Introduction.

```
Sum[function[n], {n, nmin, nmax}]
```

```
Table[function[n], {n, nmin, nmax}]
```

```
Sin[n * x]
```

```
Sin[n x]
```

```
Sum[Sin[n * x], {n, 1, 5}]
```

```
Sin[x] + Sin[2 x] + Sin[3 x] + Sin[4 x] + Sin[5 x]
```

```
Table[Sin[n * x], {n, 1, 5}]
```

```
{Sin[x], Sin[2 x], Sin[3 x], Sin[4 x], Sin[5 x]}
```

Sum

Uses

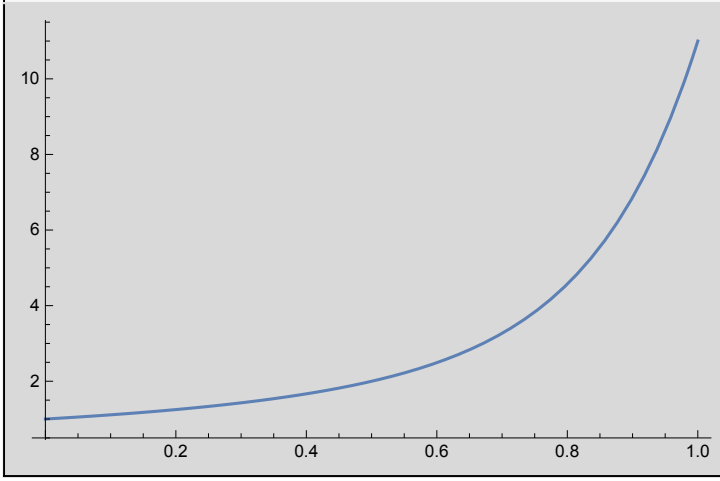
Examples of uses include Taylor/Maclaurin Series.

$$\frac{1}{1-x} = \sum_{n=0}^{\infty} x^n \text{ for } |x| < 1$$

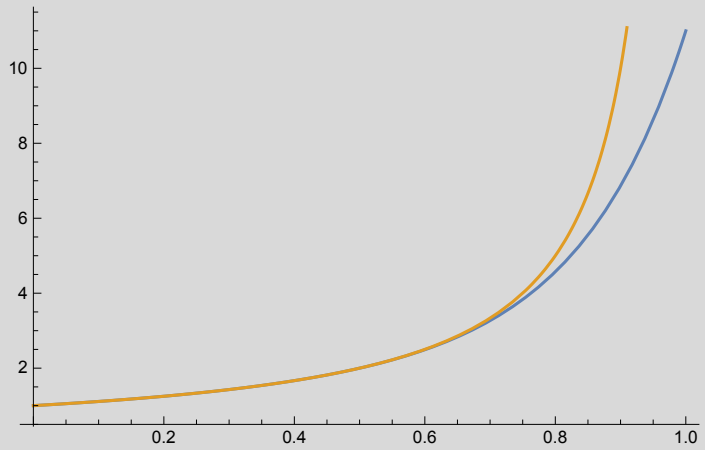
```
Sum[x^n, {n, 0, 10}]
```

```
1 + x + x^2 + x^3 + x^4 + x^5 + x^6 + x^7 + x^8 + x^9 + x^10
```

```
Plot[Sum[x^n, {n, 0, 10}], {x, 0, 1}]
```



```
Plot[{Sum[x^n, {n, 0, 10}], 1/(1 - x)}, {x, 0, 1}](*compare with exact funciton*)
```




```
1 / 1 - x
```

$$1 - x$$

```
1 / (1 - x)
```

$$\frac{1}{1 - x}$$

```
(-Sin[k * L] + (α / k) * Cos[k * L]) / (Cos[k * L] + (α / k) * Sin[k * L])
```

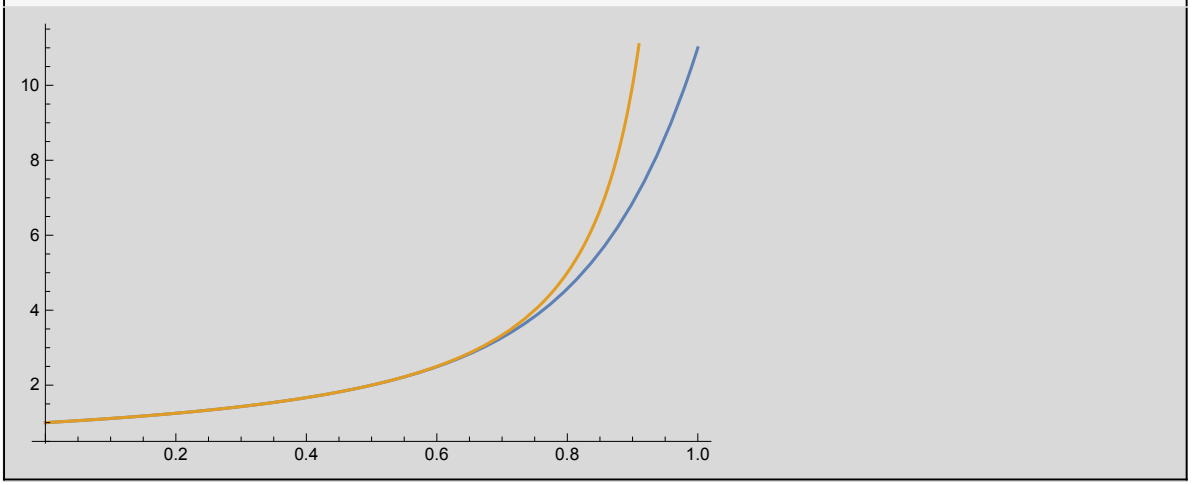
$$\frac{\frac{\alpha \, \mathrm{Cos}[k\,L]}{k} - \mathrm{Sin}[k\,L]}{\mathrm{Cos}[k\,L] + \frac{\alpha \, \mathrm{Sin}[k\,L]}{k}}$$

```
(-Sin[k * L] + α/k * Cos[k * L]) / (Cos[k * L] + α/k * Sin[k * L])
```

$$\frac{-\mathrm{Sin}[k * L] + \frac{\alpha}{k} * \mathrm{Cos}[k * L]}{\mathrm{Cos}[k * L] + \frac{\alpha}{k} * \mathrm{Sin}[k * L]}$$

```
Sumfunc[x_] := Sum[x^n, {n, 0, 10}]
```

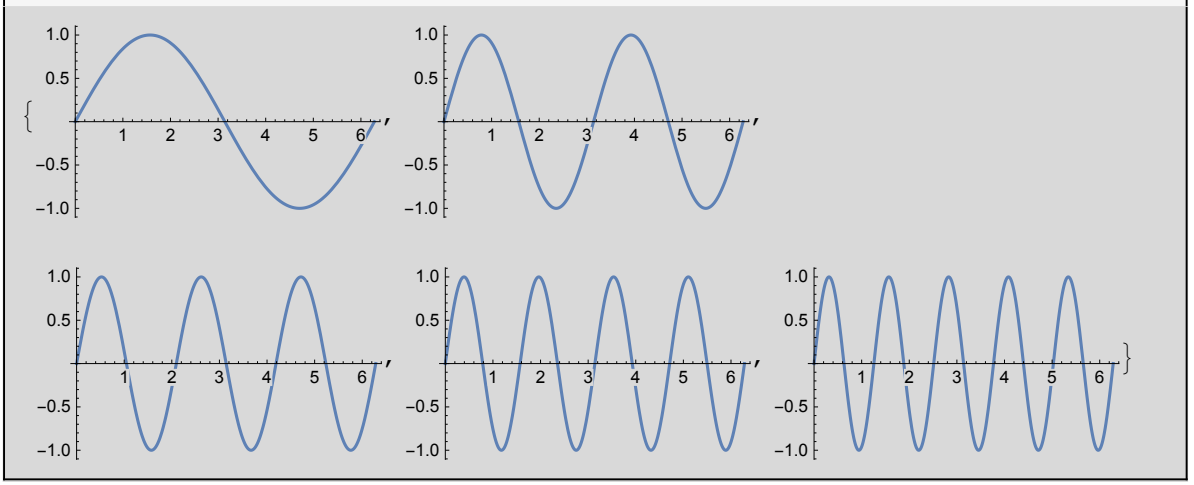
```
Plot[{Sumfunc[x], 1/(1 - x)}, {x, 0, 1}]
```



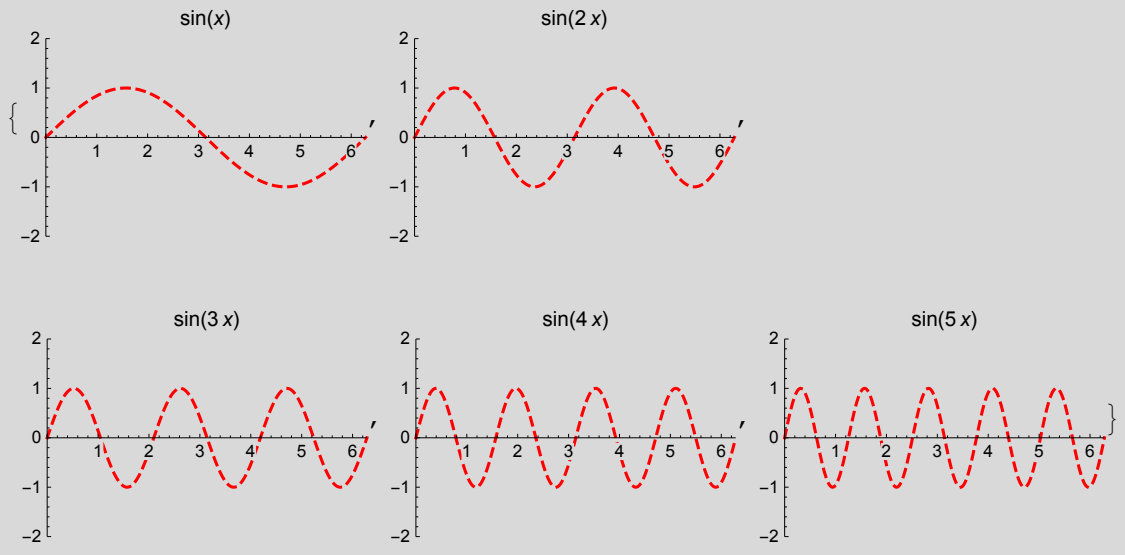
Table

In mathematica, a function needn't be a stereotypical maths function.

```
Table[Plot[Sin[n * x], {x, 0, 2 π}], {n, 1, 5}]
```

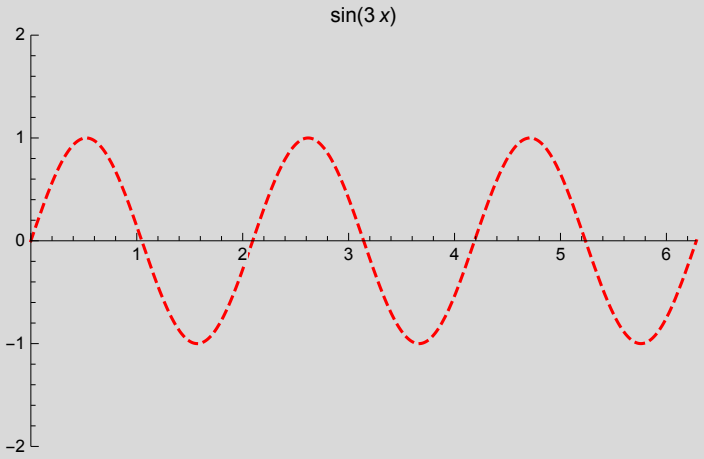


```
Table[Plot[Sin[n * x], {x, 0, 2 π}, PlotLabel → Sin[n * x],
  PlotStyle → {Red, Dashed}, PlotRange → {{0, 2 π}, {-2, 2}}], {n, 1, 5}]
```

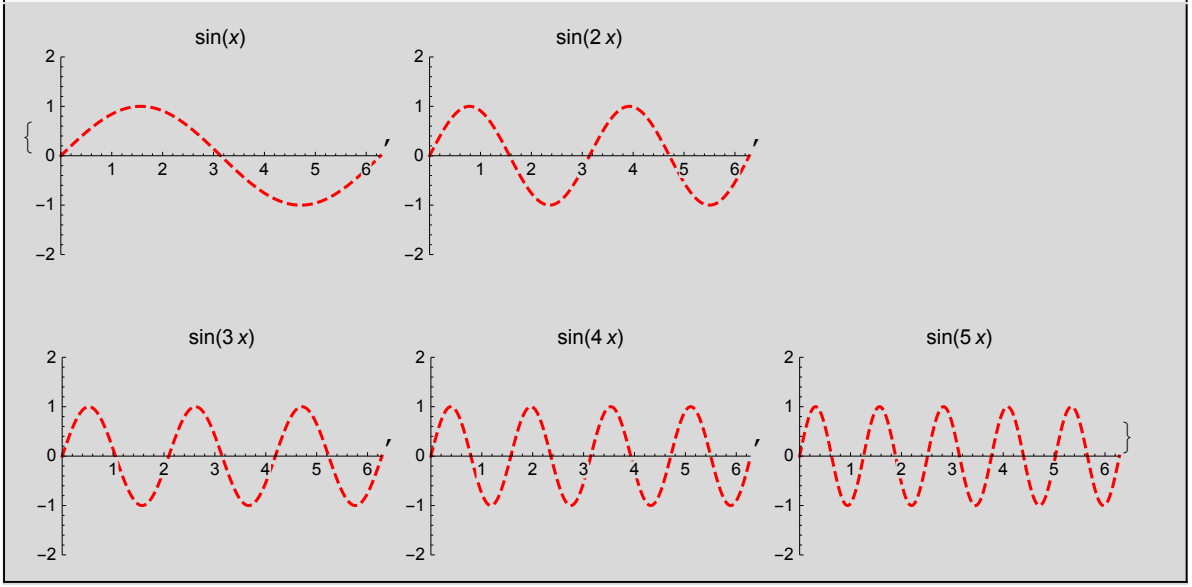



```
SineFunc[n_] := Plot[Sin[n * x], {x, 0, 2 π}, PlotLabel → Sin[n * x],
  PlotStyle → {Red, Dashed}, PlotRange → {{0, 2 π}, {-2, 2}}]
```

```
SineFunc[3](*Check code*)
```



```
Table[SineFunc[n], {n, 1, 5}]
```



Summary

> Make notebook easy to follow

a) Use functions to show structure of code

b) use palettes

> Table and Sum commands are very similar

a) Table[function[n],{n,nmin,nmax}]

b) Sum[function[n],{n,nmin,nmax}]

> When using table, our function[n] needn't be a 'mathematical' function but can be for example a plot.