In[1]:= **? Range**

Range[i_{max}] generates the list {1, 2, ..., i_{max}}.
Range[i_{min}, i_{max}] generates the list {i_{min}, ..., i_{max}}.
Range[i_{min}, i_{max}, di] uses step di.

In[2]:=
```
Range[10]
```
Out[2]= {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}

In[3]:=
```
Range[0, 10, 2]
```
Out[3]= {0, 2, 4, 6, 8, 10}

In[4]:=
```
x = Range[0, 2 Pi, 0.1]
```
Out[4]= {0., 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1., 1.1, 1.2, 1.3, 1.4,
1.5, 1.6, 1.7, 1.8, 1.9, 2., 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 3.,
3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 4., 4.1, 4.2, 4.3, 4.4, 4.5, 4.6,
4.7, 4.8, 4.9, 5., 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 5.8, 5.9, 6., 6.1, 6.2}

In[12]:=
```
Sin[Pi]
```
Out[12]= 0

In[6]:=
```
Sin[x]
```
Out[6]= {0., 0.0998334, 0.198669, 0.29552, 0.389418, 0.479426, 0.564642, 0.644218, 0.717356,
0.783327, 0.841471, 0.891207, 0.932039, 0.963558, 0.98545, 0.997495, 0.999574,
0.991665, 0.973848, 0.9463, 0.909297, 0.863209, 0.808496, 0.745705, 0.675463, 0.598472,
0.515501, 0.42738, 0.334988, 0.239249, 0.14112, 0.0415807, -0.0583741, -0.157746,
-0.255541, -0.350783, -0.44252, -0.529836, -0.611858, -0.687766, -0.756802, -0.818277,
-0.871576, -0.916166, -0.951602, -0.97753, -0.993691, -0.999923, -0.996165,
-0.982453, -0.958924, -0.925815, -0.883455, -0.832267, -0.772764, -0.70554,
-0.631267, -0.550686, -0.464602, -0.373877, -0.279415, -0.182163, -0.0830894}

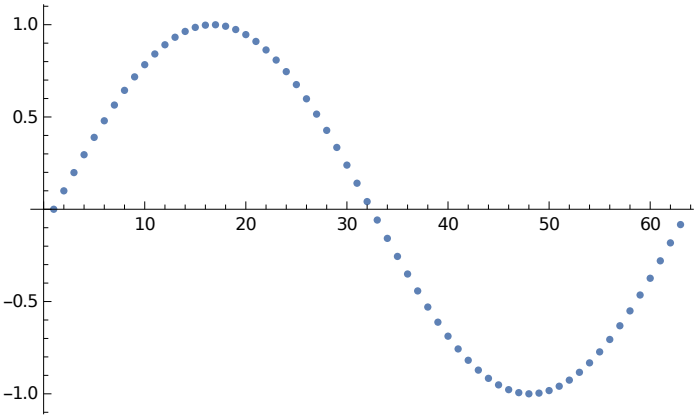
In[7]:=
```
y = Sin[x];
```

In[8]:= **? ListPlot**

ListPlot[{y_1, y_2, ...}] plots points corresponding
to a list of values, assumed to correspond to x coordinates 1, 2, ...
ListPlot[{{x_1, y_1}, {x_2, y_2}, ...}] plots a list of points with specified x and y coordinates.
ListPlot[{$list_1$, $list_2$, ...}] plots several lists of points.

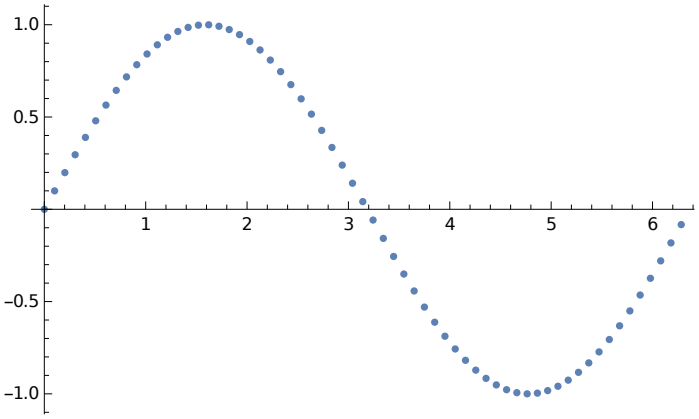
In[9]:=
```
ListPlot[y]
```

Out[9]=



In[11]:=
```
ListPlot[y, DataRange → {0, 2 Pi}]
```

Out[11]=

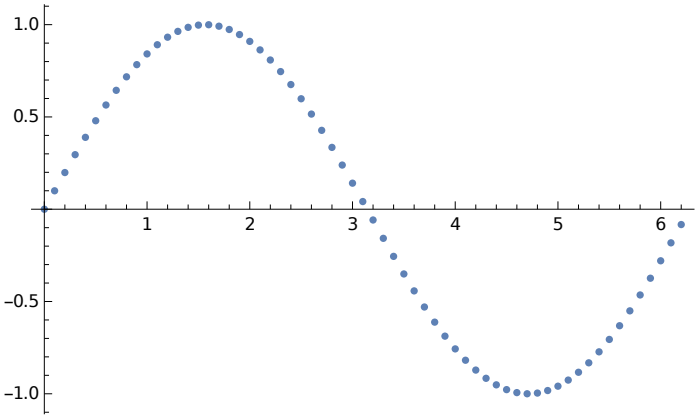


In[13]:=
```
Thread[{x, y}]
```

Out[13]=
```
{{0., 0.}, {0.1, 0.0998334}, {0.2, 0.198669}, {0.3, 0.29552}, {0.4, 0.389418},
 {0.5, 0.479426}, {0.6, 0.564642}, {0.7, 0.644218}, {0.8, 0.717356}, {0.9, 0.783327},
 {1., 0.841471}, {1.1, 0.891207}, {1.2, 0.932039}, {1.3, 0.963558}, {1.4, 0.98545},
 {1.5, 0.997495}, {1.6, 0.999574}, {1.7, 0.991665}, {1.8, 0.973848}, {1.9, 0.9463},
 {2., 0.909297}, {2.1, 0.863209}, {2.2, 0.808496}, {2.3, 0.745705}, {2.4, 0.675463},
 {2.5, 0.598472}, {2.6, 0.515501}, {2.7, 0.42738}, {2.8, 0.334988}, {2.9, 0.239249},
 {3., 0.14112}, {3.1, 0.0415807}, {3.2, -0.0583741}, {3.3, -0.157746}, {3.4, -0.255541},
 {3.5, -0.350783}, {3.6, -0.44252}, {3.7, -0.529836}, {3.8, -0.611858},
 {3.9, -0.687766}, {4., -0.756802}, {4.1, -0.818277}, {4.2, -0.871576},
 {4.3, -0.916166}, {4.4, -0.951602}, {4.5, -0.97753}, {4.6, -0.993691},
 {4.7, -0.999923}, {4.8, -0.996165}, {4.9, -0.982453}, {5., -0.958924},
 {5.1, -0.925815}, {5.2, -0.883455}, {5.3, -0.832267}, {5.4, -0.772764},
 {5.5, -0.70554}, {5.6, -0.631267}, {5.7, -0.550686}, {5.8, -0.464602},
 {5.9, -0.373877}, {6., -0.279415}, {6.1, -0.182163}, {6.2, -0.0830894}}
```

In[15]:=
```
ListPlot[Thread[{x, y}]]
```

Out[15]=



In[18]:=
```
? Thread
```

Thread[f[$args$]] "threads" f over any lists that appear in $args$.
Thread[f[$args$], h] threads f over any objects with head h that appear in $args$.
Thread[f[$args$], h, n] threads f over objects with head h that appear in the first n $args$.

In[19]:=
```
? Table
```

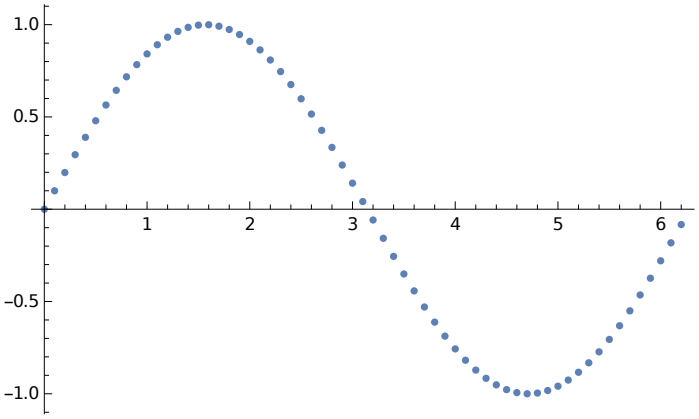
Table[$expr$, n] generates a list of n copies of $expr$.
Table[$expr$, {i, i_{max}}] generates a list of the values of $expr$ when i runs from 1 to i_{max}.
Table[$expr$, {i, i_{min}, i_{max}}] starts with $i = i_{min}$.
Table[$expr$, {i, i_{min}, i_{max}, di}] uses steps di.
Table[$expr$, {i, {i_1, i_2, ...}}] uses the successive values i_1, i_2, ...
Table[$expr$, {i, i_{min}, i_{max}}, {j, j_{min}, j_{max}}, ...] gives a nested list. The list associated with i is outermost.

In[23]:=
```
Table[{i, j}, {i, 5}, {j, 5}]
```

Out[23]=
```
{{{1, 1}, {1, 2}, {1, 3}, {1, 4}, {1, 5}},
 {{2, 1}, {2, 2}, {2, 3}, {2, 4}, {2, 5}}, {{3, 1}, {3, 2}, {3, 3}, {3, 4}, {3, 5}},
 {{4, 1}, {4, 2}, {4, 3}, {4, 4}, {4, 5}}, {{5, 1}, {5, 2}, {5, 3}, {5, 4}, {5, 5}}}
```

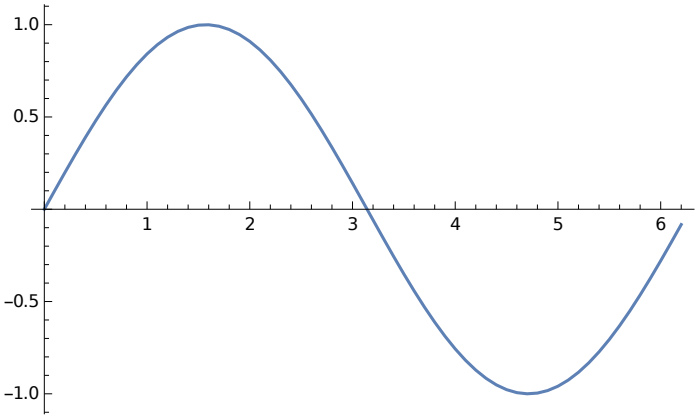
In[22]:=
```
ListPlot[Table[{i, Sin[i]}, {i, 0, 2 Pi, 0.1}]]
```

Out[22]=



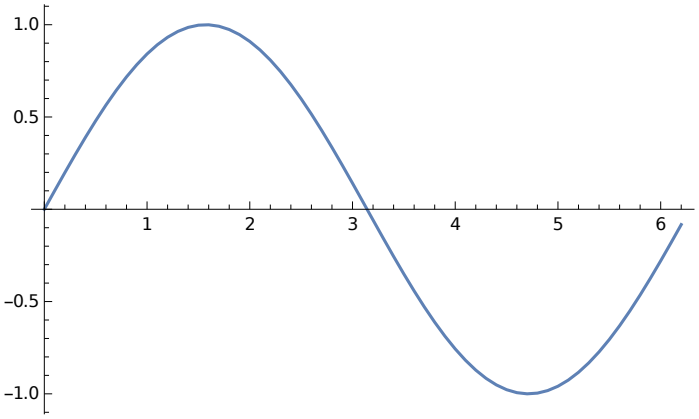
In[24]:=
```
ListPlot[Table[{i, Sin[i]}, {i, 0, 2 Pi, 0.1}], Joined → True]
```

Out[24]=



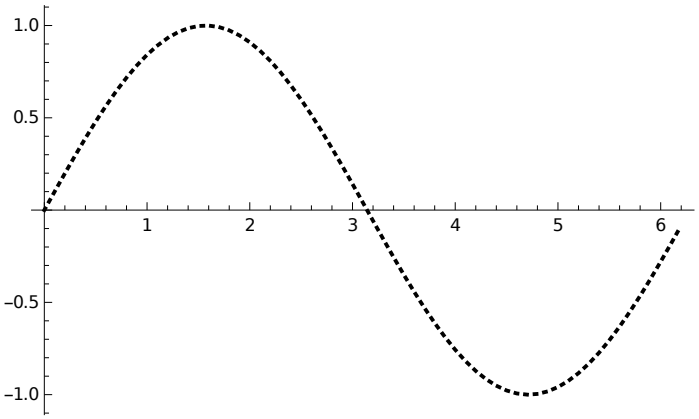
In[25]:=
```
ListLinePlot[Table[{i, Sin[i]}, {i, 0, 2 Pi, 0.1}]]
```

Out[25]=



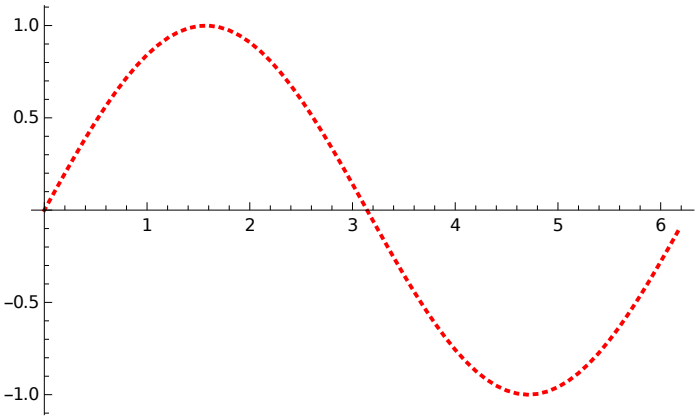
In[26]:=
```
ListLinePlot[Table[{i, Sin[i]}, {i, 0, 2 Pi, 0.1}],
 PlotStyle → {Thick, Dotted, Black}]
```

Out[26]=



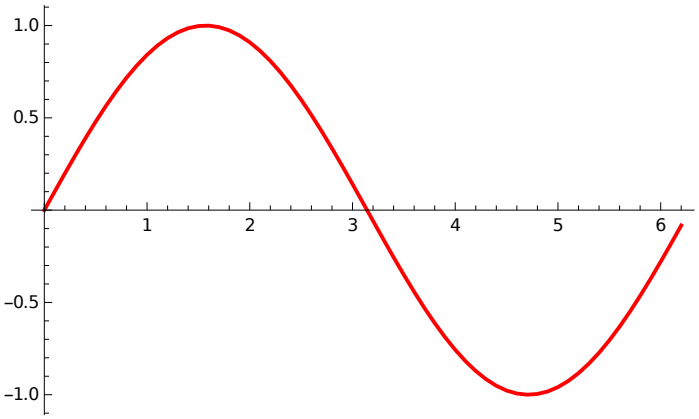
In[27]:=
```
ListLinePlot[Table[{i, Sin[i]}, {i, 0, 2 Pi, 0.1}], PlotStyle → {Thick, Dotted, Red}]
```

Out[27]=



In[28]:=
```
ListLinePlot[Table[{i, Sin[i]}, {i, 0, 2 Pi, 0.1}], PlotStyle → {Thick, Red}]
```

Out[28]=

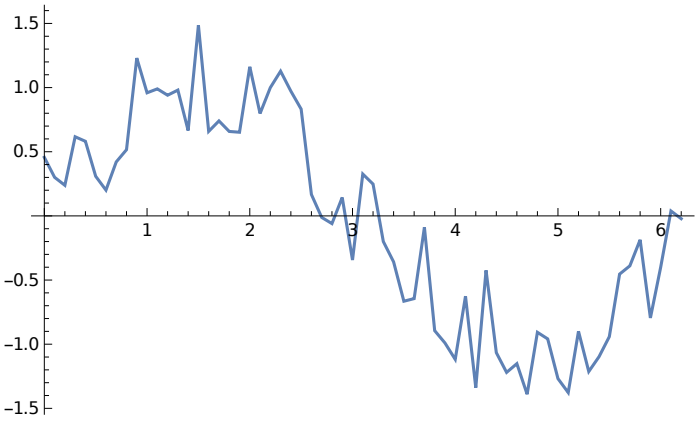


In[29]:=
```
? Random
```

Random[] gives a uniformly distributed pseudorandom Real in the range 0 to 1.
Random[*type*, *range*] gives a pseudorandom number of the specified type, lying in the specified range. Possible types are: Integer, Real and Complex. The default range is 0 to 1. You can give the range {*min*, *max*} explicitly; a range specification of *max* is equivalent to {0, *max*}.

In[35]:=
```
ListPlot[Table[{i, Sin[i] + Random[] - 0.5}, {i, 0, 2 Pi, 0.1}], Joined → True]
```

Out[35]=



In[33]:=
```
? Show
```

Show[*graphics*, *options*] shows graphics with the specified options added.
Show[g_1, g_2, ...] shows several graphics combined.

In[37]:=
```
Show[ListPlot[Table[{i, Sin[i] + Random[] - 0.5}, {i, 0, 2 Pi, 0.1}],
  Joined → True, PlotStyle → {Blue}]
   , Plot[Sin[x], {x, 0, 2 Pi}, PlotStyle → {Red, Thick}]]
```

Out[37]=