# Sample Lab

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*Calculus I*

I have finished my reading assignment on derivatives. In mathematics, the derivative of a function of a real variable measures the sensitivity to change of the function value (output value) with respect to a change in its argument (input value). Derivatives are a fundamental tool of calculus. For example, the derivative of the position of a moving object with respect to time is the object's velocity: this measures how quickly the position of the object changes when time advances.

In [1]:
```
CloudConnect["tnpham@eou.edu"]
```

Out[1]:
```
tnpham@eou.edu
```

In [2]:
```
2+2
```

Out[2]:
```
4
```

In [3]:
```
100!
```

Out[3]:
```
933262154439441526816992388562667004907159682643816214685929638952175999932299156089414639761565182862536979208272237582511852109168640000000000000000000000
```

In [4]:
```
Factor[x^3-2x+1]
```

Out[4]:
$$(-1+x)\left(-1+x+x^2\right)$$

In [5]:
```
Expand[(1+2x)^10]
```

Out[5]:
$$1+20x+180x^2+960x^3+3360x^4+8064x^5+13440x^6+15360x^7+11520x^8+5120x^9+1024x^{10}$$

In [6]:
```
D[E^(Sin[x]),x]
```

Out[6]:
$$e^{\text{Sin}[x]}\,\text{Cos}[x]$$

In [7]:
```
Expand[(1+2x)^10]
```

Out[7]:
$$1+20x+180x^2+960x^3+3360x^4+8064x^5+13440x^6+15360x^7+11520x^8+5120x^9+1024x^{10}$$

In [8]:
```
CopyToClipboard[%]
```

In [9]:
```
1 + 20 x + 180 x^2 + 960 x^3 + 3360 x^4 + 8064 x^5 + 13440 x^6 +
 15360 x^7 + 11520 x^8 + 5120 x^9 + 1024 x^10
```

Out[9]: $1 + 20\,x + 180\,x^2 + 960\,x^3 + 3360\,x^4 + 8064\,x^5 + 13\,440\,x^6 + 15\,360\,x^7 + 11\,520\,x^8 + 5120\,x^9 + 1024\,x^{10}$

In [10]:
```
CopyToClipboard[Expand[(1+2x)^10]]
```

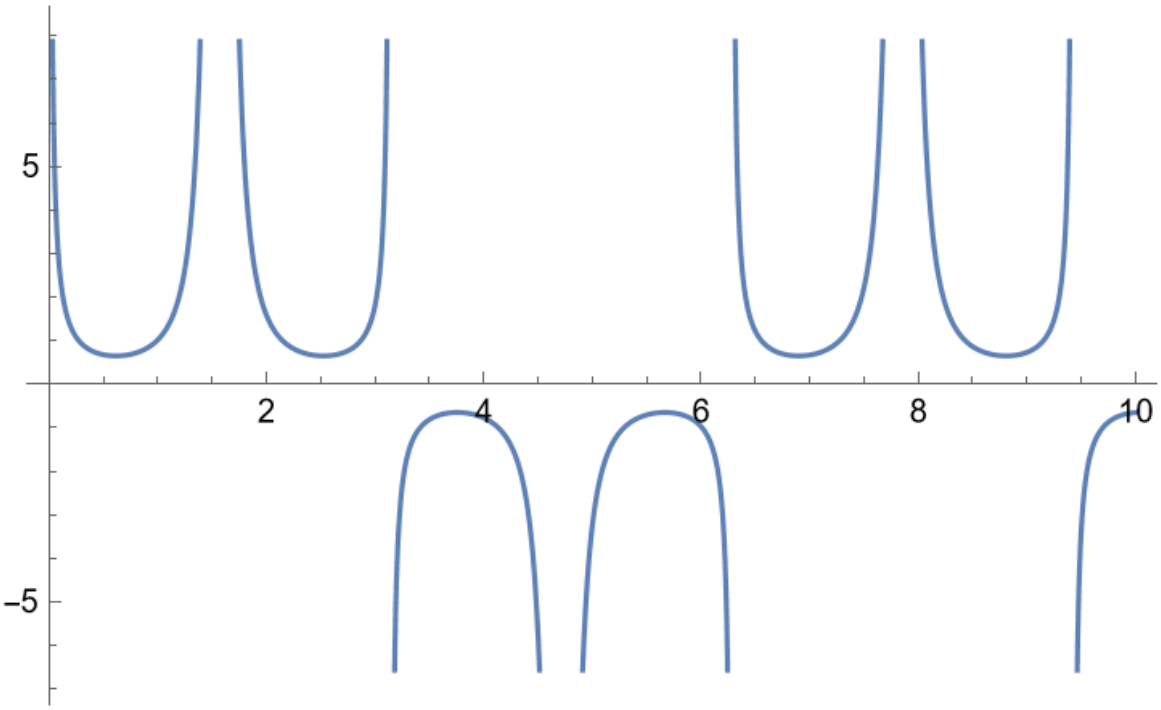
In [11]:
```
1 + 20 x + 180 x^2 + 960 x^3 + 3360 x^4 + 8064 x^5 + 13440 x^6 +
 15360 x^7 + 11520 x^8 + 5120 x^9 + 1024 x^10
```

Out[11]: $1 + 20\,x + 180\,x^2 + 960\,x^3 + 3360\,x^4 + 8064\,x^5 + 13\,440\,x^6 + 15\,360\,x^7 + 11\,520\,x^8 + 5120\,x^9 + 1024\,x^{10}$

Below is the graph of the function $f(x) = \frac{\sin x}{\sin^2(2x)}$ on the interval $[0, 10]$.

In [12]:
```
Plot[Sin[x]/Sin[2x]^2,{x,0,10}]
```

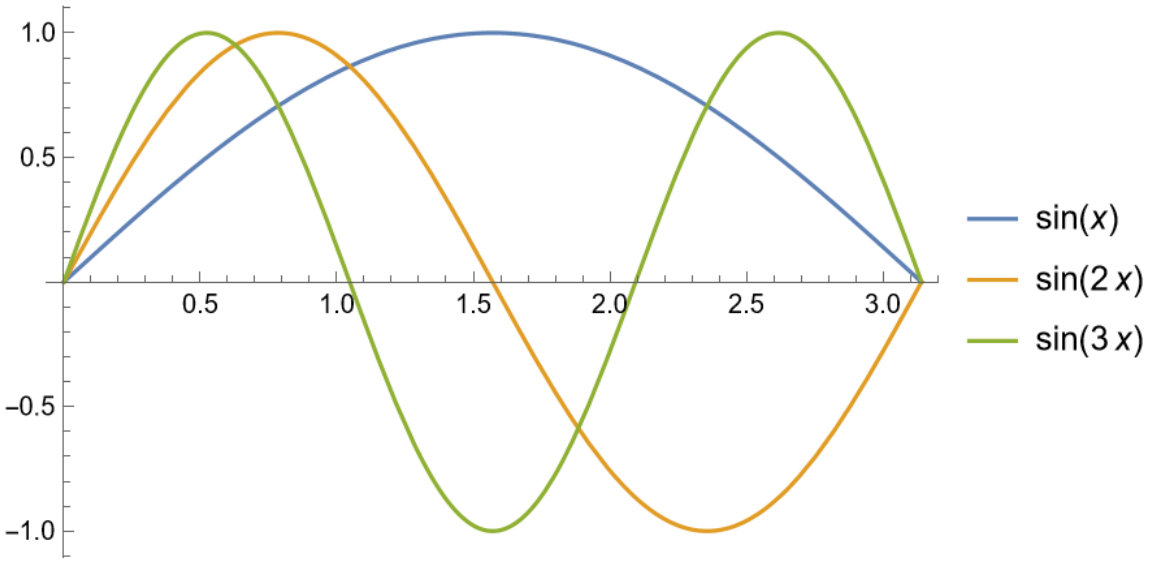
Out[12]:




In [13]:
```
CopyToClipboard[%]
```

In [14]:
```
Plot[{Sin[x],Sin[2x],Sin[3x]},{x,0,Pi},PlotLegends->"Expressions"]
```

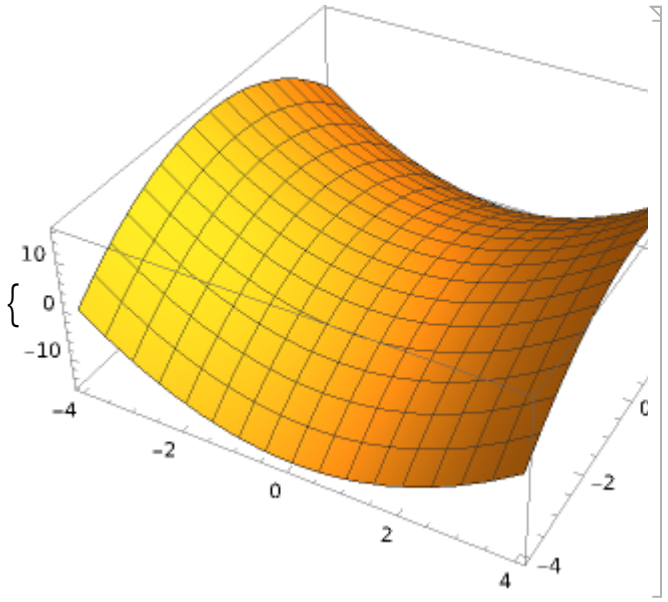
Out[14]:




In [16]:

```
Interact@Plot3D[x^2-y^2,{x,-4,4},{y,-4,4}]
```

Out[16]:

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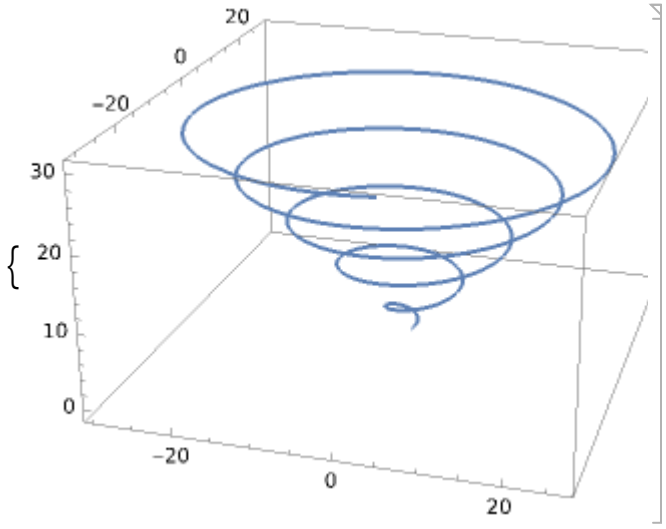
In [18]:
```
Interact@ParametricPlot3D[{t*Cos[t],t*Sin[t],t},{t,0,30}]
```

Out[18]:

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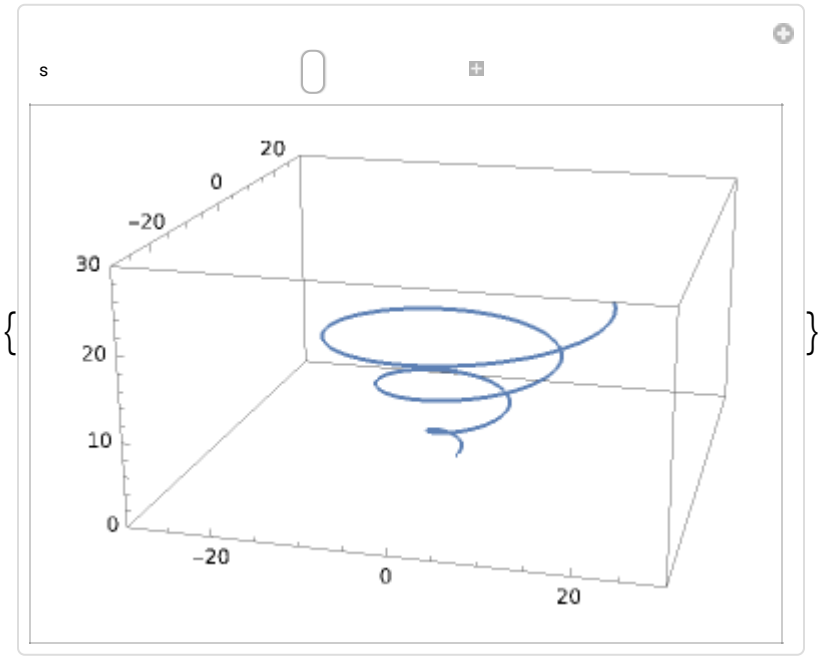
In [9]:

```
Interact@Manipulate[ParametricPlot3D[{t*Cos[t],t*Sin[t],t},{t,0,s},
PlotRange->{{-30,30},{-30,30},{0,30}}], {s,0.1,30}]
```

Out[9]:

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In [ ]: