In[ ]:= `Series[Sin[x], {x, 0, 3}]`

Out[ ]= $x - \frac{x^3}{6} + O[x]^4$

In[ ]:= `Normal[Series[Sin[x], {x, 0, 3}]]`

Out[ ]= $x - \frac{x^3}{6}$

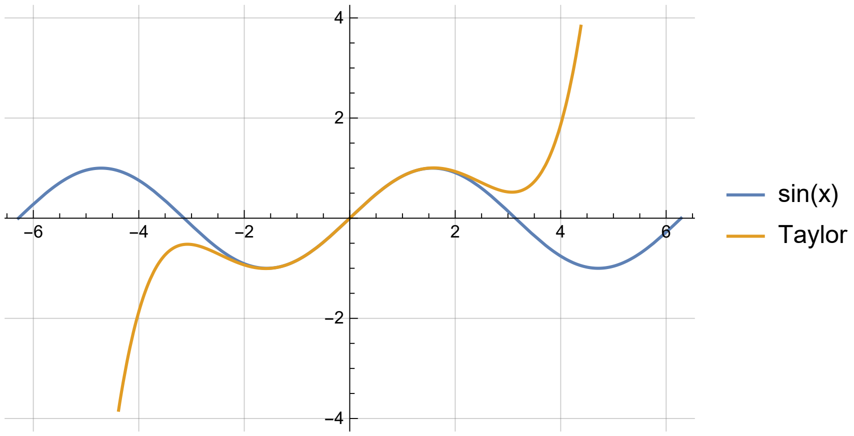
In[ ]:= `N[Pi, 20]`

Out[ ]= 3.1415926535897932385

In[ ]:=
```
f[x_] = x^2 + 3 * x - 5;
Solve[f[x] == 0, x]
```

Out[ ]= $\left\{\left\{x \to \frac{1}{2}\left(-3 - \sqrt{29}\right)\right\}, \left\{x \to \frac{1}{2}\left(-3 + \sqrt{29}\right)\right\}\right\}$

In[ ]:=
```
Normal[Series[Sin[x], {x, 0, 5}]];
Plot[{Sin[x], %}, {x, -2 * Pi, 2 * Pi},
 PlotLegends → {"sin(x)", "Taylor"}, GridLines → Automatic]
```

Out[ ]= 

In[ ]:=
```
ClearAll["Global`*"]
Ctot[q_] = a * (d / q) + b * (q / 2)
der = D[Ctot[q], q]
```

Out[ ]= $\frac{a\,d}{q} + \frac{b\,q}{2}$

Out[ ]= $\frac{b}{2} - \frac{a\,d}{q^2}$

In[ ]:=
```
Solve[der == 0, q]
qq = %[[2, 1, 2]]
```

Out[ ]= $\left\{\left\{q \to -\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{d}}{\sqrt{b}}\right\}, \left\{q \to \frac{\sqrt{2}\,\sqrt{a}\,\sqrt{d}}{\sqrt{b}}\right\}\right\}$

Out[ ]= $\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{d}}{\sqrt{b}}$

In[ ]:= `a * (d / qq) + b * (qq / 2)`

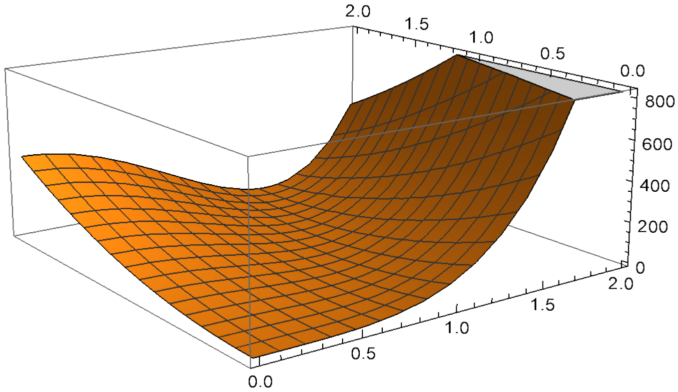
Out[ ]= $\sqrt{2}\,\sqrt{a}\,\sqrt{b}\,\sqrt{d}$

In[∘]:=
```
ClearAll["Global`*"]
f[x_, y_] = 100 * (y - x^2)^2 + (a - x)^2;
grad = D[f[x, y], {{x, y}}];
min = Solve[grad == {0, 0}, {x, y}]
f[x, y] /. {x → min[[1, 1, 2]], y → min[[1, 2, 2]]}
```

Out[∘]= $\{\{x \to a,\ y \to a^2\}\}$

Out[∘]= 0

In[∘]:=
```
a = 1;
pic = Plot3D[f[x, y], {x, 0, 2}, {y, 0, 2}]
```

Out[∘]=


In[∘]:=
```
ClearAll["Global`*"]
f[a_, b_] = (a * b) / (a + b);
grad = D[f[a, b], {{a, b}}];
agrad = Abs[grad];
errorAB = {da, db};
errorF = Simplify[agrad.errorAB]
a = 85;
da = 1;
b = 196;
db = 2;
F = f[a, b]
N[%]
{F - errorF, F + errorF}
N[%]
```

Out[∘]= $\text{db}\,\text{Abs}\left[\frac{a^2}{(a+b)^2}\right] + \text{da}\,\text{Abs}\left[\frac{b^2}{(a+b)^2}\right]$

Out[∘]= $\frac{16\,660}{281}$

Out[∘]= 59.2883

Out[∘]= $\left\{\frac{4\,628\,594}{78\,961},\ \frac{4\,734\,326}{78\,961}\right\}$

Out[∘]= {58.6187, 59.9578}

```
ClearAll["Global`*"]
A[r_, p_] = (1/2) * p * r^2;
grad = D[A[r, p], {{r, p}}];
agrad = Abs[grad];
errorRP = {dr, dp};
errorA = Simplify[agrad.errorRP]
deltaR = Solve[errorA == dA, dr]
deltaR /. {dA → (1/2), dp → (1/100) * (2 * Pi/360)};
Expand[%];
Simplify[%]
deltaR /. {dA → (1/2), r → 50, p → 2 * Pi/3,
   dp → (1/100) * (2 * Pi/360)};
Simplify[%]
N[%]
```

Out[∘]= $\frac{1}{2}\,\mathrm{dp}\,\mathrm{Abs}[r]^2 + \mathrm{dr}\,\mathrm{Abs}[p\,r]$

Out[∘]= $\left\{\left\{\mathrm{dr} \to \frac{2\,\mathrm{dA} - \mathrm{dp}\,\mathrm{Abs}[r]^2}{2\,\mathrm{Abs}[p\,r]}\right\}\right\}$

Out[∘]= $\left\{\left\{\mathrm{dr} \to \frac{18\,000 - \pi\,\mathrm{Abs}[r]^2}{36\,000\,\mathrm{Abs}[p\,r]}\right\}\right\}$

Out[∘]= $\left\{\left\{\mathrm{dr} \to -\frac{1}{480} + \frac{3}{200\,\pi}\right\}\right\}$

Out[∘]= $\{\{\mathrm{dr} \to 0.00269131\}\}$