

Getting Started with Mathematica

Calvin Sprouse
2024 March 03
PHYS 361

Defining a variable

```
In[1]:= a = 1;
```

Defining a function

```
In[2]:= f[x_] := x^a - 2;
```

Simplifying a long algebraic expression

```
g[θ_] := E^{I*θ} - E^{-I*θ} + (Cos[2] - I * Sin[2]);  
FullSimplify[g[θ]]
```

```
Out[18]=  
e^{-i Conjugate[θ]} - e^{i Conjugate[θ]} + Cos[2] + i Sin[2]
```

```
Out[19]=  
e^{-2 i} + 2 i Sin[θ]
```

Solve an algebraic expression

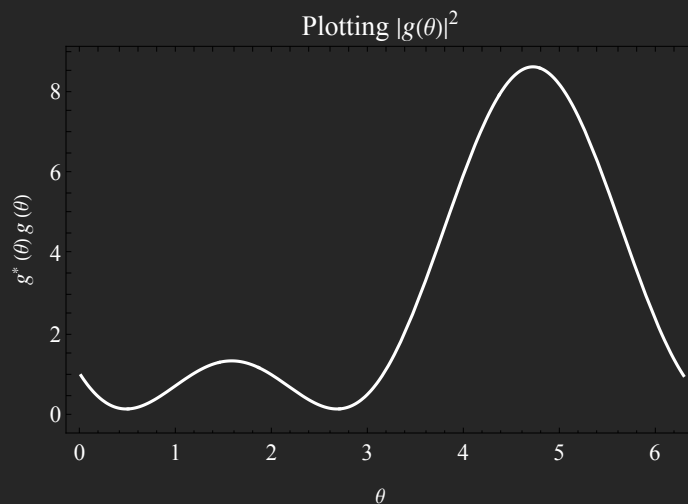
```
In[21]:= Solve[g[θ] == E^{-2*I}, θ, Assumptions -> {θ ∈ ℤ}]
```

```
Out[21]=  
{ {θ -> 0} }
```

Plot a function

```
In[36]:= Plot[
  Abs[g[θ]]2,
  {θ, 0, 2 π},
  Frame → True,
  PlotLabel → "Plotting |g(θ)|2",
  FrameLabel → {"θ", "g*(θ) g(θ)"},
  LabelStyle → {FontSize → 12, FontFamily → "Times New Roman", FontColor → White},
  PlotStyle → White]
```

Out[36]=



Solve a definite integral

```
In[37]:= j[x_] = Ex * Sin[2 * x];
```

$$\int_0^1 j[x] \, dx$$

Out[38]=

$$\frac{1}{5} (2 - 2 e \cos[2] + e \sin[2])$$

Solve an indefinite integral

```
In[39]:= ∫ j[x] dx
```

Out[39]=

$$\frac{1}{5} e^x (-2 \cos[2x] + \sin[2x])$$