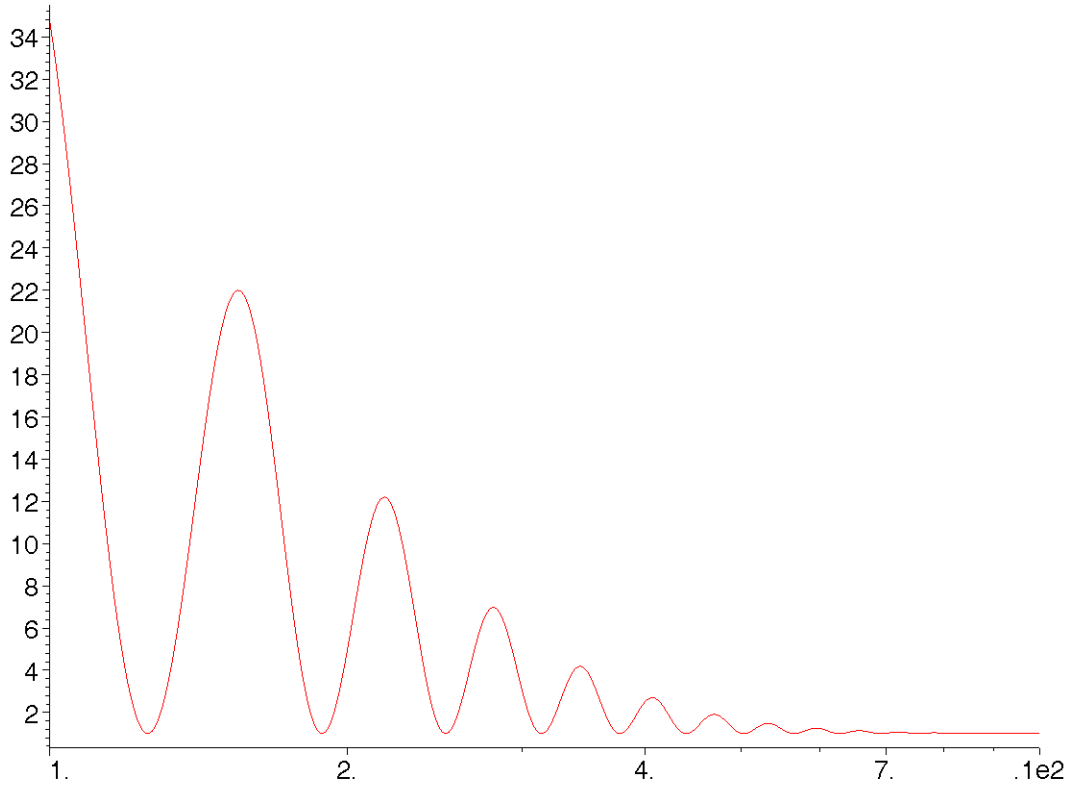
```
>
> # We can make a simple plot of the function.
> plot(f,x=1..10);
```



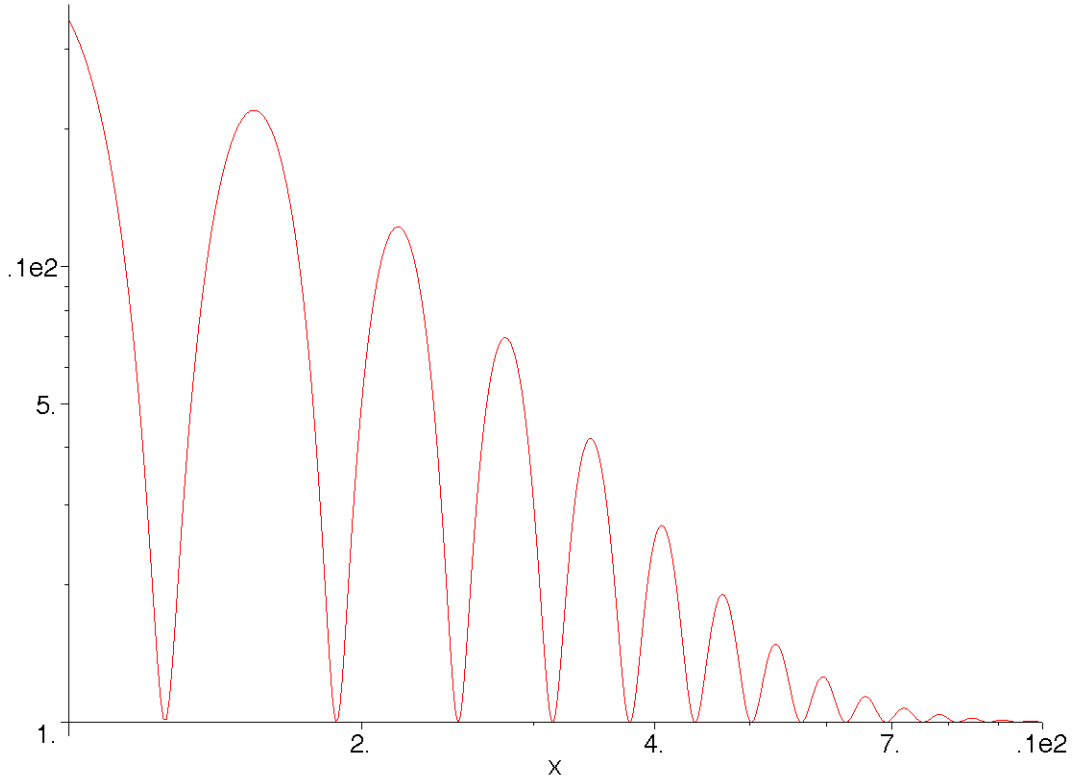

```
>
> # Here is a log plot of the function (logarithmic y-axis, linear
  x-axis).
> logplot(f,x=1..10,numpoints=1000);
```




```
> 
> # Here we make a linear-log plot (linear y-axis, logarithmic
  x-axis).
> semilogplot(f,x=1..10,numpoints=1000);
```



```
>
> # We can also make a log-log plot (logarithmic y-axis, logarithmic
  x-axis)
> loglogplot(f,x=1..10,numpoints=1000);
```




```
>
> # Integrating and differentiating a function is easy.
>
> # Indefinite Integral:
> f_integral:=int(f,x);
```

$$f\_integral := x - 10\,\mathbf{e}^{(-x)}\cos(2x) + 20\,\mathbf{e}^{(-x)}\sin(2x) + \frac{50}{101}\,\mathbf{e}^{(-x)}\cos(10x) - \frac{500}{101}\,\mathbf{e}^{(-x)}\sin(10x) + 20\,\frac{(-\sin(x) - 2\cos(x))\sin(x)}{\mathbf{e}^{x}} - 40\,\frac{1}{\mathbf{e}^{x}}$$

```
>
> # Definite Integral:
> f_definite_integral:=int(f,x=-Pi..+10);
```

$$f\_definite\_integral := 10 - 10\,\mathbf{e}^{(-10)}\cos(20) + 20\,\mathbf{e}^{(-10)}\sin(20) + \frac{50}{101}\,\mathbf{e}^{(-10)}\cos(100) - \frac{500}{101}\,\mathbf{e}^{(-10)}\sin(100) - 20\sin(10)^2\,\mathbf{e}^{(-10)} - 40\sin(10)\,\mathbf{e}^{(-10)}\cos(10) - 40\,\mathbf{e}^{(-10)} + \pi + \frac{5000}{101}\,\mathbf{e}^{\pi}$$

```
> f_definite_integral_numeric:=evalf(int(f,x=-Pi..+10));
```

$$f\_definite\_integral\_numeric := 1158.718300$$

```
>
> # derivative:
> f_prime:=diff(f,x);
```

$$f\_prime := -100\, \mathbf{e}^{(-x)} \sin(5\,x)^2 + 1000\, \mathbf{e}^{(-x)} \sin(5\,x) \cos(5\,x)$$

```
>
> # Taylor series:
> f_taylor_3rd_order:=evalf(taylor(f,x=2,4));
```

$$f\_taylor\_3rd\_order := 5.005369090 + 57.77148294\,(x - 2.) + 78.29558592\,(x - 2.)^2 - 1137.463090\,(x - 2.)^3 + \mathrm{O}((x - 2.)^4)$$

```
>
> # You can also numerically solve a function for a specified value
  in a given range.
> fsolve(f=11.0,x=0..0.5);
```

$$.06661222125$$

```
>
```