Learning Wolfram Language

Exercises for Section 1 | Starting Out: Elementary Arithmetic

1.1 Compute1+2+3.

```
In[13]:= 1 + 2 + 3
Out[13]= 6
```

1.2 Add the numbers 1,2,3,4,5.

```
In[15]:= 1 + 2 + 3 + 4 + 5
Out[15]= 15
```

1.3 Multiply the numbers 1, 2, 3, 4, 5.

```
In[16]:= 1 * 2 * 3 * 4 * 5
Out[16]= 120
```

1.4 Compute 5 squared (i . e . 5*5 or 5 raised to the power 2)

```
In[17]:= 5 ^ 2
Out[17]= 25
```

1.5 Compute 3 raised to the fourth power .

```
In[18]:= 3 ^ 4
Out[18]= 81
```

1.6 Compute 10 raised to the power 12 (a trillion) .

```
In[20]:= 10 ^ 12
Out[20]= 1 000 000 000 000
```

1.7 Compute 3 raised to the power 7 x8 .

```
In[19]:= 3 ^ (7 * 8)
Out[19]= 523 347 633 027 360 537 213 511 521
```

1.8 Add parentheses to 4 - 2*3 + 4 to make 14.

```
In[21]:= (4 - 2) * (3 + 4)
Out[21]= 14
```

1.9 Compute twenty - nine thousand mutiplied by seventy - three .

```
In[22]:= 29 000 * 73
Out[22]= 2 117 000
```

+1.1 Add all integers from - 3 to + 3.

```
In[23]:= -3 + -2 + -1 + 1 + 2 + 3
Out[23]= 0
```

+1.2 Compute 24 divided by 3.

```
In[24]:= 24 / 3
Out[24]= 8
```

+1.3 Compute 5 raised to the power 100.

```
In[25]:= 5 ^ 100
Out[25]= 7 888 609 052 210 118 054 117 285 652 827 862 296 732 064 351 090 230 047 702 789 306 640 625
```

+1.4 Subtract 5 squared from 100

```
In[26]:= 100 - (5 ^ 2)
Out[26]= 75
```

+1.5 Multiply 6 by 5 squared, and add 7

```
In[27]:= (6 * (5 ^ 2)) + 7
Out[27]= 157
```

+1.6 Compute 3 squared minus 2 cubed .

```
In[28]:= (3 ^ 2) - (2 ^ 3)
Out[28]= 1
```

+1.7 Compute 2 cubed times 3 squared

```
In[29]:= (2 ^ 3) * (3 ^ 2)
Out[29]= 72
```

+1.8 Compute "double the sum of eight and negative eleven"

In[30]:=
```
(8 - 11) * 2
```
Out[30]= -6

Exercises for Section 2 | Introducing Functions

2.1 Compute 7 + 6 + 5 using the function Plus

In[31]:=
```
Plus[7, 6, 5]
```
Out[31]= 18

2.2 Compute 2 x (3 + 4) using Times and Plus

In[32]:=
```
Times[2, Plus[3, 4]]
```
Out[32]= 14

2.3 Use Max to find the larger of 6x8 and 5x9

In[33]:=
```
Max[Times[6, 8], Times[5, 9]]
```
Out[33]= 48

2.4 Use RandomInteger to generate a random number between 0 and 1000.

In[34]:=
```
RandomInteger[1000]
```
Out[34]= 443

2.5 Use Plus and RandomInteger to generate a number between 10 and 20.

In[35]:=
```
Plus[10, RandomInteger[10]]
```
Out[35]= 12

+2.1 Compute 5 x4x3x2 using Times .

In[36]:=
```
Times[5, 4, 3, 2]
```
Out[36]= 120

+2.2 Compute 2 - 3 using Subtract

In[37]:=
```
Subtract[2, 3]
```
Out[37]= -1

+2.3 Compute (8 + 7) + (9 + 2) using Times and Plus

```
In[38]:= Times[Plus[8, 7], Plus[9, 2]]
Out[38]= 165
```

+2.4 Compute (26 - 89)/9 using Subtract and Divide

```
In[39]:= Divide[Subtract[26, 89], 9]
Out[39]= -7
```

+2.5 Compute 100 - 5^2 using Subtract and Power

```
In[40]:= Subtract[100, Power[5, 2]]
Out[40]= 75
```

+2.6 Find the larger of 3^5 and 5^3

```
In[41]:= Max[Power[3, 5], Power[5, 3]]
Out[41]= 243
```

+2.7 Multiply 3 and the larger of 4^3 and 3^4

```
In[42]:= Times[3, Max[Power[4, 3], Power[3, 4]]]
Out[42]= 243
```

+2.8 Add two random numbers each between 0 and 1000.

```
In[43]:= Plus[RandomInteger[1000], RandomInteger[1000]]
Out[43]= 698
```

Exercises for Section 3 | First Look at Lists

3.1 Use Range to create the list {1, 2, 3, 4}

```
In[44]:= Range[4]
Out[44]= {1, 2, 3, 4}
```

3.2 Make a list of numbers up to 100

```
In[45]:= Range[100]
Out[45]= {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23,
  24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43,
  44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62,
  63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81,
  82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100}
```

3.3 Use Range and Reverse to create {4, 3, 2, 1}

In[46]:=
```
Reverse[Range[4]]
```
Out[46]= {4, 3, 2, 1}

3.4 Make a list of numbers from 1 to 50 in reverse order .

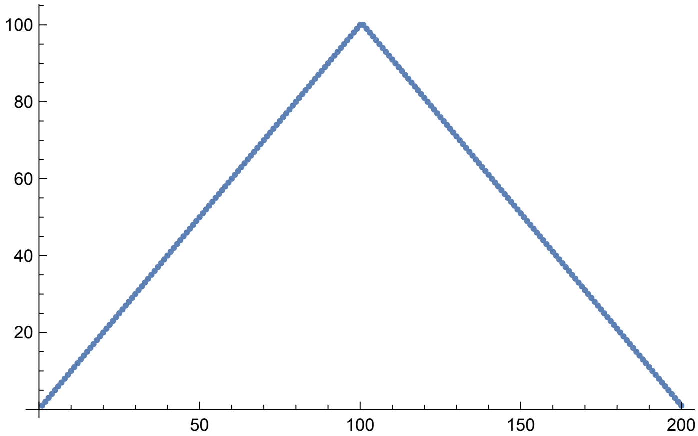
In[47]:=
```
Reverse[Range[50]]
```
Out[47]= {50, 49, 48, 47, 46, 45, 44, 43, 42, 41, 40, 39, 38, 37,
36, 35, 34, 33, 32, 31, 30, 29, 28, 27, 26, 25, 24, 23, 22, 21, 20,
19, 18, 17, 16, 15, 14, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1}

3.5 Use Range, Reverse and Join to create {1, 2, 3, 4, 4, 3, 2, 1}

In[48]:=
```
Join[Range[4], Reverse[Range[4]]]
```
Out[48]= {1, 2, 3, 4, 4, 3, 2, 1}

3.6 Plot a list that counts up from 1 to 100, then down to 1.

In[49]:=
```
ListPlot[Join[Range[100], Reverse[Range[100]]]]
```
Out[49]=



3.7 Use Range and RandomInteger to make a list with a random lenght up to 10.

In[51]:=
```
Range[RandomInteger[10]]
```
Out[51]= {1, 2, 3}

3.8 Find a simpler form for Reverse[Reverse[Range[10]]]

In[52]:=
```
Range[10]
```
Out[52]= {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}

3.9 Find a simpler form to Join[{1, 2}, Join[{3, 4}, {5}]]

In[53]:=
```
Range[5]
```
Out[53]=
```
{1, 2, 3, 4, 5}
```

3.10 Find a simpler form for Join[Range[10], Join[Range[10], Range[5]]]

In[54]:=
```
Join[Range[10], Range[10], Range[5]]
```
Out[54]=
```
{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 1, 2, 3, 4, 5}
```

3.11 Find a simpler form for Reverse[Join[Range[20], Reverse[Range[20]]]]

In[55]:=
```
Join[Range[20], Reverse[Range[20]]]
```
Out[55]=
```
{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19,
 20, 20, 19, 18, 17, 16, 15, 14, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1}
```

+3.1 Compute the reverse of the reverse of {1, 2, 3, 4}

In[57]:=
```
Reverse[Reverse[Range[4]]]
```
Out[57]=
```
{1, 2, 3, 4}
```

+3.2 Use Range, Reverse and Join to create the list {1, 2, 3, 4, 5, 4, 3, 2, 1} .

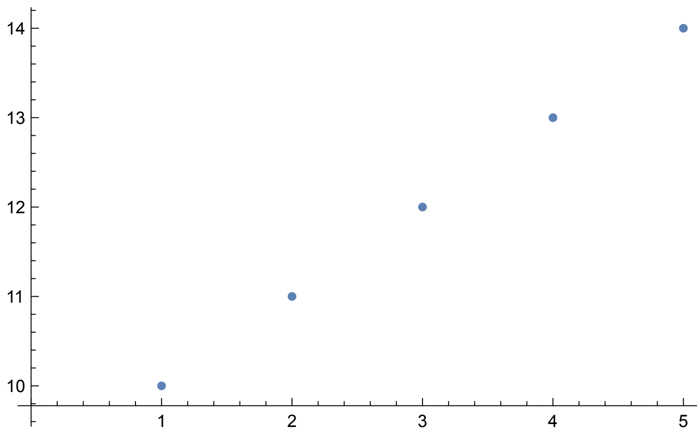
In[58]:=
```
Join[Range[4], Reverse[Range[4]]]
```
Out[58]=
```
{1, 2, 3, 4, 4, 3, 2, 1}
```

+3.3 Use Range, Reverse and Join to create {3, 2, 1, 4, 3, 2, 1, 5, 4, 3, 2, 1}

In[59]:=
```
Join[Reverse[Range[3]], Reverse[Range[4]], Reverse[Range[5]]]
```
Out[59]=
```
{3, 2, 1, 4, 3, 2, 1, 5, 4, 3, 2, 1}
```

+3.4 Plot the list numbers {10, 11, 12, 13, 14}

In[60]:=
```
ListPlot[Range[10, 14]]
```
Out[60]=

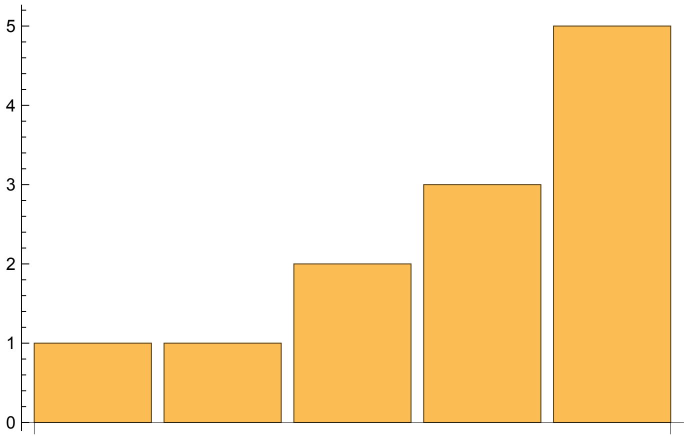


Exercises for Section 4 | Displaying Lists

4.1 Make a bar chart of {1, 1, 2, 3, 5}

In[61]:=
```
BarChart[{1, 1, 2, 3, 5}]
```

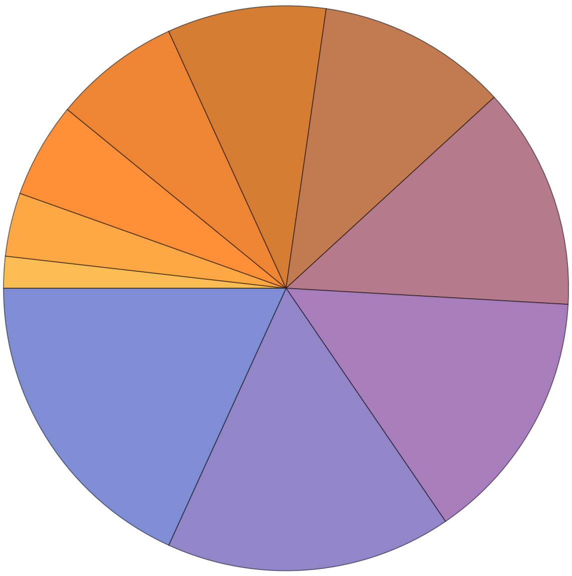
Out[61]=



4.2 Make a pie chart of numbers from 1 to 10.

In[62]:=
```
PieChart[Range[10]]
```

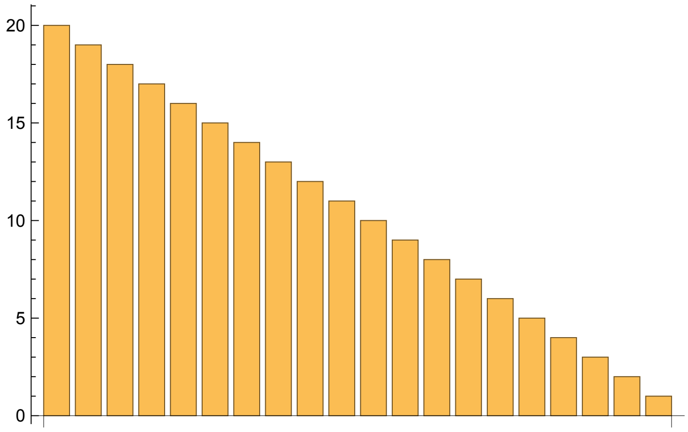
Out[62]=



4.3 Make a bar chart of numbers counting down from 20 to 1.

In[63]:=
```
BarChart[Reverse[Range[20]]]
```

Out[63]=



4.4 Display numbers from 1 to 5 in a column .

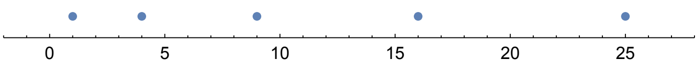
In[64]:=
```
Column[Range[5]]
```

Out[64]=
```
1
2
3
4
5
```

4.5 Make a number line plot of the squares {1, 4, 9, 16, 25} .

In[65]:=
```
NumberLinePlot[Range[5]^2]
```

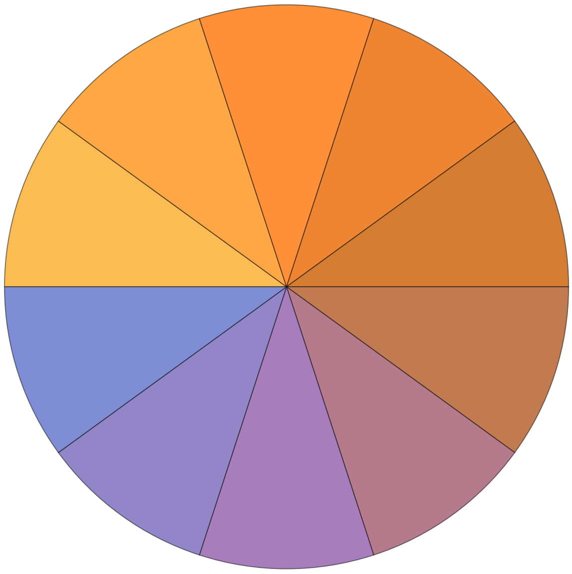
Out[65]=



4.6 Make a pie chart with 10 identical segments, each of size 1.

In[66]:=
```
PieChart[ConstantArray[1, 10]]
```

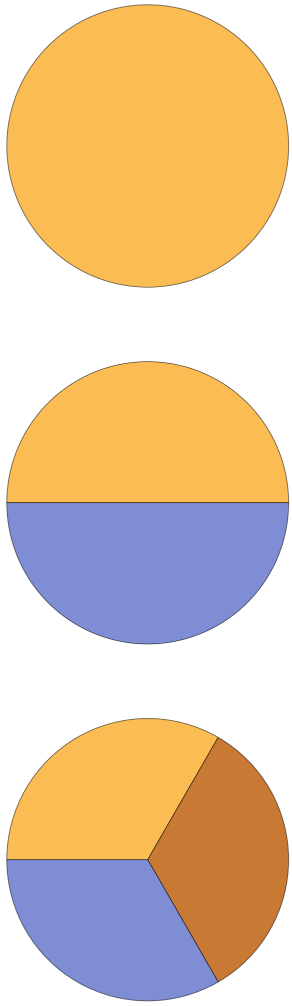
Out[66]=



4.7 Make a column of pie charts with 1, 2 and 3 identical segments.

In[67]:=
```
Column[{PieChart[{1}], PieChart[{1, 1}], PieChart[{1, 1, 1}]}, 3]
```

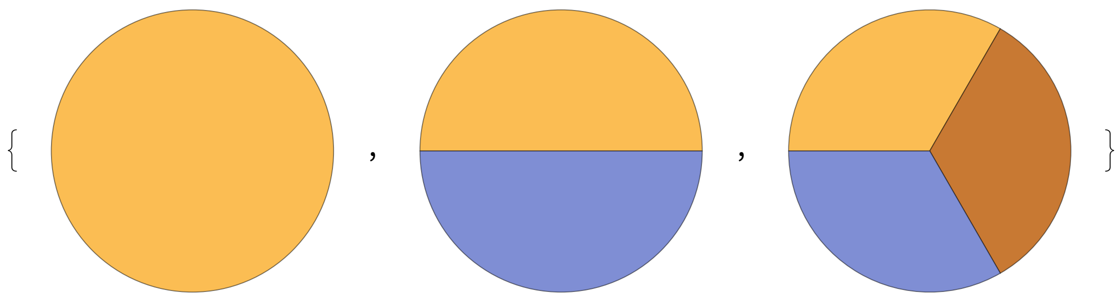
Out[67]=



+4.1 Make a list of pie charts with 1, 2 and 3 identical segments .

In[68]:=
```
{PieChart[{1}], PieChart[{1, 1}], PieChart[{1, 1, 1}]}
```

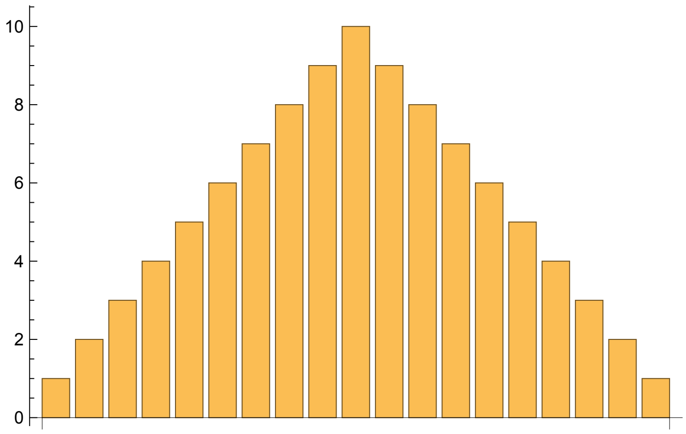
Out[68]=



+4.2 Make a bar chart of the sequence 1, 2, 3, ..., 9, 10, 9, 8, 7, ..., 1.

In[69]:=
```
BarChart[Join[Range[10], Reverse[Range[9]]]]
```

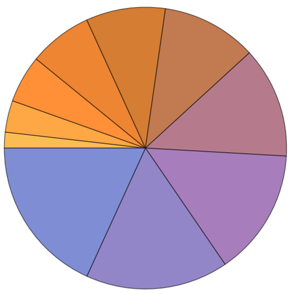
Out[69]=



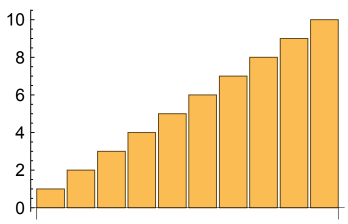
+4.3 Make a list of pie chart, bar chart and line plot of the numbers from 1 to 10.

In[70]:=
```
{PieChart[Range[10]], BarChart[Range[10]], ListLinePlot[Range[10]]}
```

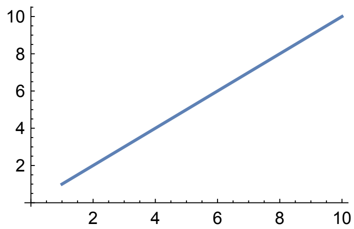
Out[70]= {



,



,

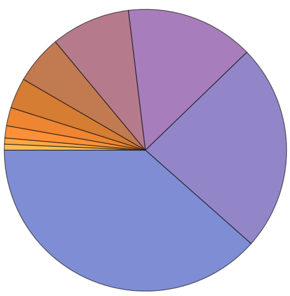


}

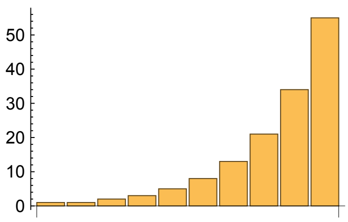
+4.4 Make a list of a pie chart and a bar chart of {1, 1, 2, 3, 5, 8, 13, 21, 34, 55}

In[71]:=
```
{PieChart[Fibonacci[Range[10]]], BarChart[Fibonacci[Range[10]]]}
```

Out[71]= {



,

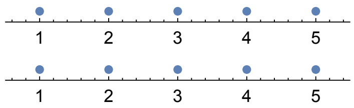


}

+4.5 Make a column of two number line plot of {1, 2, 3, 4, 5}

In[72]:=
```
Column[{NumberLinePlot[Range[5]], NumberLinePlot[Range[5]]}]
```

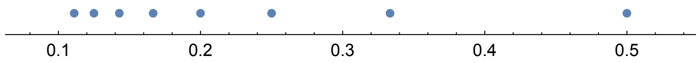
Out[72]=



+4.6 Mae a number line of fractions 1/2, 1/3, ... through 1/9.

In[73]:=
```
NumberLinePlot[{ConstantArray[1, 8] / Range[2, 9]}]
```

Out[73]=



Exercises for Section 5 | Operations on Lists

5.1 Make a list of the first 10 squares, in reverse order .

In[74]:=
```
Reverse[Range[10]^2]
```

Out[74]=
```
{100, 81, 64, 49, 36, 25, 16, 9, 4, 1}
```

5.2 Find the total of the first 10 squares .

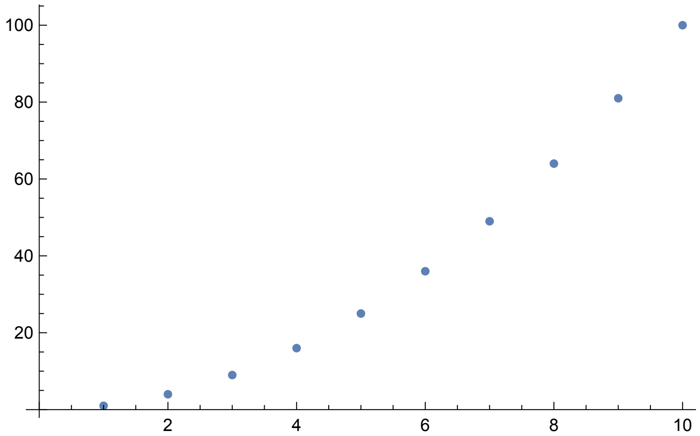
In[75]:=
```
Total[Reverse[Range[10]^2]]
```

Out[75]=
```
385
```

5.3 Make a plot of the first 10 squares, starting at 1.

In[76]:=
```
ListPlot[Range[10]^2]
```

Out[76]=



5.4 Use Sort, Join and Range to create {1, 1, 2, 2, 3, 3, 4, 4}.

In[78]:=
```
Sort[Join[Range[4], Range[4]]]
```

Out[78]=
```
{1, 1, 2, 2, 3, 3, 4, 4}
```

5.5 Use Range and + to make a list of numbers from 10 to 20, inclusive .

In[79]:=
```
Range[0, 10] + 10
```
Out[79]=
```
{10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20}
```

5.6 Make a combined list of the first 5 squares and cubes (numbers raised to the power 3), sorted into order .

In[80]:=
```
Sort[Join[Range[5]^2, Range[5]^3]]
```
Out[80]=
```
{1, 1, 4, 8, 9, 16, 25, 27, 64, 125}
```

5.7 Find the number of digits in 2^128.

In[81]:=
```
Length[IntegerDigits[2^128]]
```
Out[81]=
```
39
```

5.8 Find the first digit of 3^32

In[82]:=
```
First[IntegerDigits[2^32]]
```
Out[82]=
```
4
```

5.9 Find the first 10 digits in 2^100.

In[83]:=
```
Take[IntegerDigits[2^100], 10]
```
Out[83]=
```
{1, 2, 6, 7, 6, 5, 0, 6, 0, 0}
```

5.10 Find the largest digit that appears in 2^20.

In[84]:=
```
Max[IntegerDigits[2^20]]
```
Out[84]=
```
8
```

5.11 Find how many zeros appear in the digits of 2^1000.

In[85]:=
```
Count[IntegerDigits[2^1000], 0]
```
Out[85]=
```
28
```

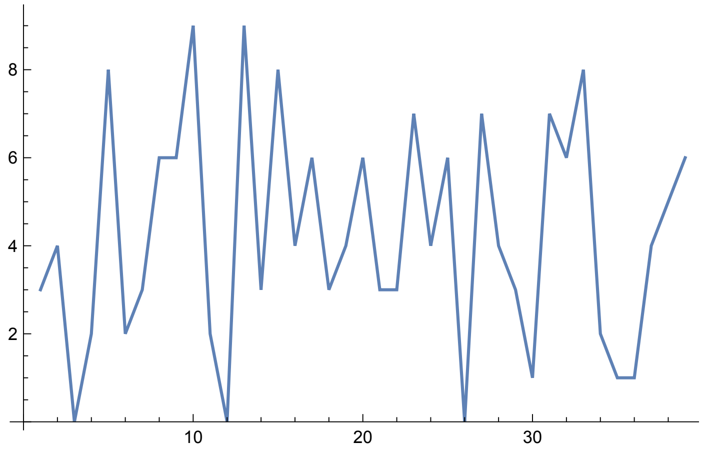
5.12 Use Part, Sort and IntegerDigit to find the second - smallest digit in 2^20.

In[86]:=
```
Part[Sort[IntegerDigits[2^20]], 2]
```
Out[86]=
```
1
```

5.13 Make a line plot of the sequence of digits that appear in 2^128.

In[87]:=
```
ListLinePlot[IntegerDigits[2^128]]
```

Out[87]=



5.14 Use Take and Drop to get the sequence 11 through 20 from Range[100].

In[88]:=
```
Take[Drop[Range[100], 10], 10]
```

Out[88]= {11, 12, 13, 14, 15, 16, 17, 18, 19, 20}

+5.1 Make a list of the first 10 multiples of 3.

In[89]:=
```
Range[10] * 3
```

Out[89]= {3, 6, 9, 12, 15, 18, 21, 24, 27, 30}

+5.2 Make a list of the first 10 squares using only Range and Times .

In[90]:=
```
Times[Range[10], Range[10]]
```

Out[90]= {1, 4, 9, 16, 25, 36, 49, 64, 81, 100}

+5.3 Find the last digit of 2^37.

In[91]:=
```
Last[IntegerDigits[2^37]]
```

Out[91]= 2

+5.4 Find the second-to-last digit of 2^32.

In[92]:=
```
Last[Drop[IntegerDigits[2^32], -1]]
```

Out[92]= 9

+5.5 Find the sum of all the digits of 3^126.

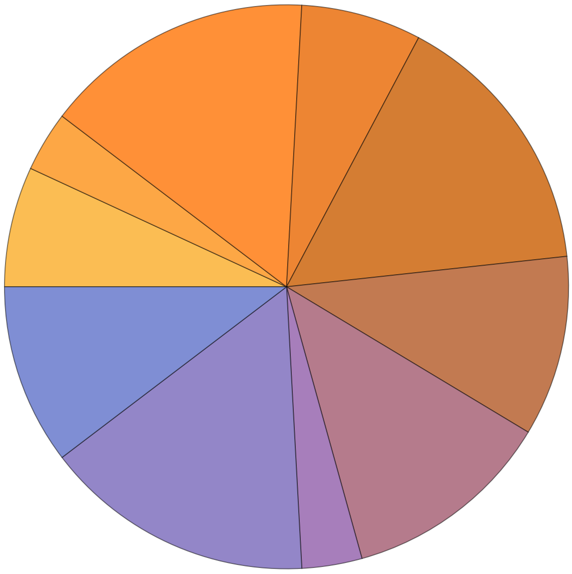
In[93]:=
```
Total[IntegerDigits[3^126]]
```

Out[93]= 234

+5.6 Make a pie chart of the sequence of digits that appear in 2^32.

In[94]:=
```
PieChart[IntegerDigits[2^32]]
```

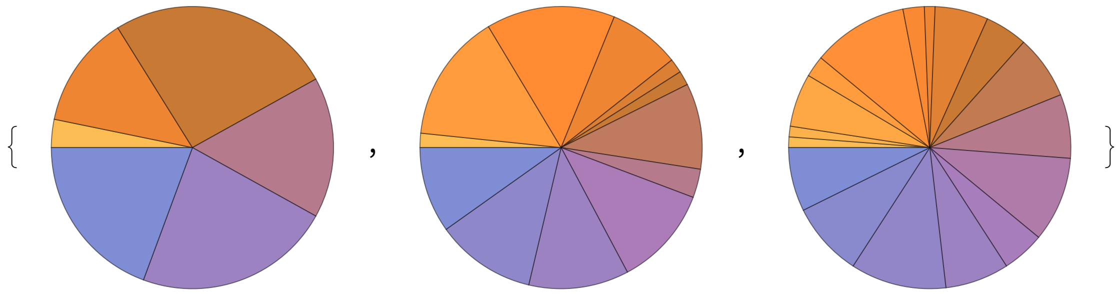
Out[94]=



+5.7 Make a list of pie charts for the sequence of digits in 2^20, 2^40, 2^60.

In[95]:=
```
{PieChart[IntegerDigits[2^20]],
 PieChart[IntegerDigits[2^40]], PieChart[IntegerDigits[2^60]]}
```

Out[95]=



Exercises for Section 6 | Making Tables

6.1 Make a list in which the number 1000 is repeated 5 times .

In[96]:=
```
Table[1000, {5}]
```

Out[96]=
```
{1000, 1000, 1000, 1000, 1000}
```

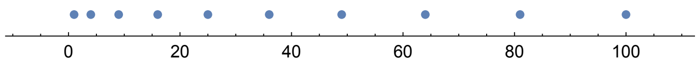
6.2 Make a table of the value of n^3 for n from 10 to 20.

```
In[97]:= Table[n^3, {n, 10, 20}]
Out[97]= {1000, 1331, 1728, 2197, 2744, 3375, 4096, 4913, 5832, 6859, 8000}
```

6.3 Make a number line plot of the first 20 squares .

```
In[99]:= NumberLinePlot[Table[n^2, {n, 10}]]
```

Out[99]=



6.4 Make a list of the even numbers (2, 4, 6, ...) up to 20.

```
In[98]:= Table[n*2, {n, 10}]
Out[98]= {2, 4, 6, 8, 10, 12, 14, 16, 18, 20}
```

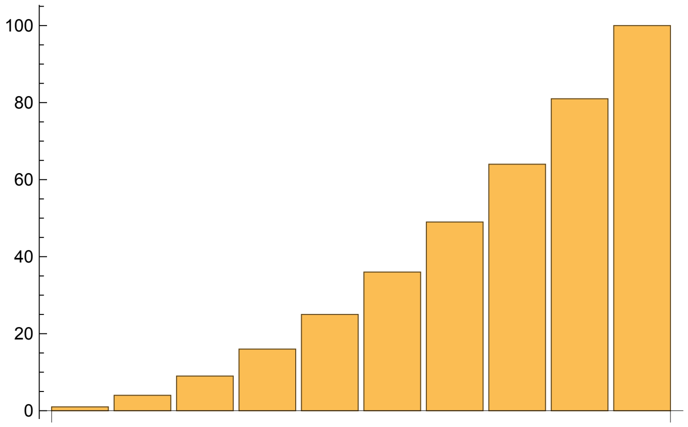
6.5 Use Table to get the same result as Range[10].

```
In[100]:= Table[n, {n, 10}]
Out[100]= {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}
```

6.6 Make a bar chart of the first 10 squares .

```
In[101]:= BarChart[Table[n^2, {n, 10}]]
```

Out[101]=



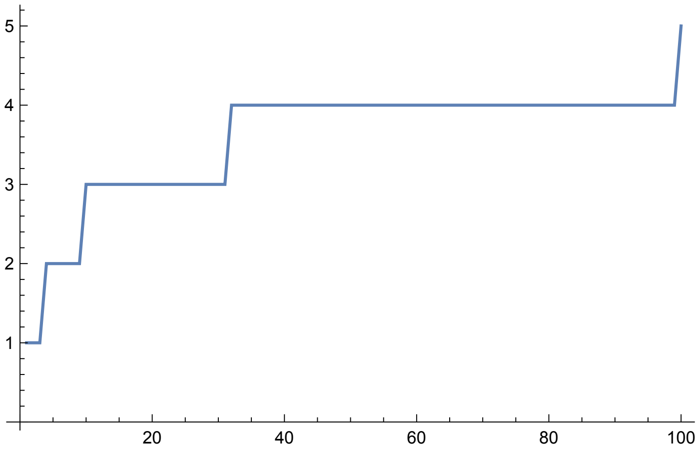
6.7 Make a table of lists of digits for the first 10 squares.

```
In[102]:= Table[IntegerDigits[n^2], {n, 10}]
Out[102]= {{1}, {4}, {9}, {1, 6}, {2, 5}, {3, 6}, {4, 9}, {6, 4}, {8, 1}, {1, 0, 0}}
```

6.8 Make a list line plot of the length of the sequence of digits for each of the first 100 squares.

In[103]:= `ListLinePlot[Table[Length[IntegerDigits[n^2]], {n, 100}]]`

Out[103]=



6.9 Make a table of the first digit of the first 20 squares.

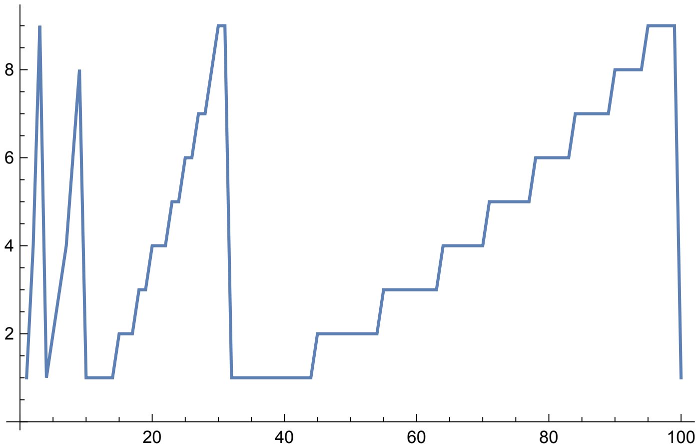
In[104]:= `Table[First[IntegerDigits[n^2]], {n, 20}]`

Out[104]= {1, 4, 9, 1, 2, 3, 4, 6, 8, 1, 1, 1, 1, 1, 2, 2, 2, 3, 3, 4}

6.10 Make a list line plot of the first digits of the first 100 squares.

In[105]:= `ListLinePlot[Table[First[IntegerDigits[n^2]], {n, 100}]]`

Out[105]=



+6.1 Make a list of the differences between n^3 and n^2 with n up to 10.

In[106]:= `Table[(n^3) - (n^2), {n, 10}]`

Out[106]= {0, 4, 18, 48, 100, 180, 294, 448, 648, 900}

+6.2 Make a list of the odd numbers (1, 3, 5, ...) up to 100.

In[107]:=
```
Table[(n*2) - 1, {n, 50}]
```

Out[107]=
```
{1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31,
 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65,
 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 97, 99}
```

+6.3 Make a list of the squares of even numbers up to 100.

In[108]:=
```
Table[(n*2)^2, {n, 50}]
```

Out[108]=
```
{4, 16, 36, 64, 100, 144, 196, 256, 324, 400, 484, 576, 676, 784, 900,
 1024, 1156, 1296, 1444, 1600, 1764, 1936, 2116, 2304, 2500, 2704, 2916,
 3136, 3364, 3600, 3844, 4096, 4356, 4624, 4900, 5184, 5476, 5776, 6084,
 6400, 6724, 7056, 7396, 7744, 8100, 8464, 8836, 9216, 9604, 10000}
```

+6.4 Create the list {-3, -2, -1, 0, 1, 2} using Range .

In[109]:=
```
Range[-3, 2]
```

Out[109]=
```
{-3, -2, -1, 0, 1, 2}
```

+6.5 Make a list for the numbers n up to 20 in which each element is a column of the value of n, n^2 and n^3.

In[110]:=
```
Table[Column[{n, n^2, n^3}], {n, 20}]
```

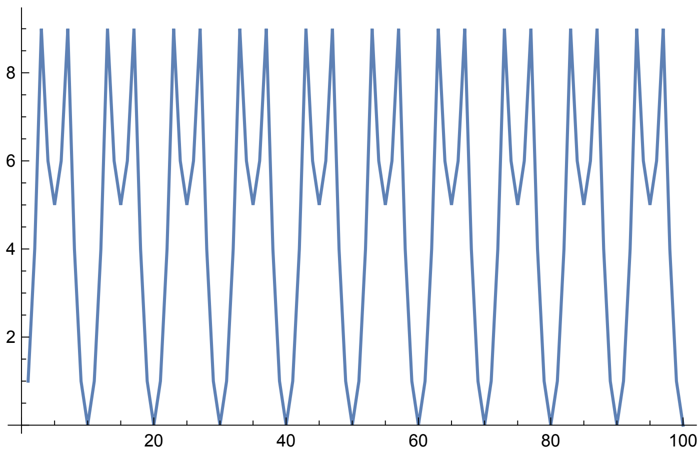
Out[110]=
```
  1    2    3     4     5      6      7      8      9     10      11
{ 1 ,  4 ,  9  ,  16 ,  25  ,  36  ,  49  ,  64  ,  81  ,  100  ,  121  ,
  1    8    27    64    125    216    343    512    729   1000    1331

 12      13      14      15      16      17      18      19      20
 144  ,  169  ,  196  ,  225  ,  256  ,  289  ,  324  ,  361  ,  400  }
 1728    2197    2744    3375    4096    4913    5832    6859    8000
```

+6.6 Make a list line plot of the last digit of the first 100 squares.

In[111]:=
```
ListLinePlot[Table[Last[IntegerDigits[n^2]], {n, 100}]]
```

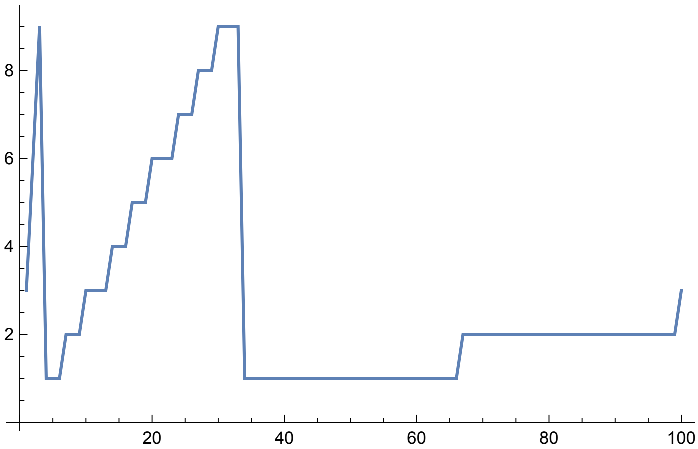
Out[111]=



+6.7 Make a list line plot of the first digit of the first 100 multiplies of 3.

In[112]:=
```
ListLinePlot[Table[First[IntegerDigits[n * 3]], {n, 100}]]
```

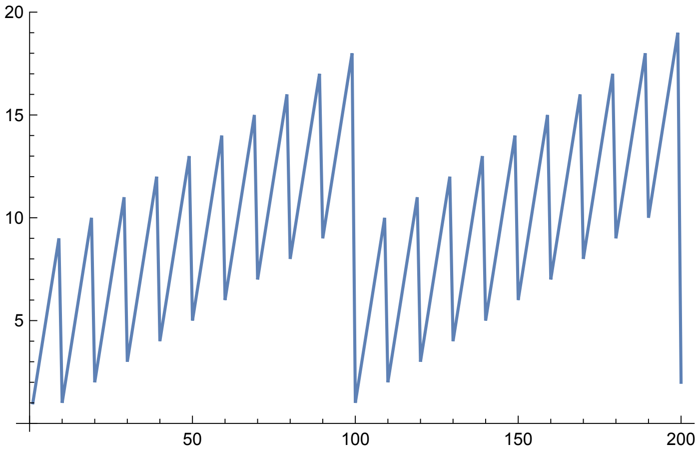
Out[112]=



+6.8 Make a list line plot of the total of the digits for each number up to 200.

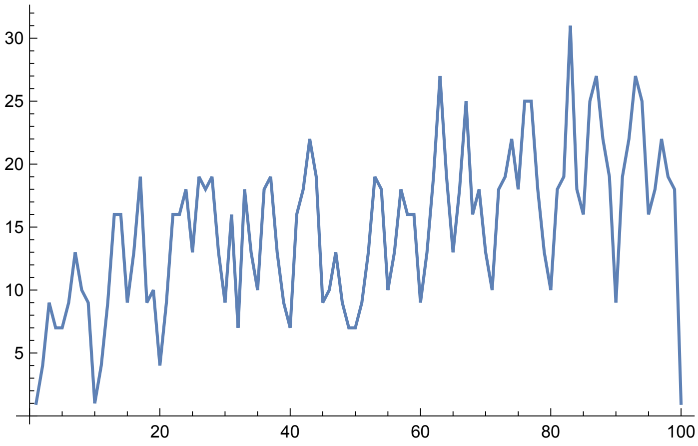
In[113]:=
```
ListLinePlot[Table[Total[IntegerDigits[n]], {n, 200}]]
```

Out[113]=



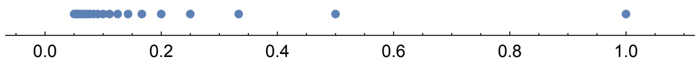
+6.9 Make a list line plot of the total of the digits for each of the first 100 squares.

In[114]:=
```
ListLinePlot[Table[Total[IntegerDigits[n^2]], {n, 100}]]
```

Out[114]=


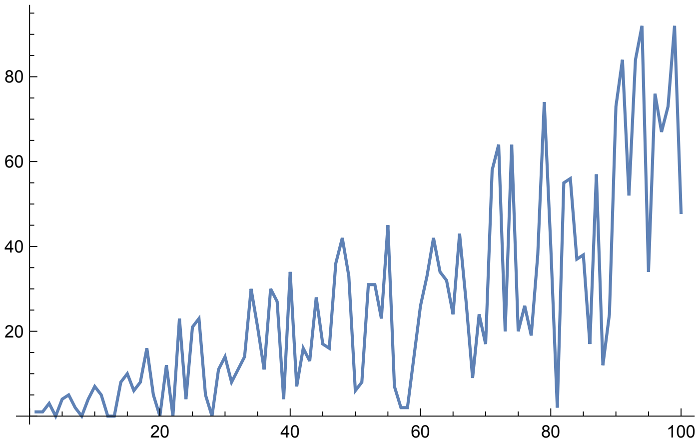
+6.10 Make a number line plot of the numbers 1/n with n from 1 to 20.

In[115]:=
```
NumberLinePlot[Table[1 / n, {n, 1, 20}]]
```

Out[115]=


+6.11 Make a line plot of a list of 100 random integers where the nth integer is between 0 and n.

In[116]:=
```
ListLinePlot[Table[RandomInteger[n], {n, 100}]]
```

Out[116]=


Exercises for Section 7 | Colors and Styles

7.1 Make a list of red, yellow and green.

In[117]:=
```
{Red, Yellow, Green}
```

Out[117]=


7.2 Make a red, yellow, green column ("traffic light")

In[118]:=
```
Column[{Red, Yellow, Green}]
```

Out[118]=

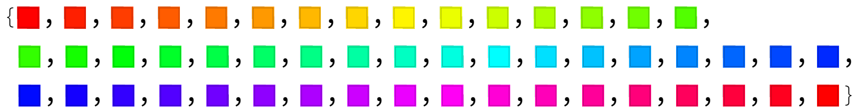

7.3 Compute the negation of the color Orange.

In[119]:=
```
ColorNegate[Orange]
```

Out[119]=

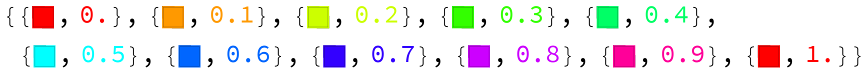

7.4 Make a list of color with hues varying from 0 to 1 in steps of 0.02.

In[120]:=
```
Table[Hue[n], {n, 0, 1, 0.02}]
```

Out[120]=


7.8 Make a list of numbers from 0 to 1 in steps of 0.1, each with a hue equal to its value.

In[122]:=
```
Table[{Hue[n], Style[n, Hue[n]]}, {n, 0, 1, 0.1}]
```

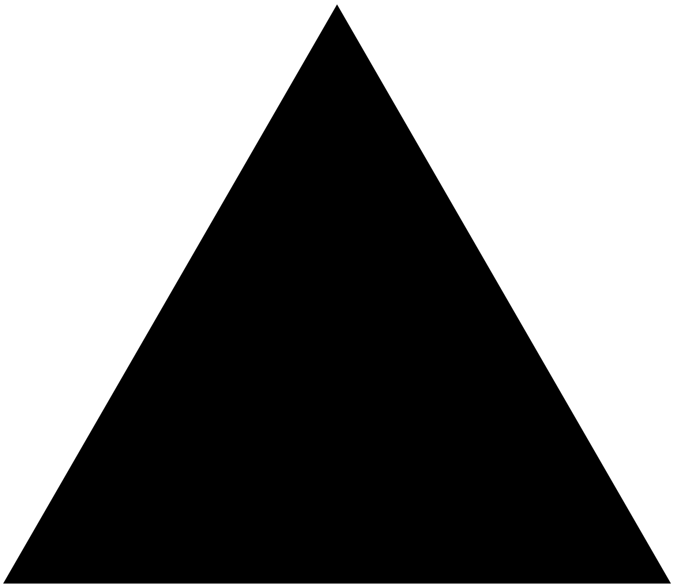
Out[122]=


Exercises for Section 8 | Basic Graphics Objects

8.1 Use RegularPolygon to draw a triangle.

In[123]:=
```
Graphics[RegularPolygon[3]]
```

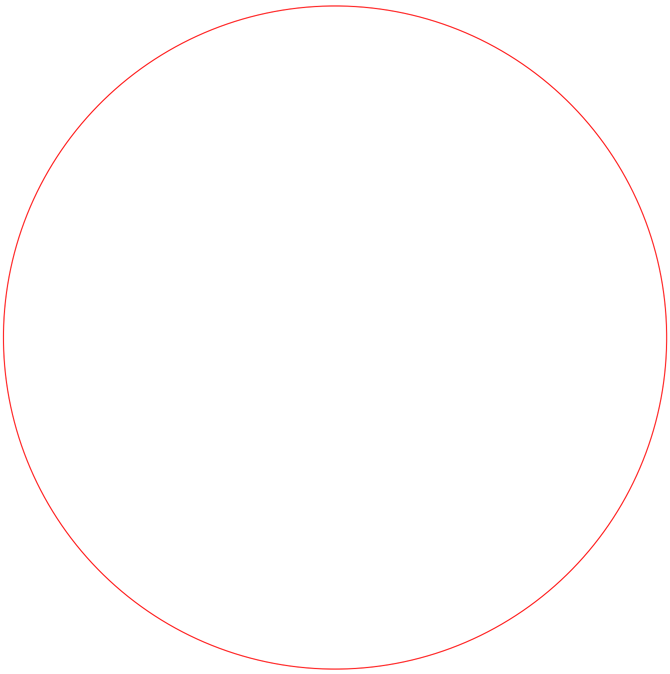
Out[123]=



8.2 Make graphics of a red circle.

In[124]:=
```
Graphics[Style[Circle[], Red]]
```

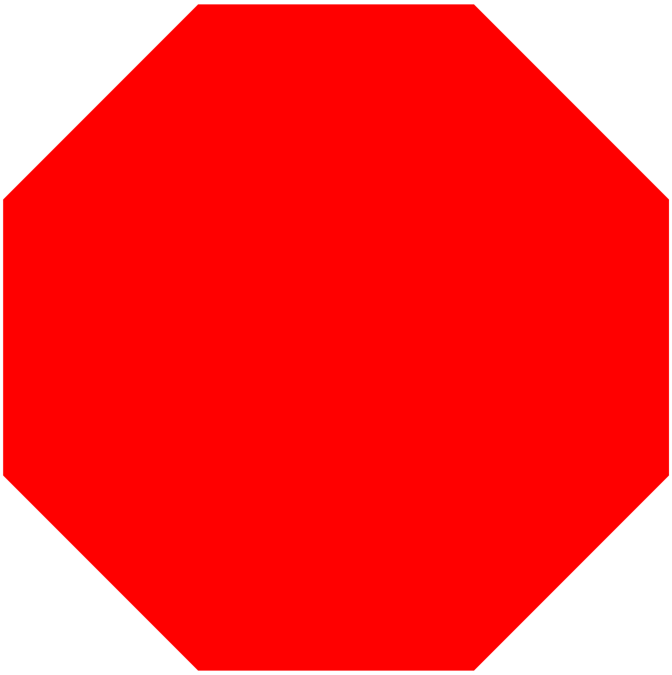
Out[124]=



8.3 Make a red octagon.

In[125]:=
```
Graphics[Style[RegularPolygon[8], Red]]
```

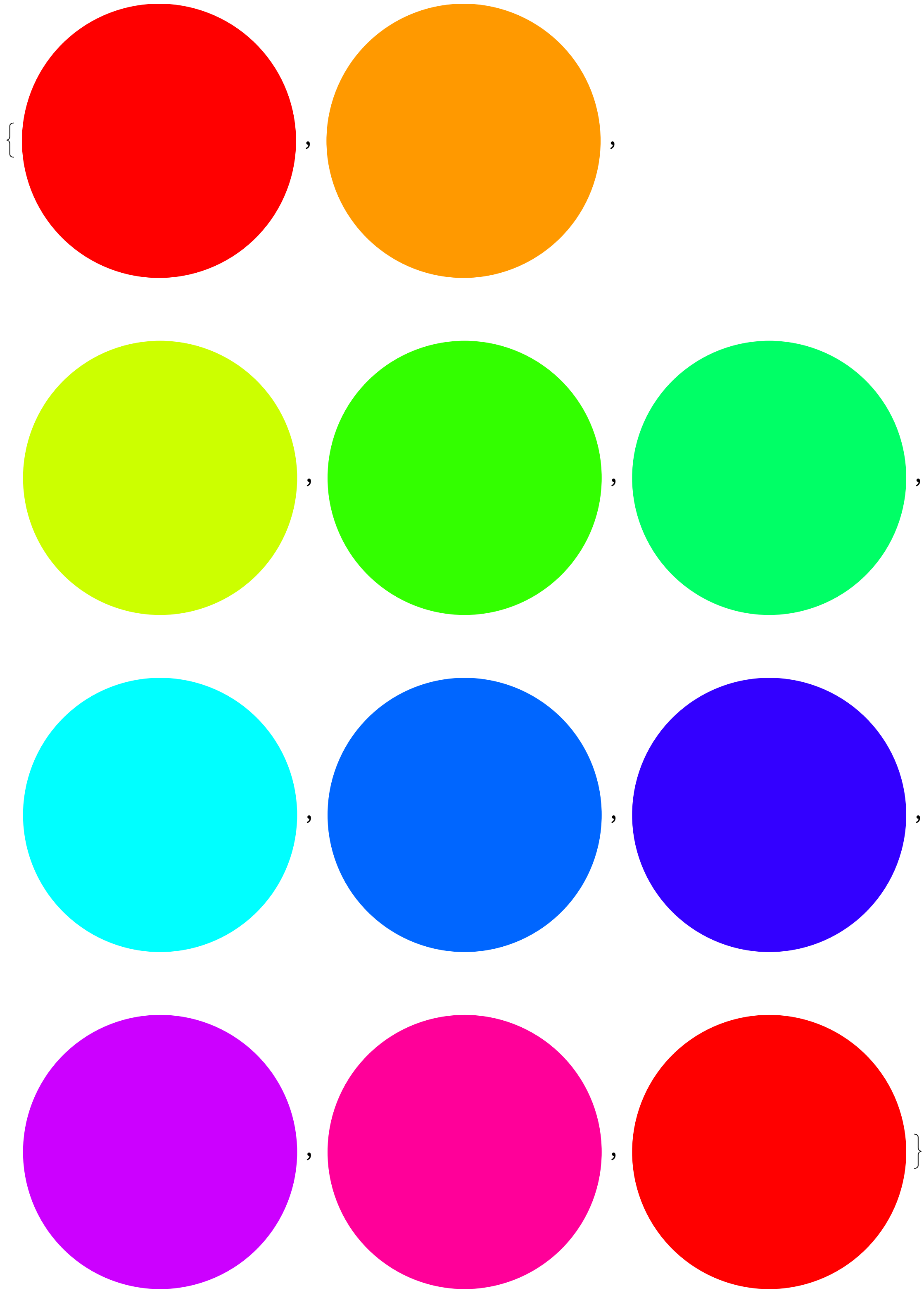
Out[125]=



8.4 Make a list whose elements are disks with hues varying from 0 to 1 in steps of 0.1.

In[127]:=
```
Table[Graphics[Style[Disk[], Hue[n]]], {n, 0, 1, 0.1}]
```

Out[127]=

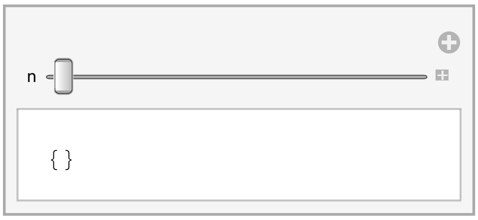


Exercise for Section 9 | Interactive Manipulation

9.1 Make a Manipulate to show Range[n] with n varying from 0 to 100.

In[128]:=
```
Manipulate[Range[n], {n, 0, 100}]
```

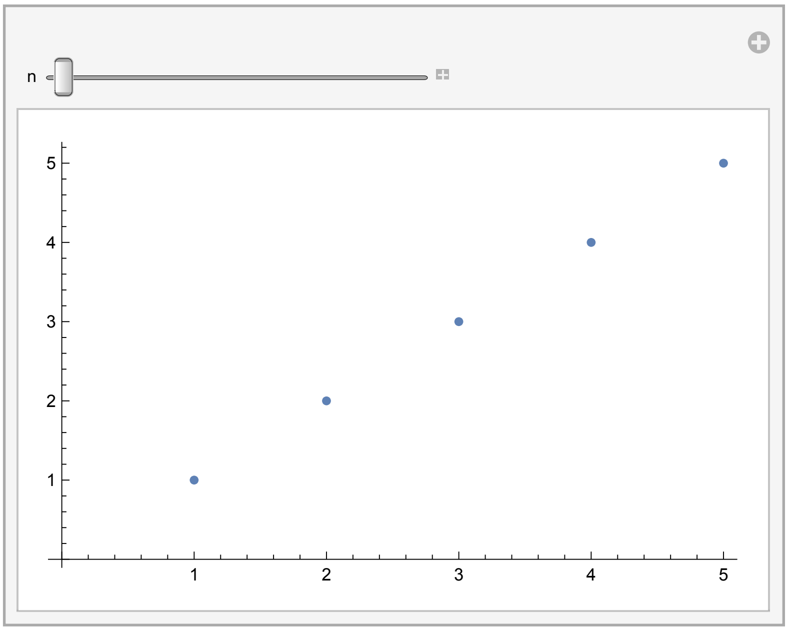
Out[128]=



9.2 Make a Manipulate to plot the whole numbers up to n, where n can range from 5 to 50.

In[129]:=
```
Manipulate[ListPlot[Range[1, n]], {n, 5, 50}]
```

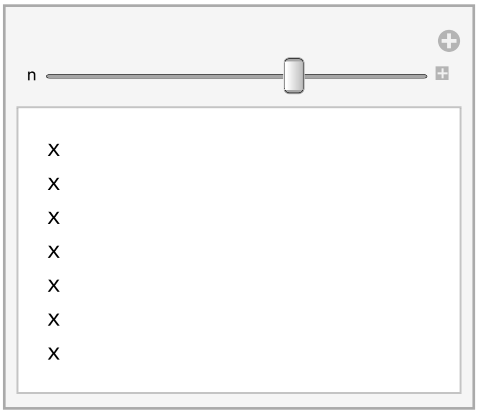
Out[129]=



9.3 Make a Manipulate to show a column of between 1 and 10 copies of x.

In[130]:=
```
Manipulate[Column[Table[x, n]], {n, 1, 10, 1}]
```

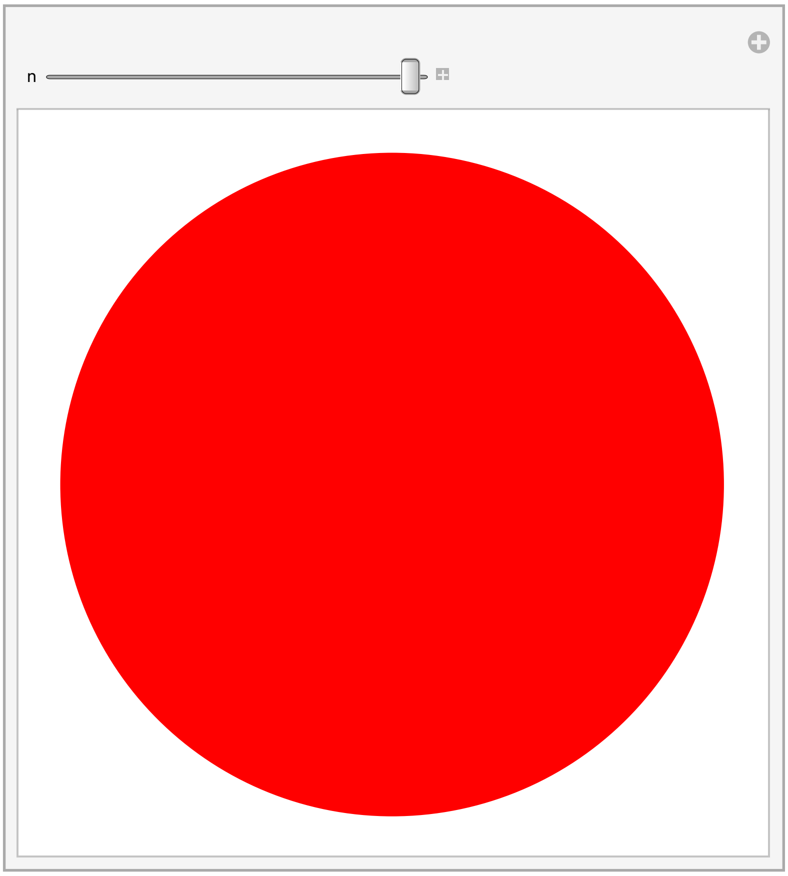
Out[130]=



9.4 Make a Manipulate to show a disk with a hue varying from 0 to 1.

In[131]:=
```
Manipulate[Graphics[Style[Disk[], Hue[n]]], {n, 0, 1}]
```

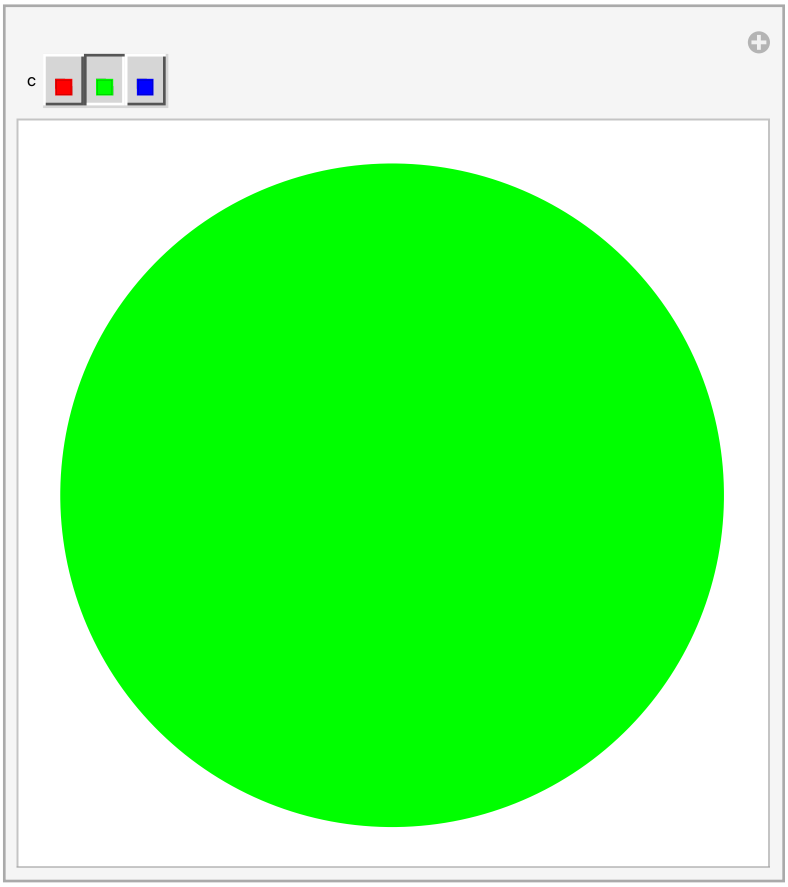
Out[131]=



9.5 Make a manipulate to show a disk with red, green and blue color components varying from 0 to 1.

In[132]:=
```
Manipulate[Graphics[Style[Disk[], c]], {c, {Red, Green, Blue}}]
```

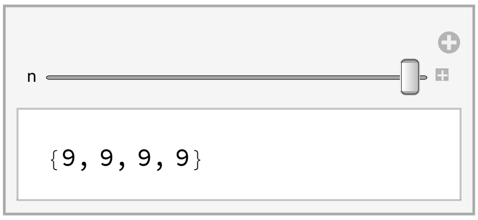
Out[132]=



9.6 Make a Manipulate to show digit sequences of 4 - digit integers (between 1000 and 9999).

In[133]:=
```
Manipulate[IntegerDigits[n], {n, 1000, 9999, 1}]
```

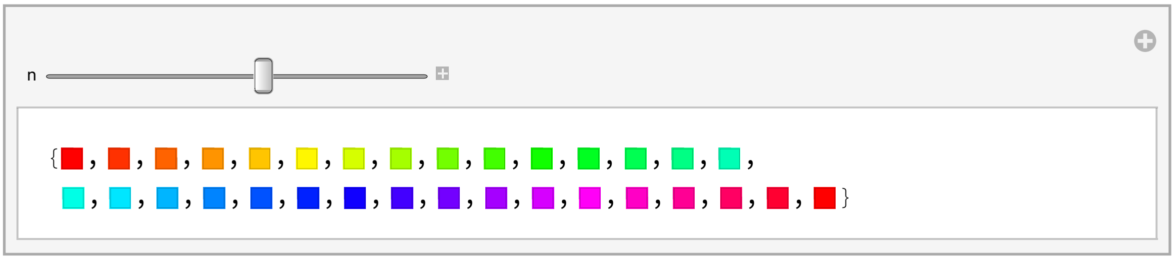
Out[133]=



9.7 Make a Manipulate to create a list of between 5 and 50 equally spaced hues.

In[135]:=
```
Manipulate[Table[Hue[h], {h, 0, 1, 1 / n}], {n, 5, 50, 1}]
```

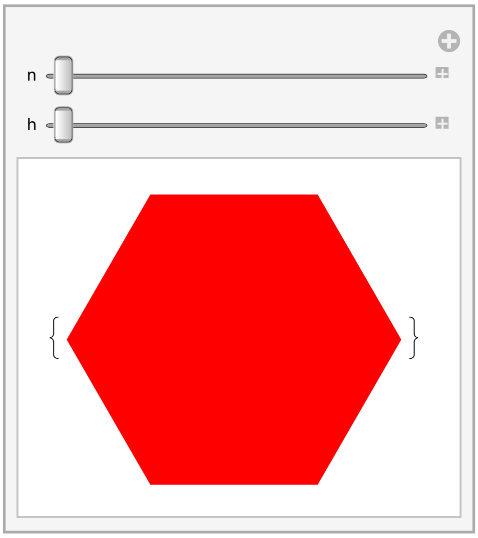
Out[135]=



9.8 Make a Manipulate that shows a list of a variable number of hexagons (between 1 and 10), and with variable hues.

In[137]:=
```
Manipulate[Table[Graphics[Style[RegularPolygon[6], Hue[h]]], n],
 {n, 1, 10, 1}, {h, 0, 1}]
```

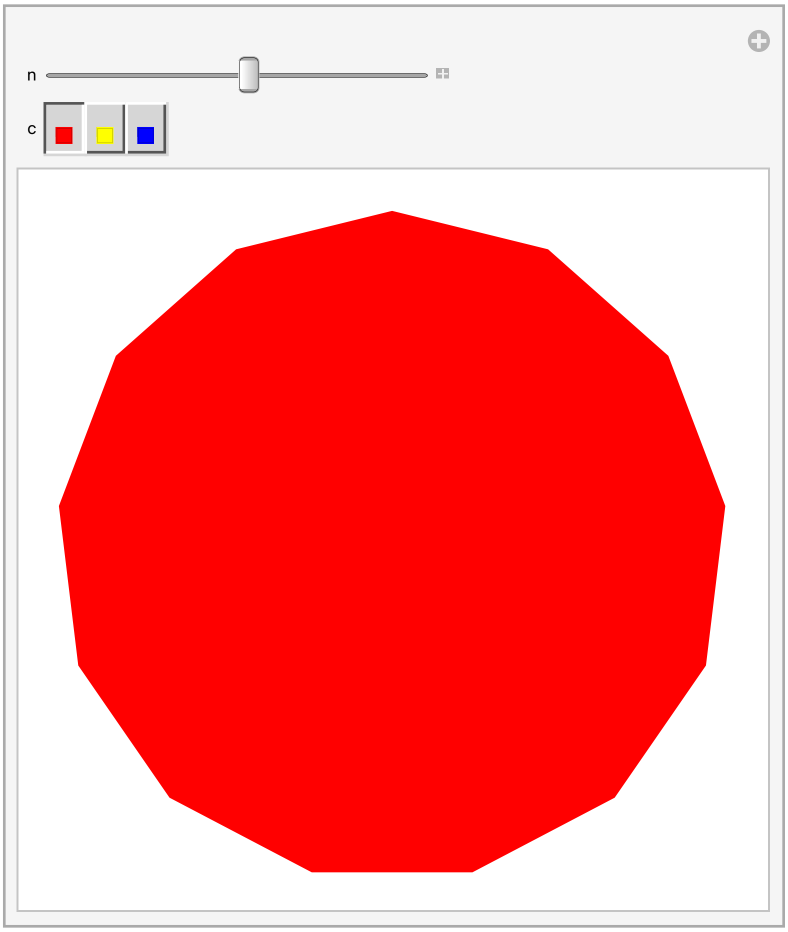
Out[137]=



9.9 Make a Manipulate that lets you show a regular polygon with between 5 and 20 sides, in red, yellow or blue.

In[139]:=
```
Manipulate[Graphics[Style[RegularPolygon[n], c]],
 {n, 5, 20, 1}, {c, {Red, Yellow, Blue}}]
```

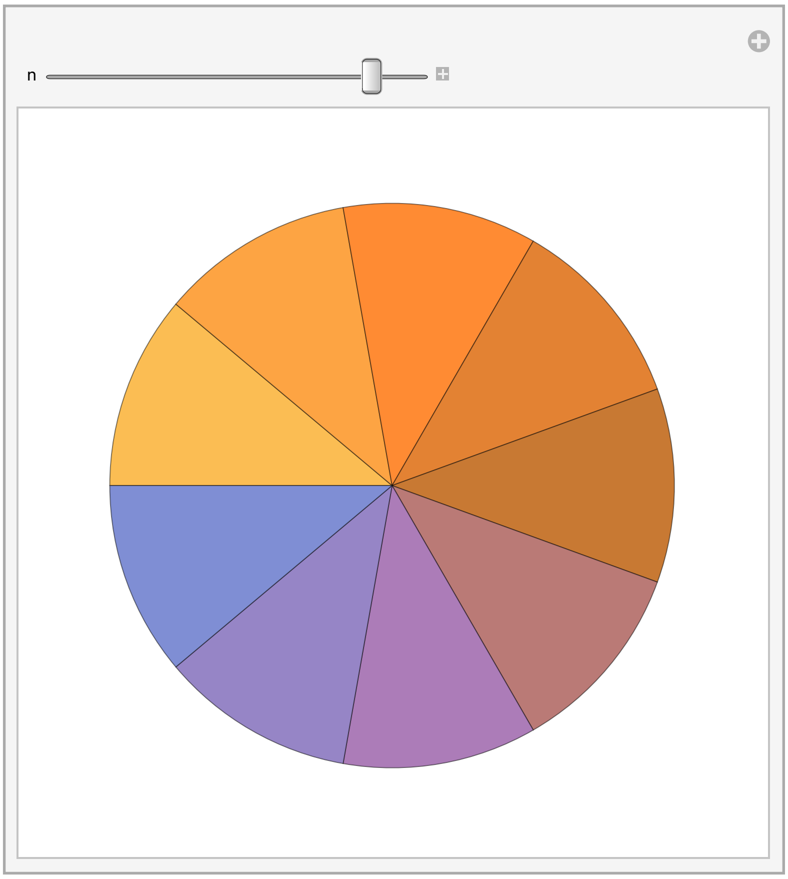
Out[139]=



9.10 Make a Manipulate that shows a pie chart with a number of equal segments varying from 1 to 10.

In[140]:=
```
Manipulate[PieChart[ConstantArray[1, n]], {n, 1, 10, 1}]
```

Out[140]=



9.11 Make a Manipulate that gives a bar chart of the 3 digits in integers from 100 to 999.

In[141]:=
```
Manipulate[BarChart[IntegerDigits[n]], {n, 100, 999, 1}]
```

Out[141]=

9.12 Make a Manipulate that shows n random colors, where n can range from 1 to 50.

In[142]:=
```
Manipulate[RandomColor[n], {n, 1, 50, 1}]
```

Out[142]=

9.13 Make a Manipulate to display a column of integer powers with bases from 1 to 25 and exponents from 1 to 10.

In[143]:=
```
Manipulate[Column[Range[n]^i], {n, 1, 20}, {i, 1, 10, 1}]
```

Out[143]=

n

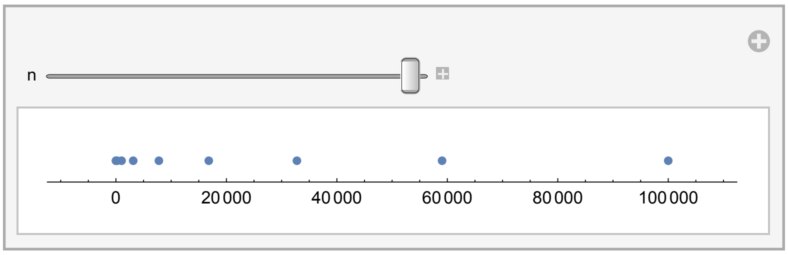
i

1
128
2187
16 384
78 125

9.14 Make a Manipulate of a number line of values of x^n for integer x from 1 to 10, with n varying from 0 to 5.

In[144]:=
```
Manipulate[NumberLinePlot[Range[10]^n], {n, 0, 5}]
```

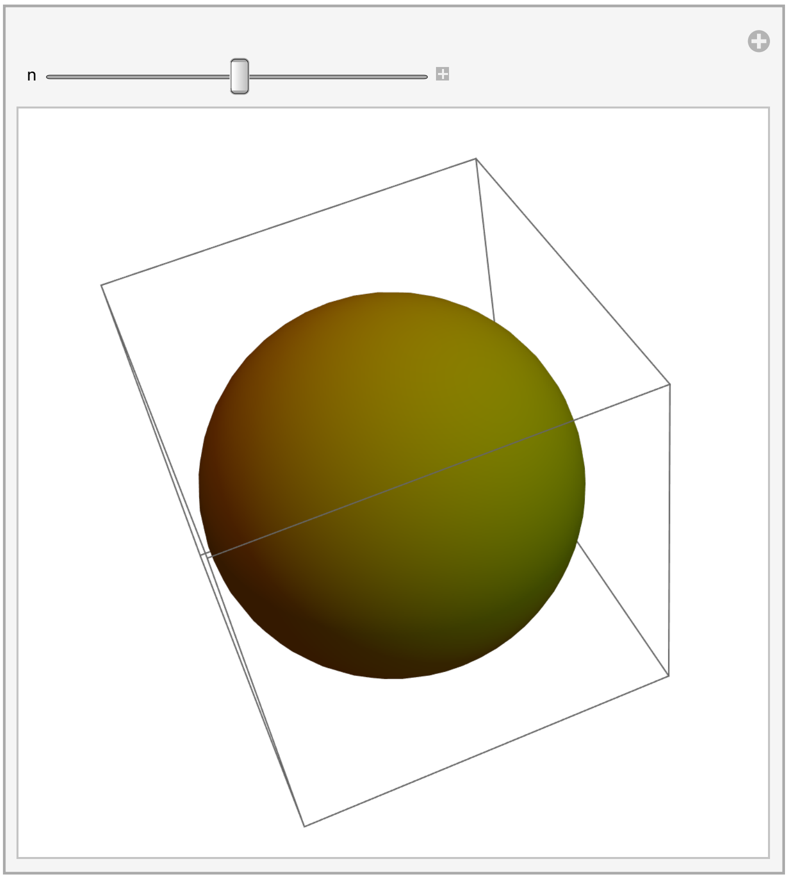
Out[144]=



9.15 Make a Manipulate to show a sphere that can vary in color from green to red.

In[145]:=
```
Manipulate[Graphics3D[Style[Sphere[], RGBColor[n, 1 - n, 0]]], {n, 0, 1}]
```

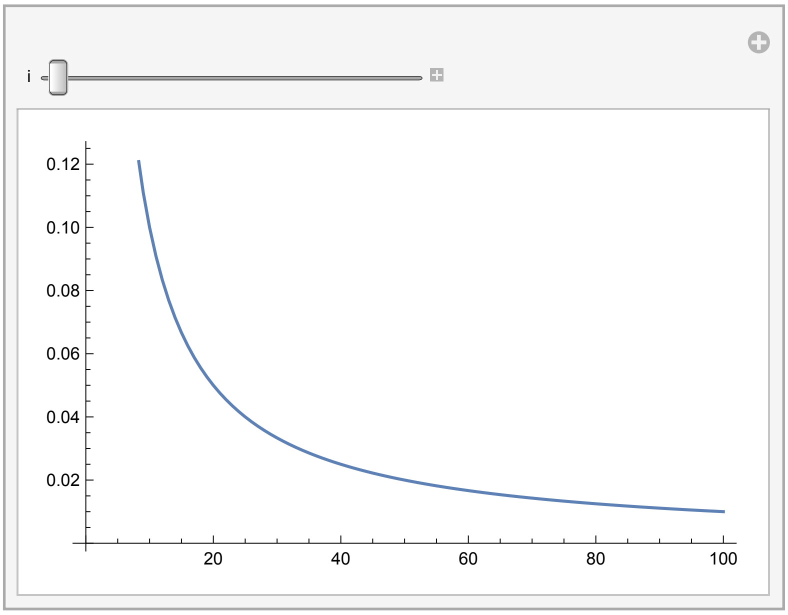
Out[145]=



+9.1 Make a Manipulate to plot numbers from 1 to 100 raised to powers that can vary between - 1 and + 1.

In[146]:=
```
Manipulate[ListLinePlot[Range[100]^i], {i, -1, 1}]
```

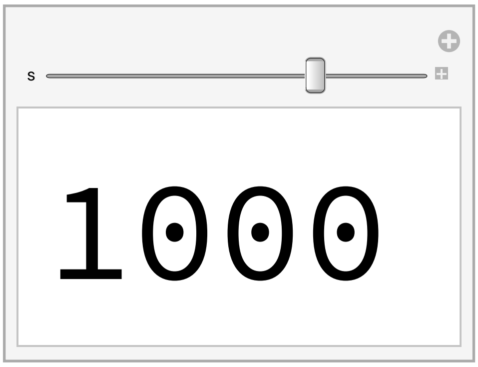
Out[146]=



+9.2 Make a Manipulate to display 1000 at sizes between 5 and 100.

In[147]:=
```
Manipulate[Style[1000, s], {s, 5, 100}]
```

Out[147]=



+9.3 Make a Manipulate to show a bar chart with 4 bars, each with a height that can be between 0 and 10.

In[148]:=
```
Manipulate[BarChart[{n, x, y, z}], {n, 0, 10}, {y, 0, 10}, {z, 0, 10}]
```

Out[148]=