In[1]:=
```
f[x_] := Sin[x^2]
```

In[2]:=
```
D[f[x], {x, 4}]
```

Out[2]=
$$-48\,x^2\,\text{Cos}\left[x^2\right] - 12\,\text{Sin}\left[x^2\right] + 16\,x^4\,\text{Sin}\left[x^2\right]$$

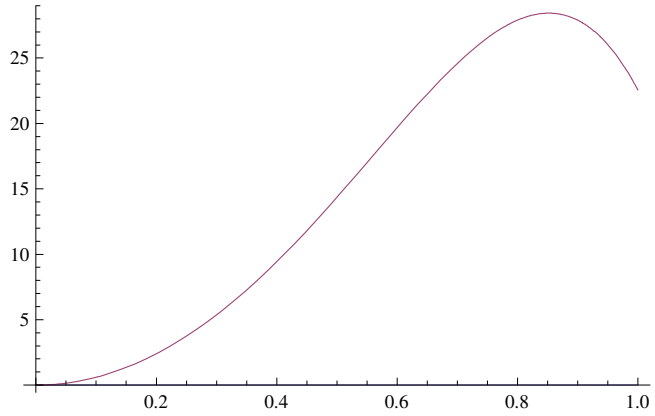
In[3]:=
```
g[x_] := -48 x^2 Cos[x^2] - 12 Sin[x^2] + 16 x^4 Sin[x^2]
```

In[4]:=
```
M = 12 + 48
```

Out[4]=
```
60
```

In[5]:=
```
Plot[{0, Abs[g[x]]}, {x, 0, 1}]
```

Out[5]=



In[6]:=
```
FindMaximum[Abs[g[x]], {x, 1}]
```

Out[6]=
```
{28.4285, {x → 0.852077}}
```

In[7]:=
```
N[(1000 M / 180)^(1 / 4)]
```

Out[7]=
```
4.27287
```

In[8]:=
```
n = 6
```

Out[8]=
```
6
```

In[9]:=
```
h = (1 - 0) / n
```

Out[9]=
$$\frac{1}{6}$$

In[10]:=
$$\frac{h}{3}\,(f[0] + 4\,(f[1/6] + f[3/6] + f[5/6]) + 2\,(f[2/6] + f[4/6]) + f[1])$$

Out[10]=
$$\frac{1}{18}\left(2\left(\text{Sin}\left[\frac{1}{9}\right] + \text{Sin}\left[\frac{4}{9}\right]\right) + 4\left(\text{Sin}\left[\frac{1}{36}\right] + \text{Sin}\left[\frac{1}{4}\right] + \text{Sin}\left[\frac{25}{36}\right]\right) + \text{Sin}[1]\right)$$

In[11]:=
```
a = N[%, 20]
```

Out[11]=
```
0.31020534474963330655
```

In[12]:=
$$\int_0^1 f[x]\,dx$$

Out[12]=
$$\sqrt{\frac{\pi}{2}}\ \text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\right]$$

In[13]:=
```
b = N[%, 20]
```

Out[13]=
```
0.31026830172338110181
```

In[14]:=
```
b - a
```

Out[14]=
```
0.00006295697374779526
```

In[15]:=
```
% < 10^(-3)
```

Out[15]=
```
True
```