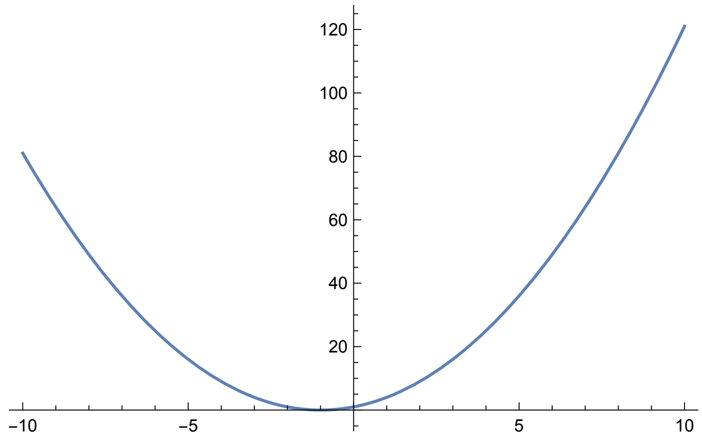
PLOT:

2D plot of a polynomial function:(The interval notation of {x,min,max} defines the domain.)

In[72]:=
```
Plot[x^2 + 2 x + 1, {x, -10, 10}]
```

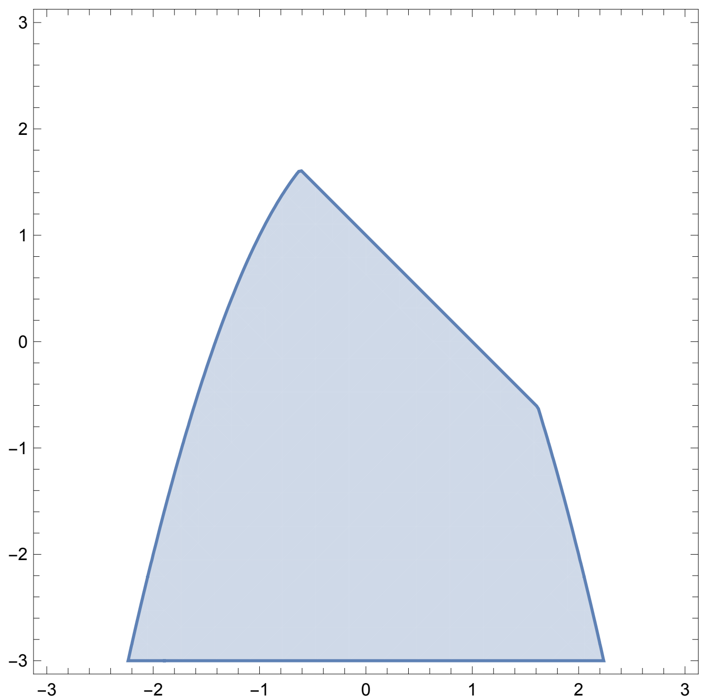
Out[72]=



RegionPlot : PLot a 2D region for a set of inequalities. (&& = and)

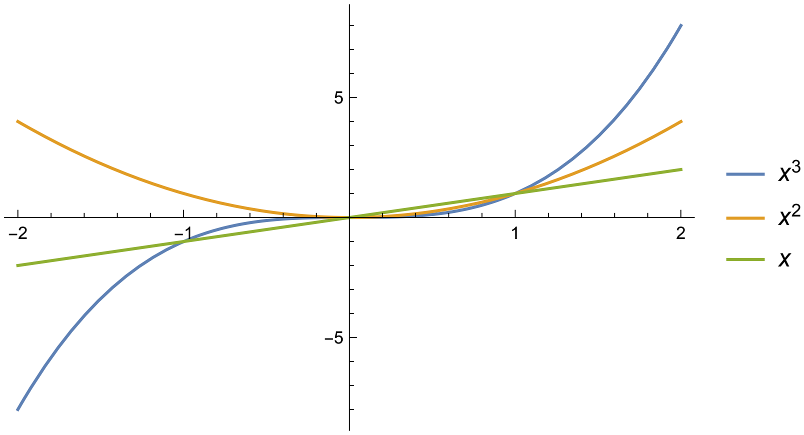
In[73]:=
```
RegionPlot[Reduce[{x^2 + y < 2 && x + y < 1}], {x, -3, 3}, {y, -3, 3}]
```

Out[73]=



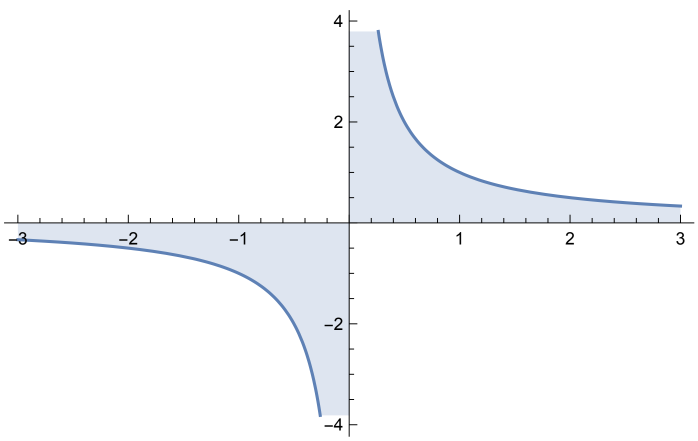
You can add “Legend” in the given plot

In[74]:=
```
Plot[{x^3, x^2, x}, {x, -2, 2}, PlotLegends → "Expressions"]
```

Out[74]=


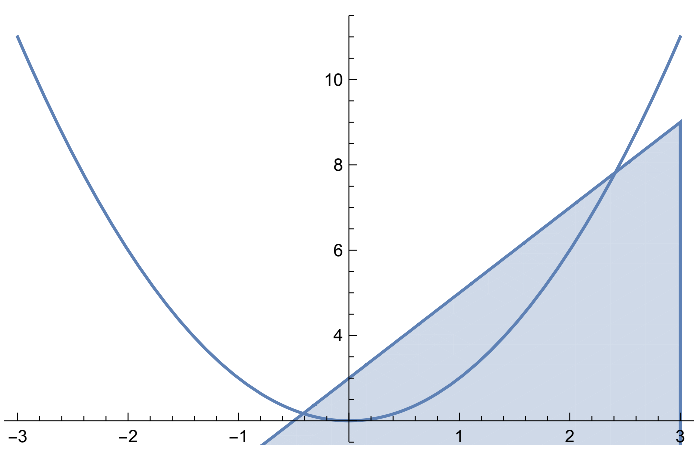
Filling a plot to visualize the area under a curve

In[75]:=
```
Plot[1 / x, {x, -3, 3}, Filling → Axis]
```

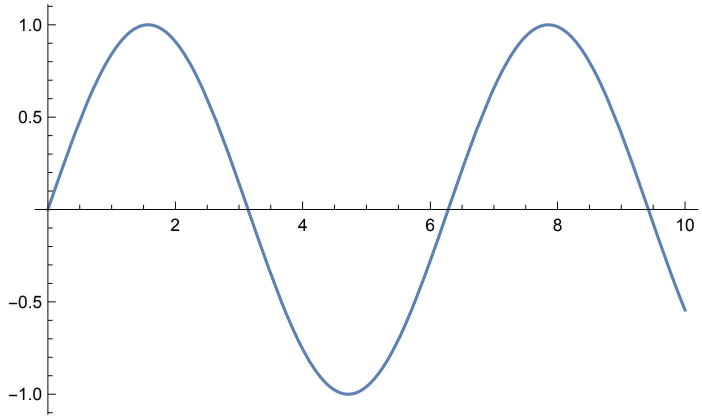
Out[75]=


You can combine different plot types with show:

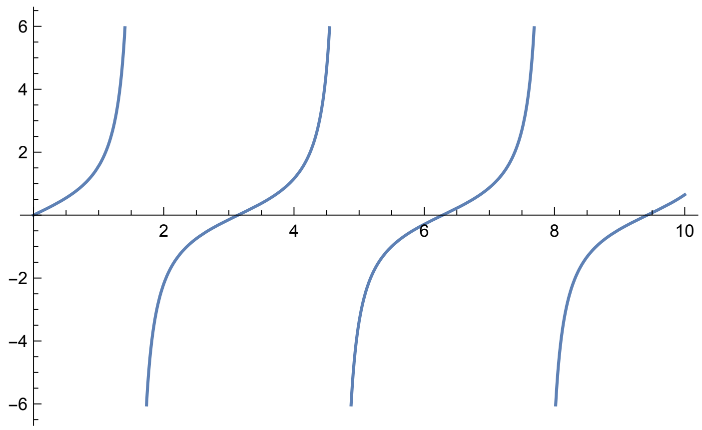
In[76]:=
```
Show[{Plot[x^2 + 2, {x, -3, 3}], RegionPlot[2 x > y - 3, {x, -3, 3}, {y, 0, 9}]}]
```

Out[76]=


In[77]:= `Plot[Sin[x], {x, 0, 10}]`

Out[77]=


In[78]:= `Plot[Tan[x], {x, 0, 10}]`

Out[78]=


Trigonometry: Basic trigonometry function

In[79]:= `Sin[x] / Cos[x] == Tan[x]`

Out[79]= `True`

In[80]:= `ArcTan[1]`

Out[80]= $\frac{\pi}{4}$

for pi, use esc pi esc

In[81]:= `Sin[π / 2]`

Out[81]= 1

In[82]:= `Sin[90 °]`

Out[82]= 1

You can expand trigonometric functions using expand (or reduce)

In[83]:= `TrigExpand[Sin[2 x]]`

Out[83]= `2 Cos[x] Sin[x]`

Factor trigonometric polynomials:

In[84]:=
```
TrigFactor[Cos[x]^2 - Sin[x]^2]
```

Out[84]= $2\,\mathrm{Sin}\left[\frac{\pi}{4} - x\right]\,\mathrm{Sin}\left[\frac{\pi}{4} + x\right]$

Solve can be used to solve the trigonometric equations like:

In[85]:=
```
Solve[Cos[x]^2 + Sin[x]^2 == x]
```

Out[85]= $\{\{x \to 1\}\}$

Specify a domain for solutions:

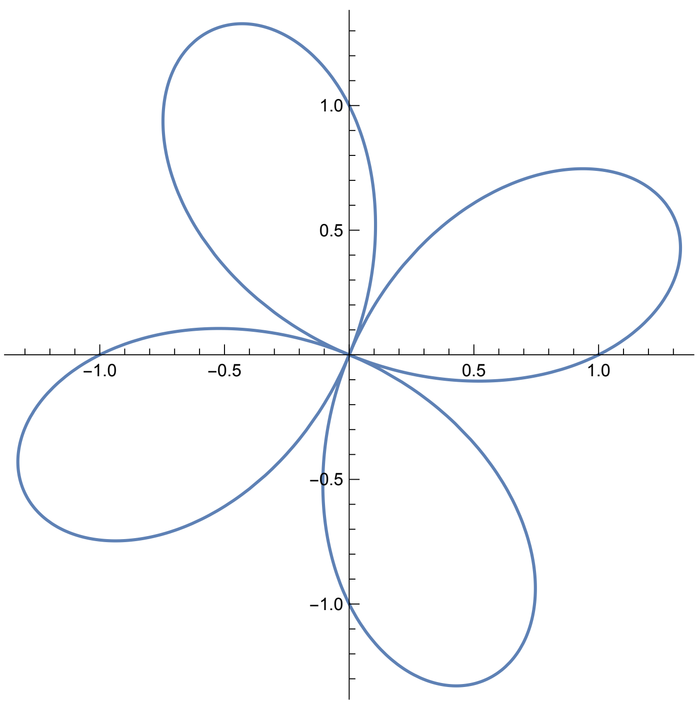
In[86]:=
```
Solve[{Tan[x] == 1, 0 < x < 2 Pi}]
```

Out[86]= $\left\{\left\{x \to \frac{\pi}{4}\right\}, \left\{x \to \frac{5\,\pi}{4}\right\}\right\}$

Polar Coordinates

In[87]:=
```
PolarPlot[Sin[2 θ] + Cos[2 θ], {θ, 0, 2 Pi}]
```

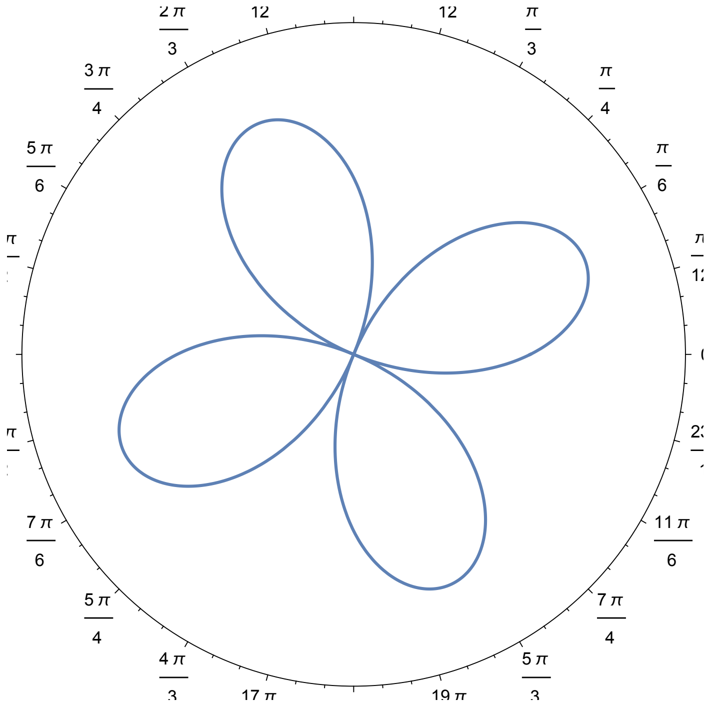
Out[87]=



Display polar axes instead:

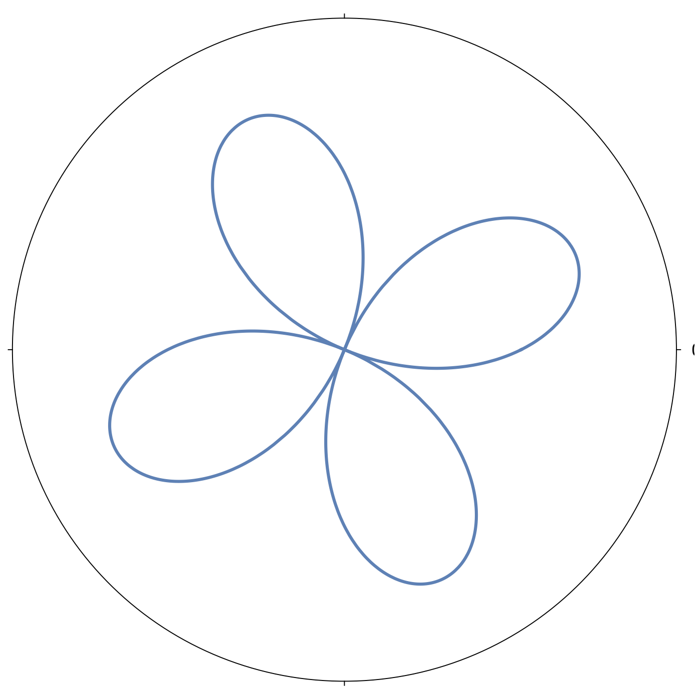
In[93]:=
```
PolarPlot[Sin[2 θ] + Cos[2 θ], {θ, 0, 2 Pi}, PolarAxes → Automatic]
```

Out[93]=



In[95]:=
```
PolarPlot[Sin[2 θ] + Cos[2 θ], {θ, 0, 2 Pi},
 PolarAxes → Automatic, PolarTicks → {0 °, 90 °, 180 °, 270 °}]
```

Out[95]=



Convert Cartesian co-ordinates to polar:(r, θ)

In[96]:=
```
ToPolarCoordinates[{1, 1}]
```
Out[96]= $\left\{\sqrt{2}, \frac{\pi}{4}\right\}$

Exponential & Logarithms

Exponential constant as E. Log gives the natural logarithm of an expression:

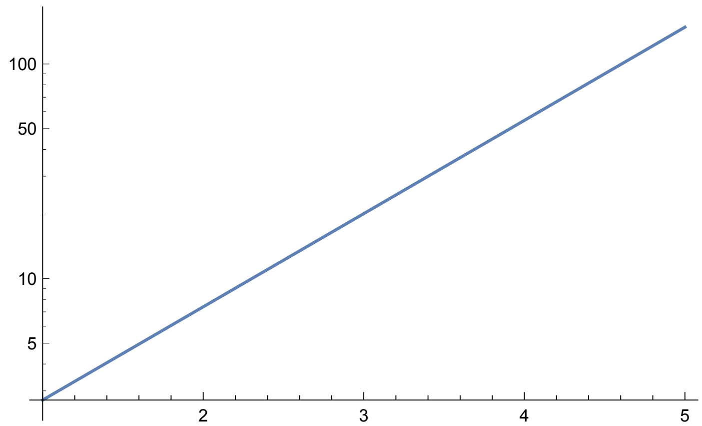
In[97]:=
```
Log[E^2]
```
Out[97]= 2

To calculate the log base 2:

In[98]:=
```
Log[2, 64]
```
Out[98]= 6

In order to make a plot on a logarithmic scale:

In[99]:=
```
LogPlot[E^x, {x, 1, 5}]
```
Out[99]=



Make both axes logarithmic:

In[100]:=
```
LogLogPlot[x^2 + x^3, {x, 1, 100}]
```
Out[100]=