EXERCISE 3.5 CONTINUED

(6)

In[14]:=
```
t = Table[" ", {100}]
```

Out[14]=
```
{ ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,
   ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,
   ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,
   ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  , }
```

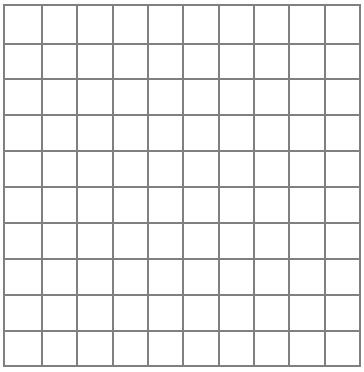
In[18]:=
```
p = Partition[t, {10}]
```

Out[18]=
```
{{ ,  ,  ,  ,  ,  ,  ,  ,  ,  }, { ,  ,  ,  ,  ,  ,  ,  ,  ,  },
 { ,  ,  ,  ,  ,  ,  ,  ,  ,  }, { ,  ,  ,  ,  ,  ,  ,  ,  ,  },
 { ,  ,  ,  ,  ,  ,  ,  ,  ,  }, { ,  ,  ,  ,  ,  ,  ,  ,  ,  }, { ,  ,  ,  ,  ,  ,  ,  ,  ,  },
 { ,  ,  ,  ,  ,  ,  ,  ,  ,  }, { ,  ,  ,  ,  ,  ,  ,  ,  ,  }, { ,  ,  ,  ,  ,  ,  ,  ,  ,  }}
```

(a)

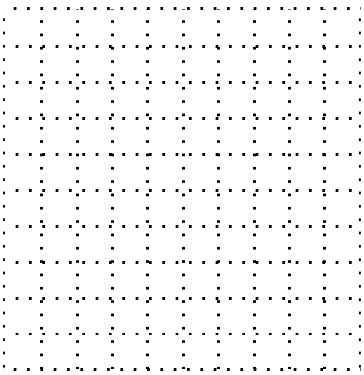
In[19]:=
```
Grid[p, Dividers → Gray]
```

Out[19]=



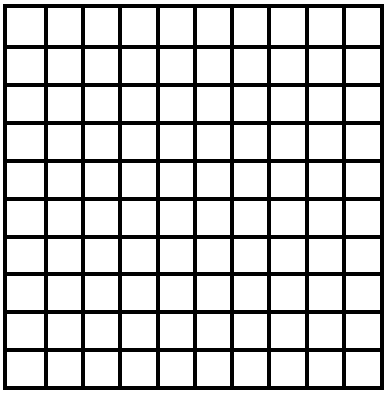
In[20]:=
```
Grid[p, Dividers → Dotted]
```

Out[20]=



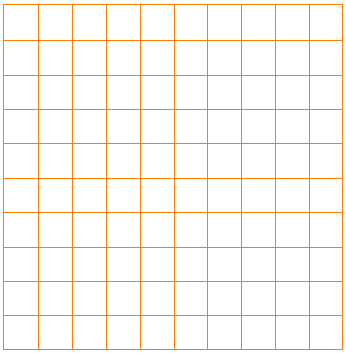
In[21]:=
```
Grid[p, Dividers → Thick]
```

Out[21]=



In[22]:=
```
Grid[p, Dividers → Directive[Thin, Orange]]
```

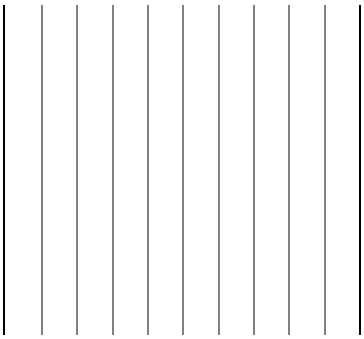
Out[22]=



(b)

In[23]:=
```
Grid[p, Dividers → {{Black, {Gray}, Black}, None}]
```

Out[23]=



(c)

In[25]:=
```
t = Table[" ", {100}]
```

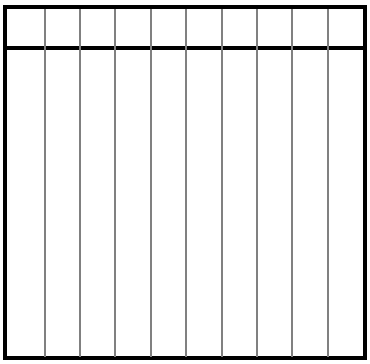
Out[25]=
```
{ ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,
   ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,
   ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,
   ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  ,  }
```

In[27]:=
```
p = Partition[t, {10}]
```

Out[27]=
```
{{ ,  ,  ,  ,  ,  ,  ,  ,  ,  }, { ,  ,  ,  ,  ,  ,  ,  ,  ,  },
 { ,  ,  ,  ,  ,  ,  ,  ,  ,  }, { ,  ,  ,  ,  ,  ,  ,  ,  ,  },
 { ,  ,  ,  ,  ,  ,  ,  ,  ,  }, { ,  ,  ,  ,  ,  ,  ,  ,  ,  }, { ,  ,  ,  ,  ,  ,  ,  ,  ,  },
 { ,  ,  ,  ,  ,  ,  ,  ,  ,  }, { ,  ,  ,  ,  ,  ,  ,  ,  ,  }, { ,  ,  ,  ,  ,  ,  ,  ,  ,  }}
```

In[30]:=
```
Grid[p, Dividers → {{Thick, {Gray}, Thick}, {1 → Thick, 2 → Thick, 11 → Thick}}]
```

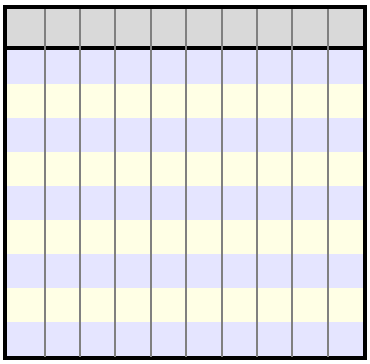
Out[30]=



,
(d)

In[34]:=
```
Grid[p, Dividers → {{Thick, {Gray}, Thick}, {1 → Thick, 2 → Thick, 11 → Thick}},
 Background → {None, {Lighter[Gray, .7], {Lighter[Blue, .9], Lighter[Yellow, .9]}}}]
```

Out[34]=



, .
MOREOVER

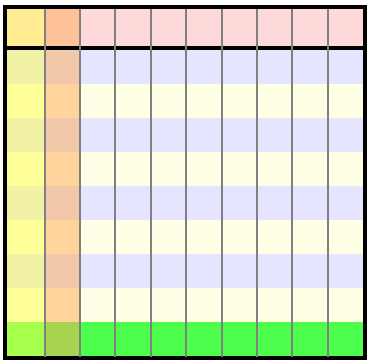
In[20]:=
```
Grid[p,
 Dividers → {{Thick, {Gray}, Thick}, {1 → Thick, 2 → Thick, 11 → Thick}}, Background →
  {None, {Lighter[Pink, .7], {Lighter[Blue, .9], Lighter[Yellow, .9]}, Lighter[Green, .3]}}]
```

Out[20]=
```
Grid[p, Dividers → {{Thickness[Large], {}, Thickness[Large]},
   {1 → Thickness[Large], 2 → Thickness[Large], 11 → Thickness[Large]}},
 Background → {None, {{}, {{}, {}, {}}}]
```

,
ALSO

In[44]:=
```
Grid[p, Dividers → {{Thick, {Gray}, Thick}, {1 → Thick, 2 → Thick, 11 → Thick}},
 Background → {{Lighter[Yellow, 0.3], Lighter[Orange]},
   {Lighter[Pink, .7], {Lighter[Blue, .9], Lighter[Yellow, .9]}, Lighter[Green, .3]}}]
```

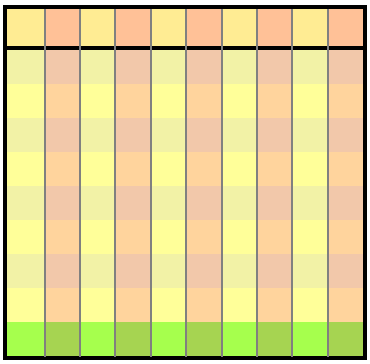
Out[44]=



,
NOTICE

In[46]:=
```
Grid[p, Dividers → {{Thick, {Gray}, Thick}, {1 → Thick, 2 → Thick, 11 → Thick}},
 Background → {{{Lighter[Yellow, 0.3], Lighter[Orange]}},
   {Lighter[Pink, .7], {Lighter[Blue, .9], Lighter[Yellow, .9]}, Lighter[Green, .3]}}]
```

Out[46]=



,

(e)

In[2]:=
```
t = Table[{Superscript[10, x], N[10^x]}, {x, -5, 5}]
```

Out[2]=
$$\{\{10^{-5}, 0.00001\}, \{10^{-4}, 0.0001\}, \{10^{-3}, 0.001\}, \{10^{-2}, 0.01\}, \{10^{-1}, 0.1\},$$
$$\{10^{0}, 1.\}, \{10^{1}, 10.\}, \{10^{2}, 100.\}, \{10^{3}, 1000.\}, \{10^{4}, 10\,000.\}, \{10^{5}, 100\,000.\}\}$$

In[49]:=
```
Grid[t, Dividers → {{1 → Black, 2 → Black, 3 → Black}, {Black, {Gray}, Black}},
 Background → {{Lighter[Black, 0.4], None},
   {Lighter[Gray, .6], {None, Lighter[Gray, 0.6]}}}, Alignment → {{Left, "."}, Baseline},
 ItemStyle → {{Directive[FontFamily → "Helvitica", FontColor → White]}, Default}]
```

Out[49]=

10^{-5}	0.00001
10^{-4}	0.0001
10^{-3}	0.001
10^{-2}	0.01
10^{-1}	0.1
10^{0}	1.
10^{1}	10.
10^{2}	100.
10^{3}	1000.
10^{4}	10 000.
10^{5}	100 000.

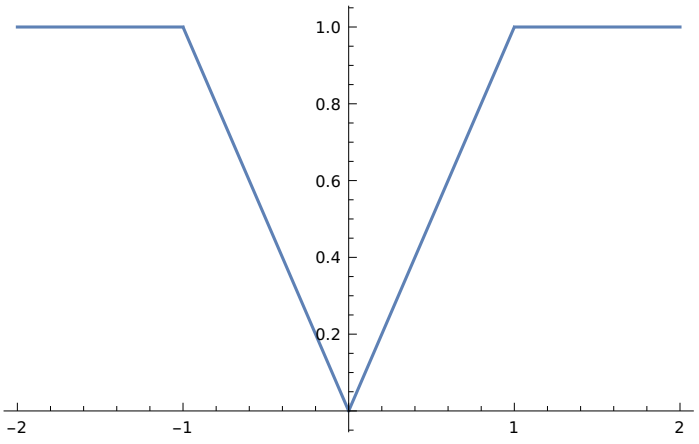
SECTION 3.6

In[1]:=
```
Clear[f];
t = Piecewise[{{x, 0 ≤ x ≤ 1}, {-x, -1 < x < 0}}, 1]
```

Out[2]=
$$\begin{cases} x & 0 \le x \le 1 \\ -x & -1 < x < 0 \\ 1 & \text{True} \end{cases}$$

In[3]:=
```
Plot[t, {x, -2, 2}]
```

Out[3]=

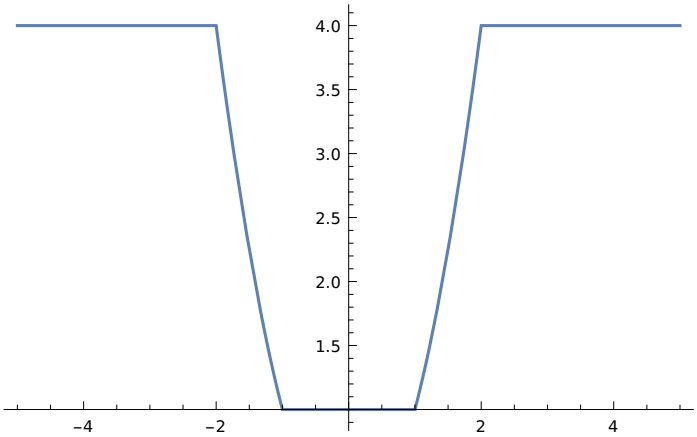


In[10]:=
```
k = Piecewise[{{x^2, (-2 ≤ x ≤ -1) || (1 ≤ x ≤ 2)}, {1, -1 < x < 1}}, 4]
```

Out[10]=
$$\begin{cases} x^2 & -2 \le x \le -1 \,||\, 1 \le x \le 2 \\ 1 & -1 < x < 1 \\ 4 & \text{True} \end{cases}$$

In[11]:=
```
Plot[k, {x, -5, 5}]
```

Out[11]=



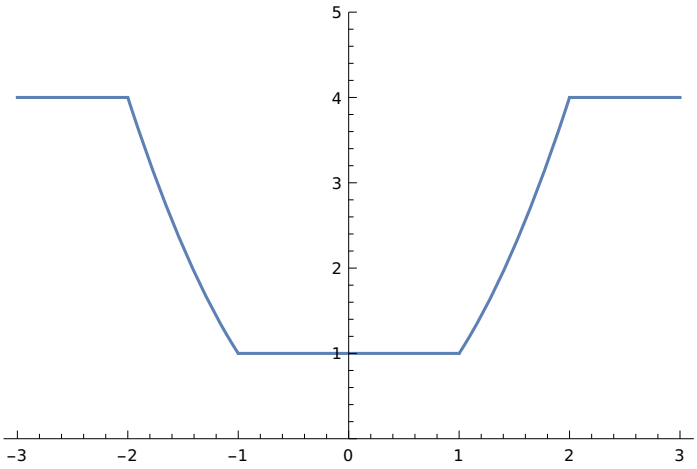
In[12]:=
```
p = Piecewise[{{x^2, 1 ≤ Abs[x] ≤ 2}, {1, Abs[x] < 1}}, 4]
```

Out[12]=

$$\begin{cases} x^2 & 1 \le \text{Abs}[x] \le 2 \\ 1 & \text{Abs}[x] < 1 \\ 4 & \text{True} \end{cases}$$

In[13]:=
```
Plot[p, {x, -3, 3}, PlotRange → {0, 5}]
```

Out[13]=



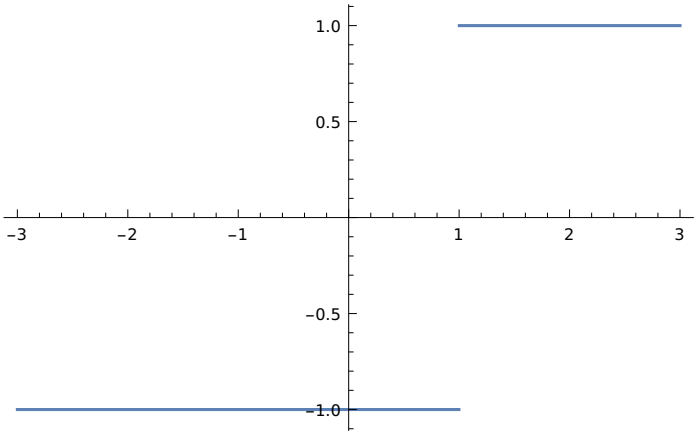
In[16]:=
```
l = Piecewise[{{1, x ≥ 1}, {-1, x < 1}}]
```

Out[16]=

$$\begin{cases} 1 & x \ge 1 \\ -1 & x < 1 \\ 0 & \text{True} \end{cases}$$

In[17]:=
```
Plot[l, {x, -3, 3}]
```

Out[17]=



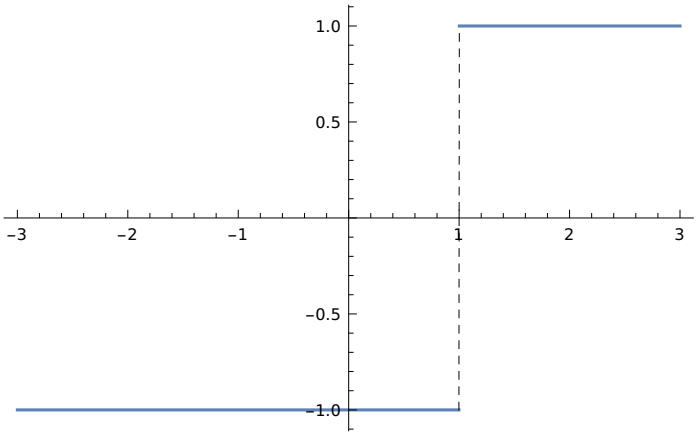
In[18]:=
```
j = Piecewise[{{1, x ≥ 1}, {-1, x < 1}}]
```

Out[18]=

$$\begin{cases} 1 & x \geq 1 \\ -1 & x < 1 \\ 0 & \text{True} \end{cases}$$

In[20]:=
```
Plot[j, {x, -3, 3}, ExclusionsStyle → Dashed]
```

Out[20]=



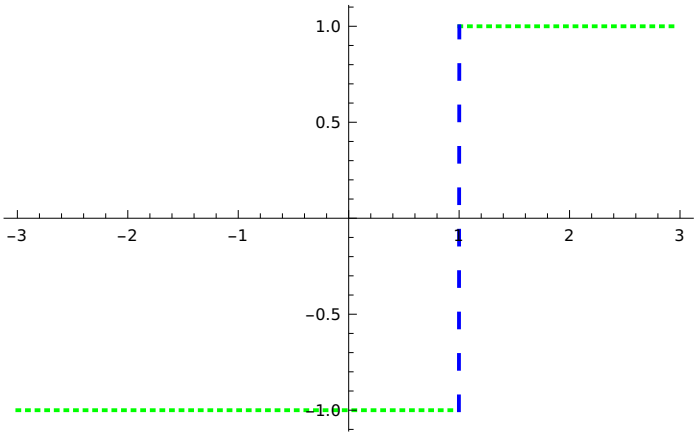
In[21]:=
```
u = Piecewise[{{1, x ≥ 1}, {-1, x < 1}}]
```

Out[21]=

$$\begin{cases} 1 & x \geq 1 \\ -1 & x < 1 \\ 0 & \text{True} \end{cases}$$

In[27]:=
```
Plot[u, {x, -3, 3}, PlotStyle → Directive[Thick, Green, Dotted],
 ExclusionsStyle → Directive[Blue, Thick, Dashing[{0.02, 0.04}]]]
```

Out[27]=



EXERCISE 3.6

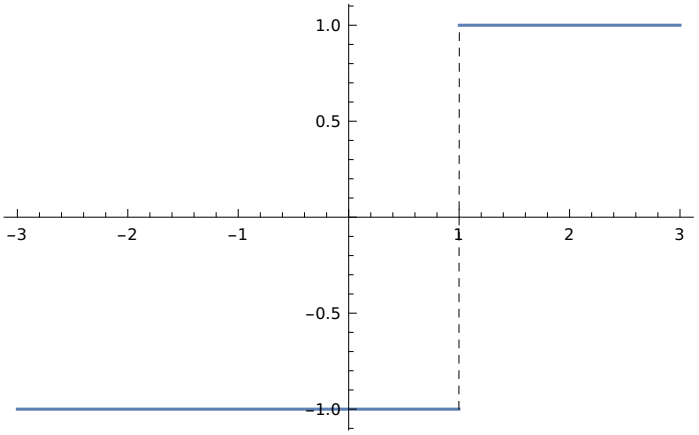
In[1]:=
```
t = Piecewise[{{1, x ≥ 1}}, -1]
```

Out[1]=

$$\begin{cases} 1 & x \geq 1 \\ -1 & \text{True} \end{cases}$$

In[3]:=
```
Plot[t, {x, -3, 3}, ExclusionsStyle → Dashed]
```

Out[3]=



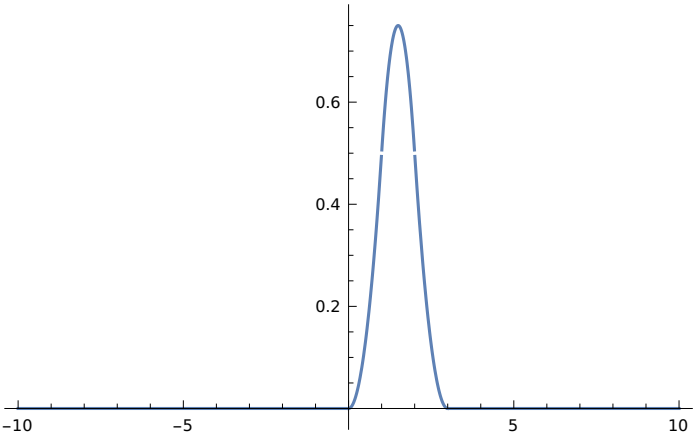
In[4]:=
```
p = Piecewise[{{0, x < 0}, {(x ^ 2) / 2, 0 ≤ x < 1},
   {-x ^ 2 + 3 x - 3 / 2, 1 ≤ x < 2}, {(1 / 2) (3 - x) ^ 2, 2 ≤ x < 3}, {0, 3 ≤ x}}]
```

Out[4]=

$$\begin{cases} 0 & x < 0 \\ \frac{x^2}{2} & 0 \leq x < 1 \\ -\frac{3}{2} + 3x - x^2 & 1 \leq x < 2 \\ \frac{1}{2}(3-x)^2 & 2 \leq x < 3 \\ 0 & \text{True} \end{cases}$$

In[8]:=
```
Plot[p, {x, -10, 10}]
```

Out[8]=



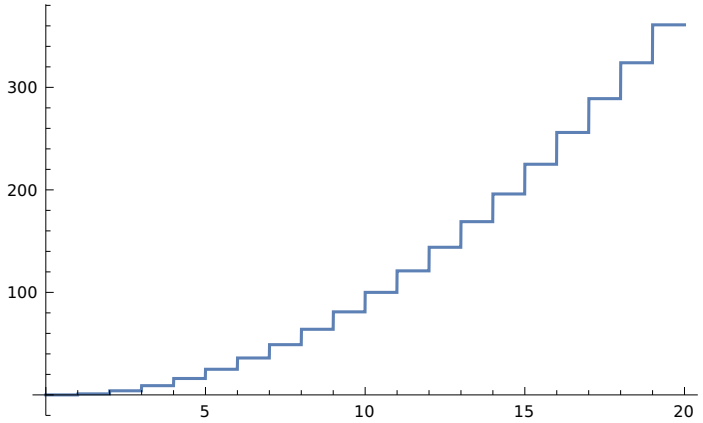
In[19]:=
```
l = Piecewise[Table[{n^2, n ≤ x < n + 1}, {n, 0, 19}]]
```

Out[19]=

0	0 ≤ x < 1
1	1 ≤ x < 2
4	2 ≤ x < 3
9	3 ≤ x < 4
16	4 ≤ x < 5
25	5 ≤ x < 6
36	6 ≤ x < 7
49	7 ≤ x < 8
64	8 ≤ x < 9
81	9 ≤ x < 10
100	10 ≤ x < 11
121	11 ≤ x < 12
144	12 ≤ x < 13
169	13 ≤ x < 14
196	14 ≤ x < 15
225	15 ≤ x < 16
256	16 ≤ x < 17
289	17 ≤ x < 18
324	18 ≤ x < 19
361	19 ≤ x < 20
0	True

In[20]:=
```
Plot[l, {x, 0, 20}]
```

Out[20]=



FOR FUN

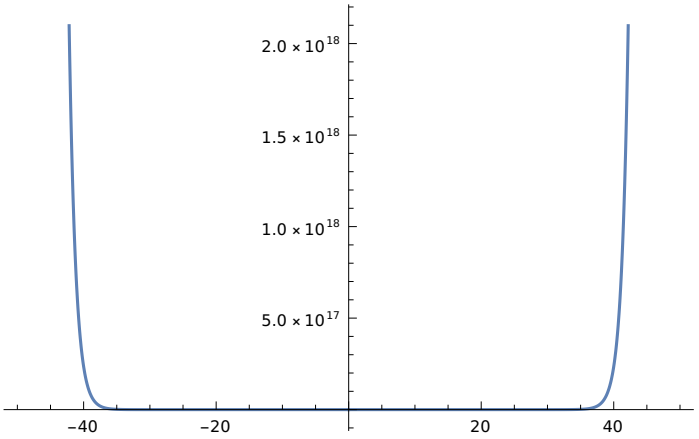
In[21]:=
```
g = Piecewise[{{e^x, x > 0}, {e^(-x), x < 0}}]
```

Out[21]=

$$\begin{cases} e^{x} & x > 0 \\ e^{-x} & x < 0 \\ 0 & \text{True} \end{cases}$$

In[22]:=
```
Plot[g, {x, -50, 50}]
```

Out[22]=



In[23]:=
```
Clear[g]
```

In[26]:=
```
g = Piecewise[Table[{n, n ≤ x < n + 1}, {n, -30, 30}]]
```

$$\begin{cases} -30 & -30 \le x < -29 \\ -29 & -29 \le x < -28 \\ -28 & -28 \le x < -27 \\ -27 & -27 \le x < -26 \\ -26 & -26 \le x < -25 \\ -25 & -25 \le x < -24 \\ -24 & -24 \le x < -23 \\ -23 & -23 \le x < -22 \\ -22 & -22 \le x < -21 \\ -21 & -21 \le x < -20 \end{cases}$$

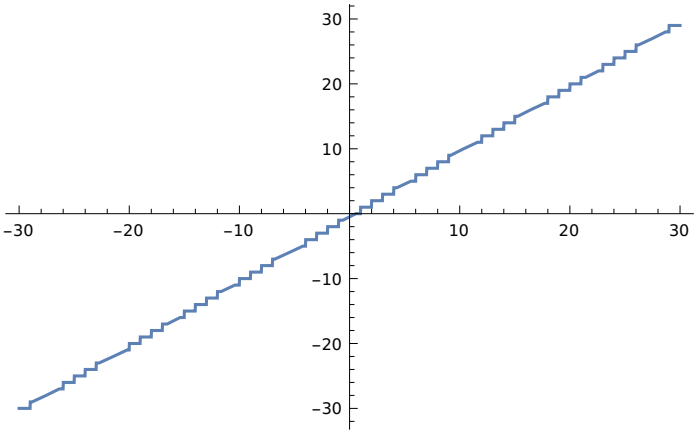
Out[26]=

-20	$-20 \le x < -19$
-19	$-19 \le x < -18$
-18	$-18 \le x < -17$
-17	$-17 \le x < -16$
-16	$-16 \le x < -15$
-15	$-15 \le x < -14$
-14	$-14 \le x < -13$
-13	$-13 \le x < -12$
-12	$-12 \le x < -11$
-11	$-11 \le x < -10$
-10	$-10 \le x < -9$
-9	$-9 \le x < -8$
-8	$-8 \le x < -7$
-7	$-7 \le x < -6$
-6	$-6 \le x < -5$
-5	$-5 \le x < -4$
-4	$-4 \le x < -3$
-3	$-3 \le x < -2$
-2	$-2 \le x < -1$
-1	$-1 \le x < 0$
0	$0 \le x < 1$
1	$1 \le x < 2$
2	$2 \le x < 3$
3	$3 \le x < 4$
4	$4 \le x < 5$
5	$5 \le x < 6$
6	$6 \le x < 7$
7	$7 \le x < 8$
8	$8 \le x < 9$
9	$9 \le x < 10$
10	$10 \le x < 11$
11	$11 \le x < 12$
12	$12 \le x < 13$
13	$13 \le x < 14$
14	$14 \le x < 15$
15	$15 \le x < 16$
16	$16 \le x < 17$
17	$17 \le x < 18$
18	$18 \le x < 19$
19	$19 \le x < 20$
20	$20 \le x < 21$
21	$21 \le x < 22$
22	$22 \le x < 23$
23	$23 \le x < 24$
24	$24 \le x < 25$
25	$25 \le x < 26$
26	$26 \le x < 27$
27	$27 \le x < 28$
28	$28 \le x < 29$
29	$29 \le x < 30$
30	$30 \le x < 31$

$$\begin{cases} 0 & \text{True} \end{cases}$$

In[27]:=
```
Plot[g, {x, -30, 30}]
```

Out[27]=



In[28]:=
```
Clear[g]
```

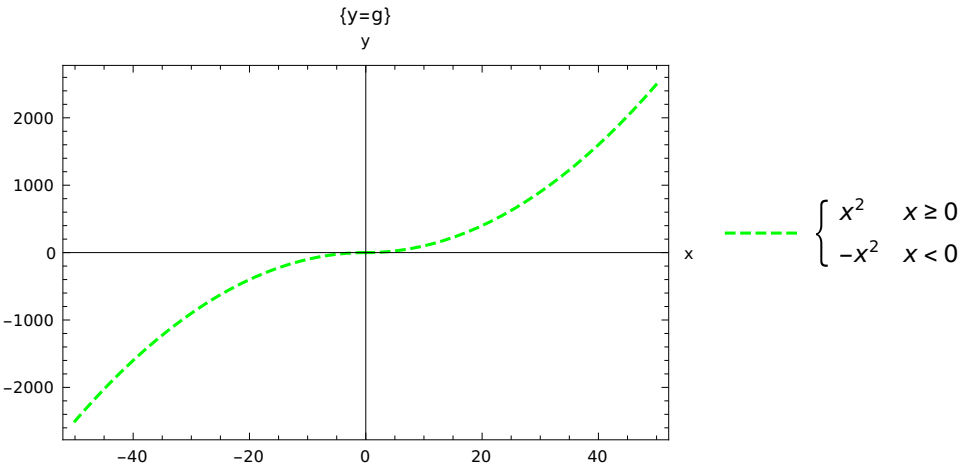
In[31]:=
```
g = Piecewise[{{x^2, x ≥ 0}, {-x^2, x < 0}}]
```

Out[31]=

$$\begin{cases} x^2 & x \geq 0 \\ -x^2 & x < 0 \\ 0 & \text{True} \end{cases}$$

In[40]:=
```
Plot[g, {x, -50, 50}, PlotStyle → Directive[Darker, Dashed, Green],
 AxesLabel → {"x", "y"}, Frame → True, PlotLabel → {"y=g"}, PlotLegends → {g}]
```

Out[40]=

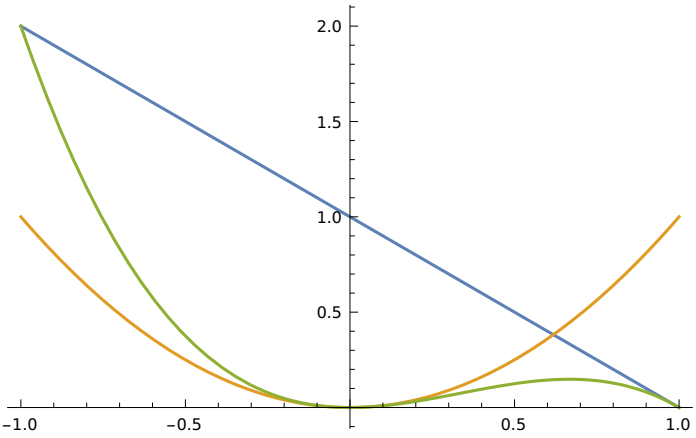


$$\begin{cases} x^2 & x \geq 0 \\ -x^2 & x < 0 \end{cases}$$

SECTION 3.8

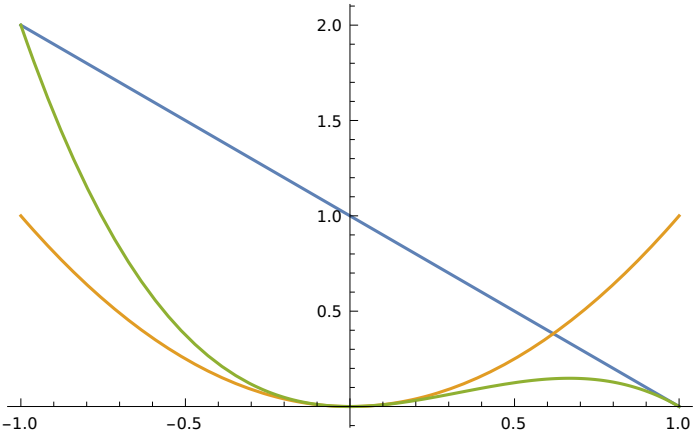
In[15]:=
```
Clear[f, g];
f[x_] := 1 - x;
g[x_] := x^2;
Plot[{f[x], g[x], f[x] * g[x]}, {x, -1, 1}]
```

Out[18]=



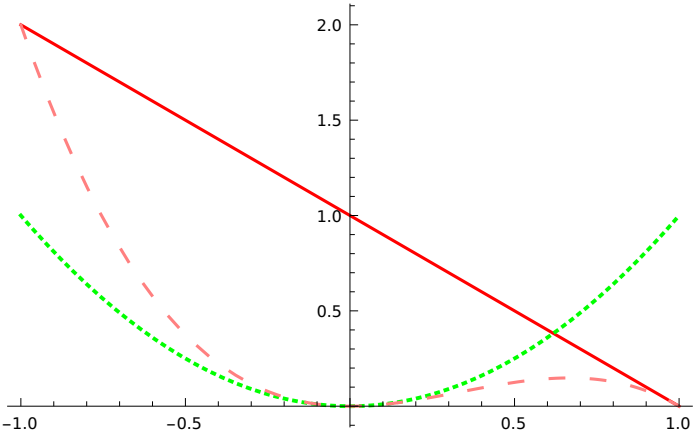
In[20]:=
```
Plot[Tooltip[{f[x], g[x], f[x] * g[x]}], {x, -1, 1}]
```

Out[20]=



In[22]:=
```
Plot[{f[x], g[x], f[x] * g[x]}, {x, -1, 1}, PlotStyle →
  {Red, Directive[Green, Thick, Dotted], Directive[Pink, Darker, Dashing[{0.02, 0.04}]]}]
```

Out[22]=



In[4]:=
```
? f
```

Out[4]=

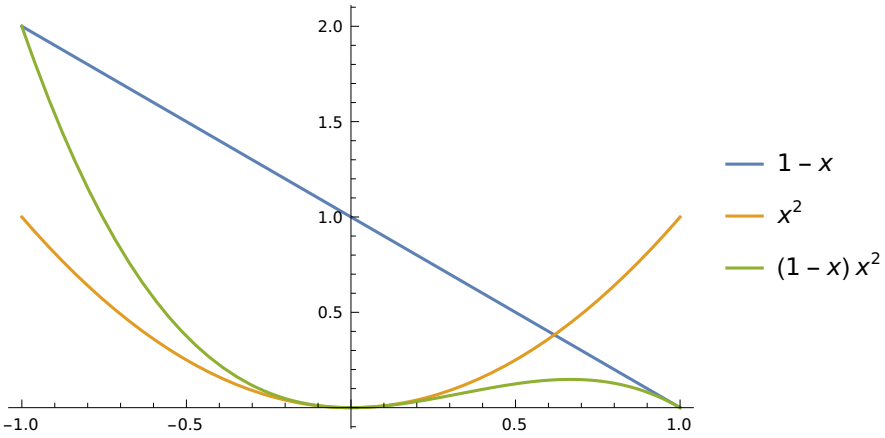
Symbol

Global`f

Full Name Global`f

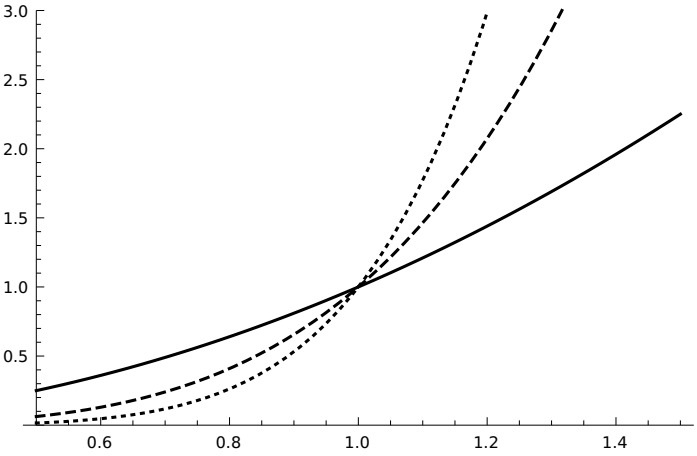
In[14]:=
```
f[x_] := 1 - x;
g[x_] := x^2;
Plot[{f[x], g[x], f[x] * g[x]}, {x, -1, 1}, PlotLegends → {f[x], g[x], f[x] * g[x]}]
```

Out[16]=



In[17]:=
```
Plot[{x^2, x^4, x^6}, {x, 0.5, 1.5}, PlotRange → {0, 3},
 PlotStyle → {Black, Directive[Dashed, Black], Directive[Dotted, Black]}]
```

Out[17]=

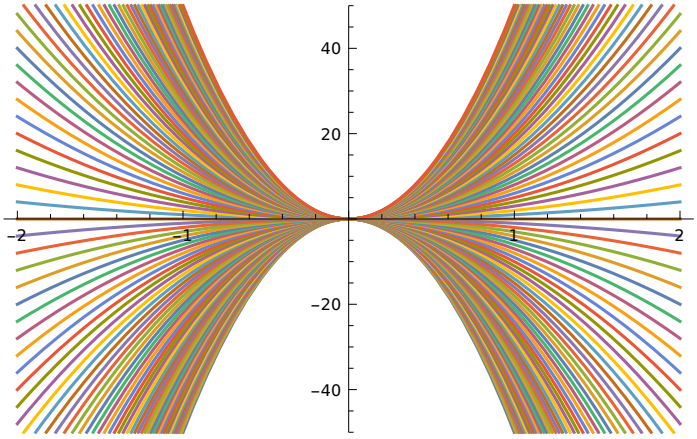


In[20]:=
```
t = Table[n * x^2, {n, -50, 50}]
```

Out[20]=
$$\{-50 x^2, -49 x^2, -48 x^2, -47 x^2, -46 x^2, -45 x^2, -44 x^2, -43 x^2, -42 x^2, -41 x^2, -40 x^2, -39 x^2, -38 x^2, -37 x^2, -36 x^2, -35 x^2, -34 x^2, -33 x^2, -32 x^2, -31 x^2, -30 x^2, -29 x^2, -28 x^2, -27 x^2, -26 x^2, -25 x^2, -24 x^2, -23 x^2, -22 x^2, -21 x^2, -20 x^2, -19 x^2, -18 x^2, -17 x^2, -16 x^2, -15 x^2, -14 x^2, -13 x^2, -12 x^2, -11 x^2, -10 x^2, -9 x^2, -8 x^2, -7 x^2, -6 x^2, -5 x^2, -4 x^2, -3 x^2, -2 x^2, -x^2, 0, x^2, 2 x^2, 3 x^2, 4 x^2, 5 x^2, 6 x^2, 7 x^2, 8 x^2, 9 x^2, 10 x^2, 11 x^2, 12 x^2, 13 x^2, 14 x^2, 15 x^2, 16 x^2, 17 x^2, 18 x^2, 19 x^2, 20 x^2, 21 x^2, 22 x^2, 23 x^2, 24 x^2, 25 x^2, 26 x^2, 27 x^2, 28 x^2, 29 x^2, 30 x^2, 31 x^2, 32 x^2, 33 x^2, 34 x^2, 35 x^2, 36 x^2, 37 x^2, 38 x^2, 39 x^2, 40 x^2, 41 x^2, 42 x^2, 43 x^2, 44 x^2, 45 x^2, 46 x^2, 47 x^2, 48 x^2, 49 x^2, 50 x^2\}$$

In[21]:=
```
Plot[t, {x, -2, 2}, PlotRange → 50]
```

Out[21]=



In[30]:=
```
? f
```

Out[30]=

Symbol

Global`f

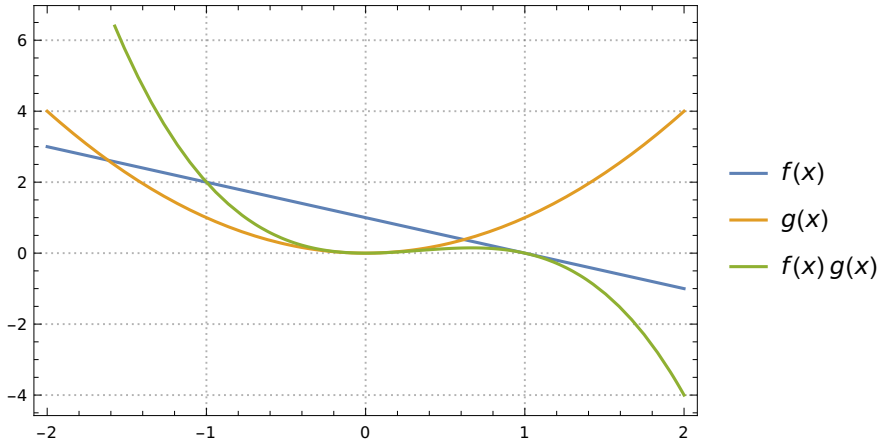
Definitions

```
f[x_] := 1 - x
```

Full Name Global`f

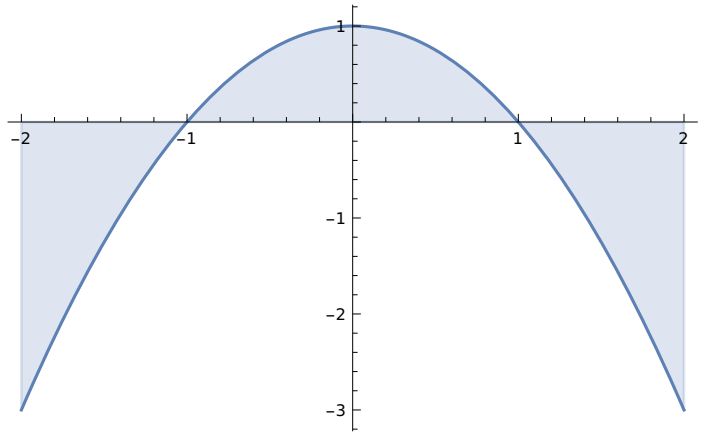
In[31]:=
```
Plot[{f[x], g[x], f[x] * g[x]}, {x, -2, 2}, PlotTheme → "Detailed "]
```

Out[31]=



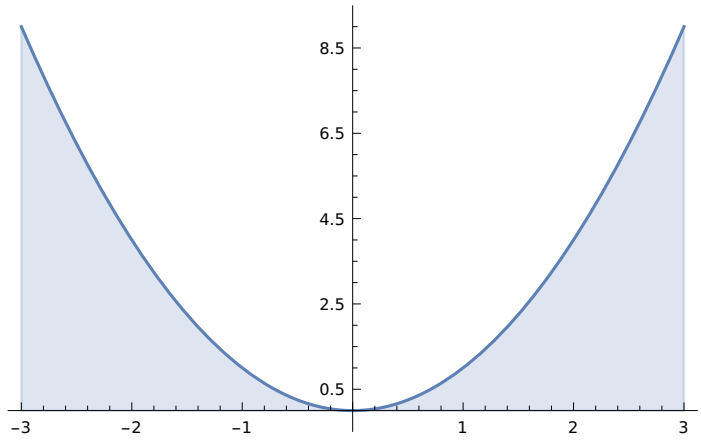
In[33]:=
```
Plot[1 - x^2, {x, -2, 2}, Filling → Axis]
```

Out[33]=



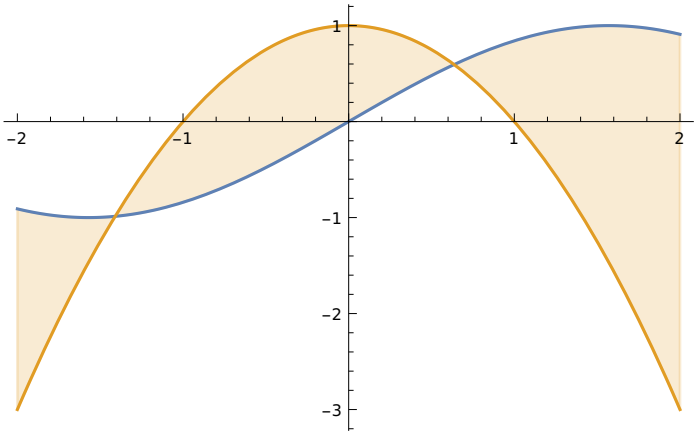
In[34]:=
```
Plot[x^2, {x, -3, 3}, Filling → Axis]
```

Out[34]=



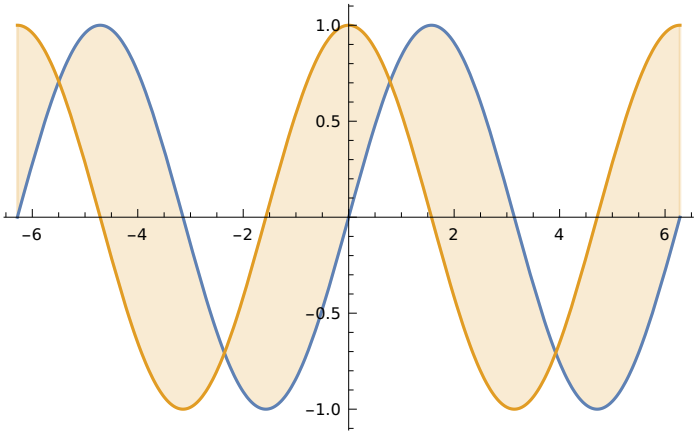
In[37]:=
```
Plot[{Sin[x], 1 - x^2}, {x, -2, 2}, Filling → {1}]
```

Out[37]=



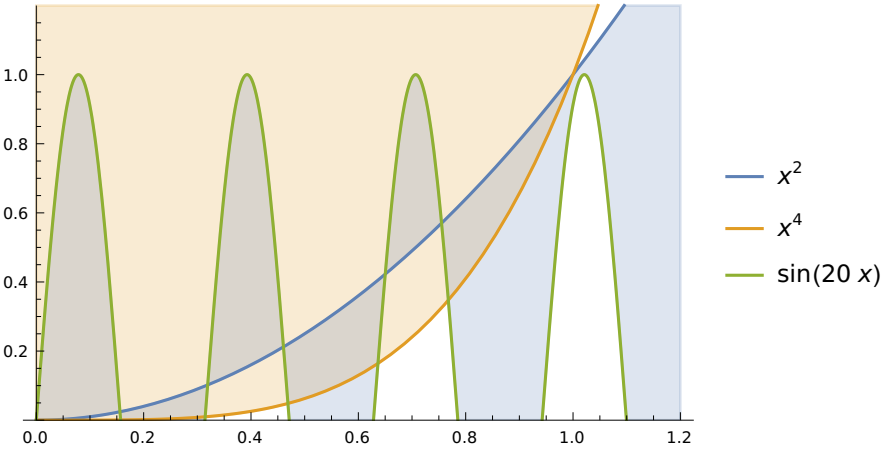
In[40]:=
```
Plot[{Sin[x], Cos[x]}, {x, -2 π, 2 π}, Filling → {1}]
```

Out[40]=



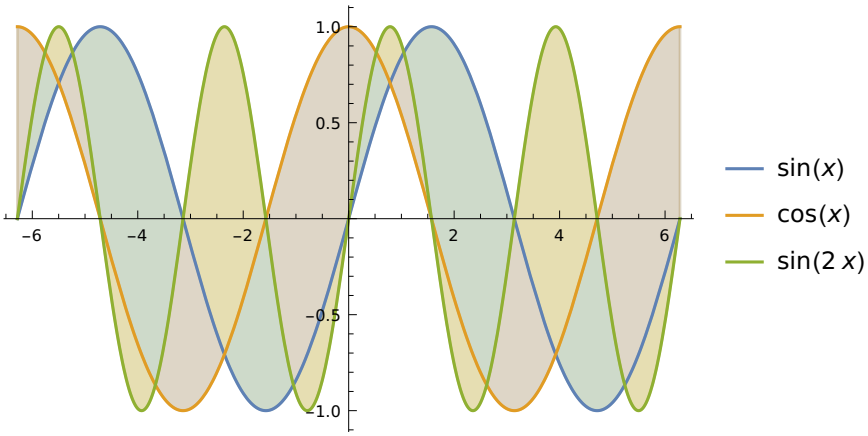
In[47]:=
```
Plot[{x^2, x^4, Sin[20 x]}, {x, 0, 1.2}, PlotRange → {0, 1.2},
 Filling → {1 → {3}, 2 → Top}, PlotLegends → {x^2, x^4, Sin[20 x]}]
```

Out[47]=



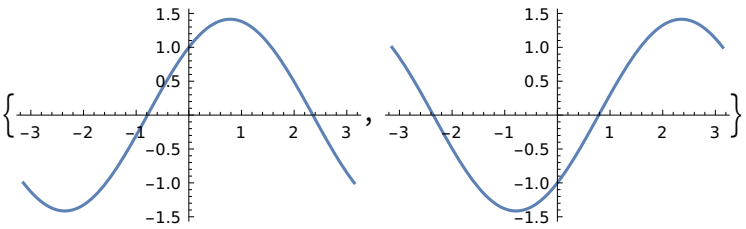
In[52]:=
```
Plot[{Sin[x], Cos[x], Sin[2 x]}, {x, -2 π, 2 π},
 PlotLegends → {Sin[x], Cos[x], Sin[2 x]}, Filling → {1 → {2}, 3 → {1}, 2 → {3}}]
```

Out[52]=



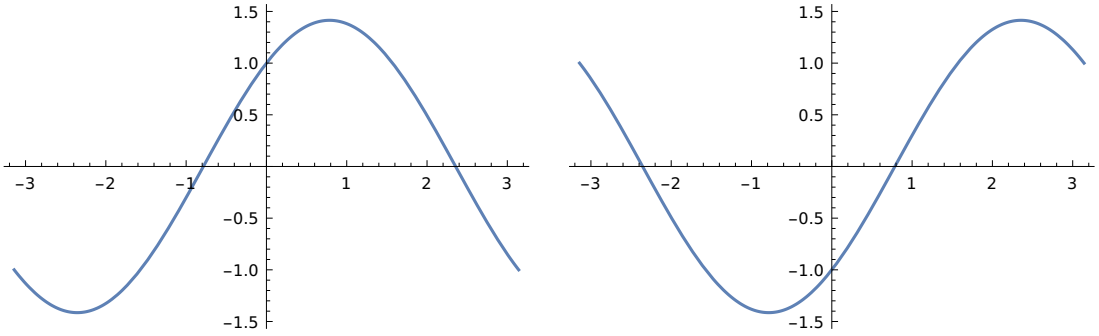
In[1]:=
```
{Plot[Sin[x] + Cos[x], {x, -π, π}], Plot[Sin[x] - Cos[x], {x, -π, π}]}
```

Out[1]=



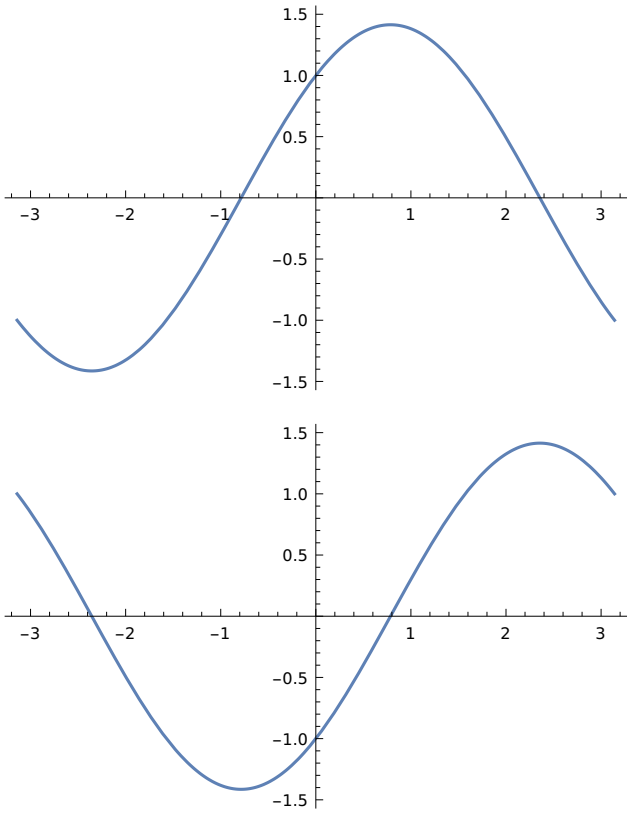
In[2]:=
```
GraphicsRow [{Plot[Sin[x] + Cos[x], {x, -π, π}], Plot[Sin[x] - Cos[x], {x, -π, π}]}]
```

Out[2]=



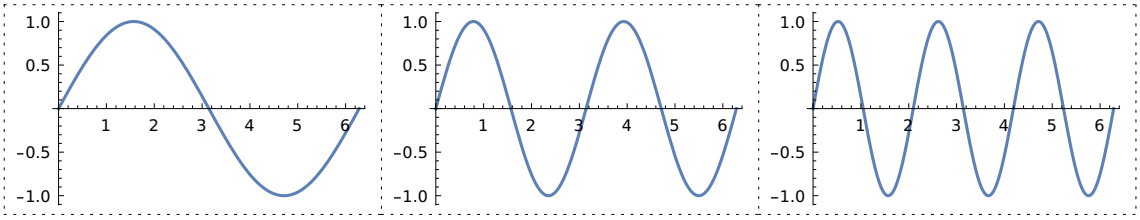
In[3]:=
```
GraphicsColumn[{Plot[Sin[x] + Cos[x], {x, -π, π}], Plot[Sin[x] - Cos[x], {x, -π, π}]}]
```

Out[3]=



In[6]:=
```
GraphicsRow[Table[Plot[Sin[m * x], {x, 0, 2 π}], {m, 3}], Frame → All, FrameStyle → Dotted]
```

Out[6]=

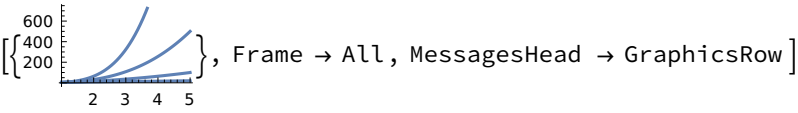


In[7]:=
```
GraphicsRow[Plot[Table[4 x^n, {n, 4}], {x, 1, 5}], Frame → All]
```

GraphicsGrid :

TagBox[RowBox[{{, GraphicsBox[{{{{}, {}, TagBox[{Directive[<< 3 >>], LineBox[<< 1 >>], LineBox[<< 1 >>], LineBox[<< 1 >>], LineBox[<< 1 >>]}, Annotation[#1, Charting`Private`Tag$639636#1] &]}}, {}}, {DisplayFunction -> Identity, Ticks -> {Automatic, Automatic}, AxesOrigin -> {1., 0}, FrameTicks -> {{Automatic, Automatic}, {Automatic, Automatic}}, GridLines -> {None, None}, DisplayFunction -> Identity, PlotRangePadding -> {{Scaled[0.02], Scaled[0.02]}, {Scaled[0.05], Scaled[0.05]}}, PlotRangeClipping -> True, ImagePadding -> All, DisplayFunction -> Identity, << 15 >>}], }}], Short[#1, 5] &] is not a list of lists.

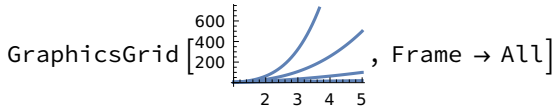
Out[7]=



In[8]:=
```
GraphicsGrid[Plot[Table[4 x^n, {n, 4}], {x, 1, 5}], Frame → All]
```

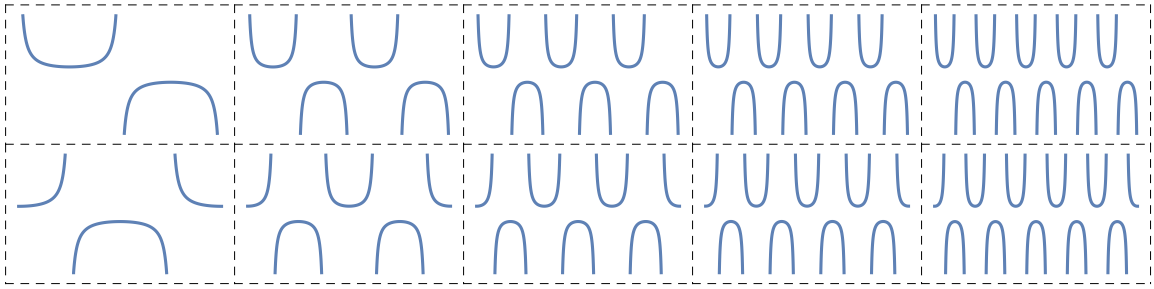
GraphicsGrid :
TagBox[GraphicsBox[{{{{}, {}, TagBox[{Directive[Opacity[<< 1 >>], RGBColor[<< 3 >>], AbsoluteThickness[<< 1 >>]], LineBox[{<< 77 >>}], LineBox[{<< 77 >>}], LineBox[{<< 77 >>}], LineBox[{<< 64 >>}]}], Annotation[#1, Charting`Private`Tag$639849#1] &]}}, {}}, {DisplayFunction → Identity, Ticks → {Automatic, Automatic}, AxesOrigin → {1., 0}, FrameTicks → {{Automatic, Automatic}, {Automatic, Automatic}}, GridLines → {None, None}, DisplayFunction → Identity, PlotRangePadding → {{Scaled[0.02], Scaled[0.02]}, {Scaled[0.05], Scaled[0.05]}}, PlotRangeClipping → True, ImagePadding → All, DisplayFunction → Identity, << 15 >>}], Short[#1, 5] &] is not a list of lists.

Out[8]=



In[10]:=
```
GraphicsGrid[{Table[Plot[Csc[m * x], {x, 0, 2 π}, Axes → False], {m, 5}],
  Table[Plot[Sec[m * x], {x, 0, 2 π}, Axes → False], {m, 5}]},
 Frame → All, FrameStyle → Dashed]
```

Out[10]=

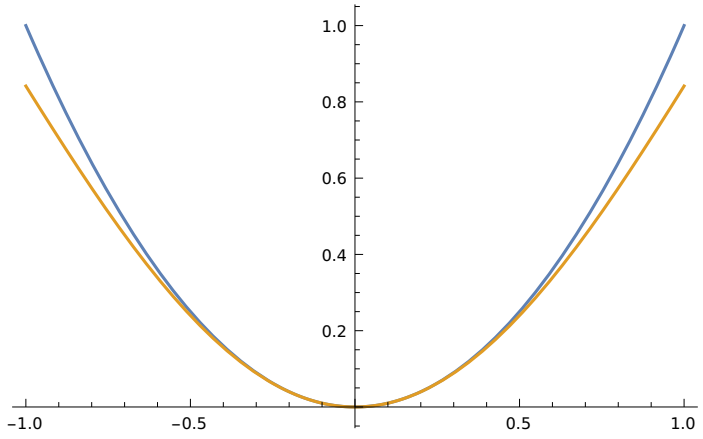


EXERCISE 3.8

(1)

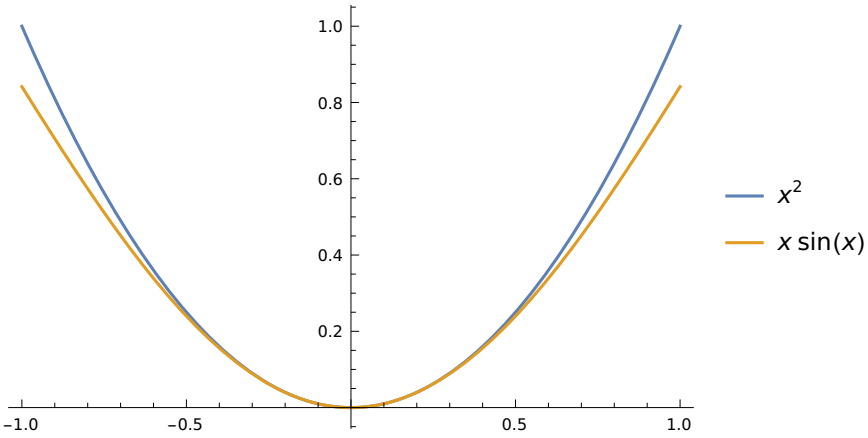
In[1]:=
```
Plot[{x^2, x * Sin[x]}, {x, -1, 1}]
```

Out[1]=



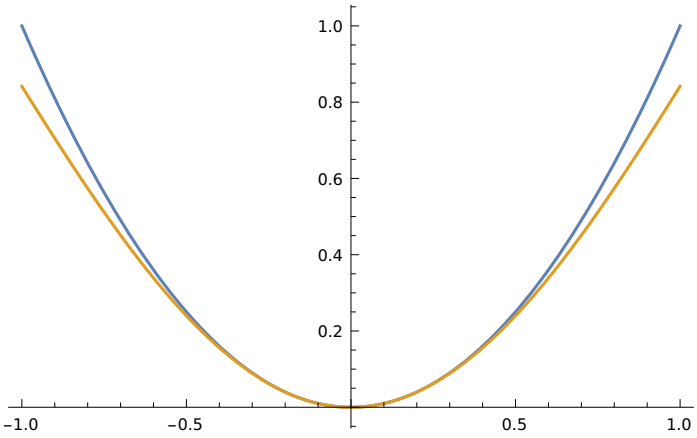
In[2]:=
```
Plot[{x^2, x*Sin[x]}, {x, -1, 1}, PlotLegends → {x^2, x*Sin[x]}]
```

Out[2]=



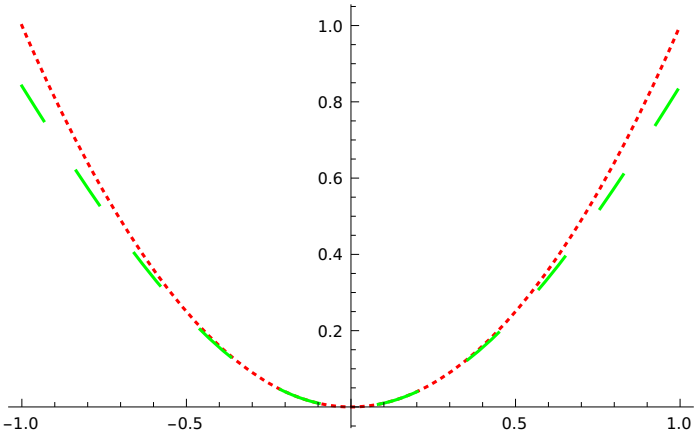
In[3]:=
```
Plot[Tooltip[{x^2, x*Sin[x]}], {x, -1, 1}]
```

Out[3]=



In[7]:=
```
Plot[{x^2, x*Sin[x]}, {x, -1, 1},
 PlotStyle → {Directive[Red, Dotted], Directive[Green, Dashing[{0.06, 0.087}]]}]
```

Out[7]=

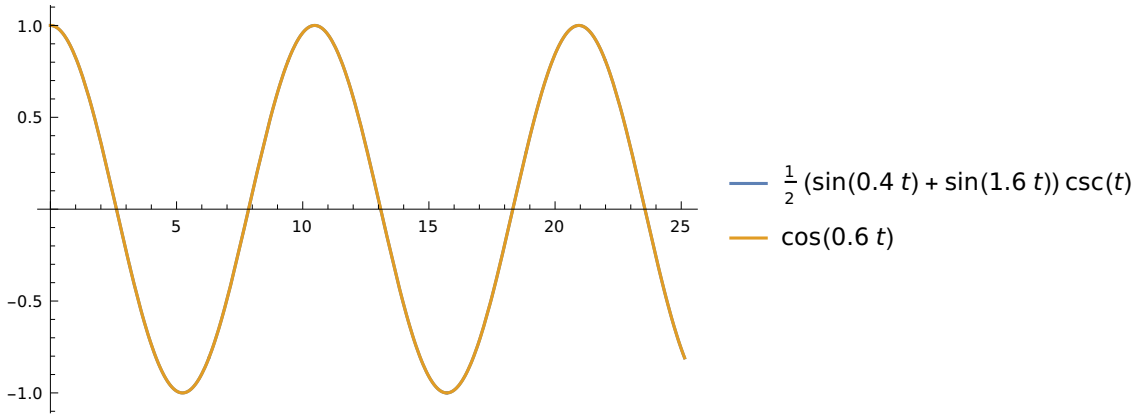


(2)

(a)

In[12]:=
```
Plot[{(Sin[0.4 t] + Sin[1.6 t]) / (2 Sin[t]), Cos[0.6 t]}, {t, 0, 8 π},
 PlotLegends → {(Sin[0.4 t] + Sin[1.6 t]) / (2 Sin[t]), Cos[0.6 t]}]
```

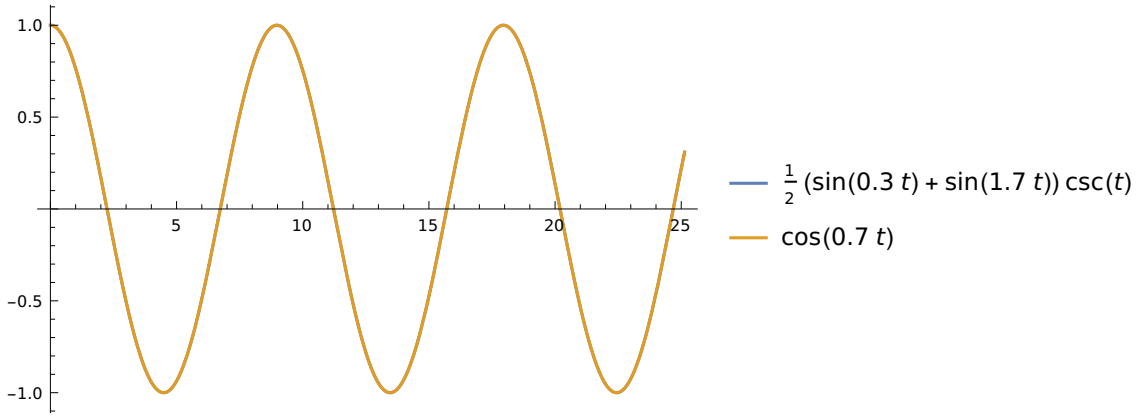
Out[12]=



(b)

In[18]:=
```
Plot[{(Sin[0.3 t] + Sin[1.7 t]) / (2 Sin[t]), Cos[0.7 t]}, {t, 0, 8 π},
 PlotLegends → {(Sin[0.3 t] + Sin[1.7 t]) / (2 Sin[t]), Cos[0.7 t]}]
```

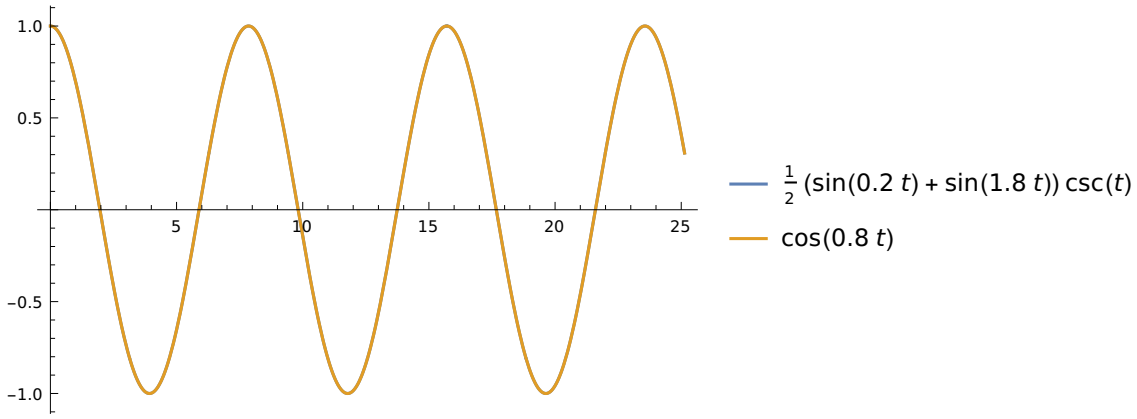
Out[18]=



(c)

In[19]:=
```
Plot[{(Sin[0.2 t] + Sin[1.8 t]) / (2 Sin[t]), Cos[.8 t]}, {t, 0, 8 π},
 PlotLegends → {(Sin[0.2 t] + Sin[1.8 t]) / (2 Sin[t]), Cos[.8 t]}]
```

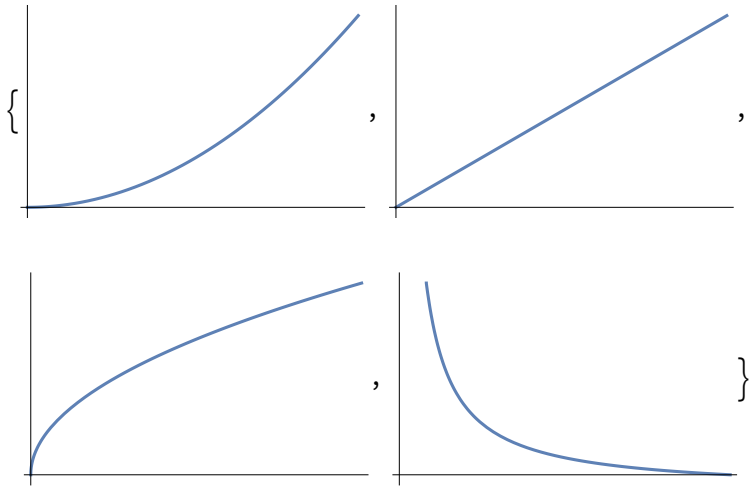
Out[19]=



(3)

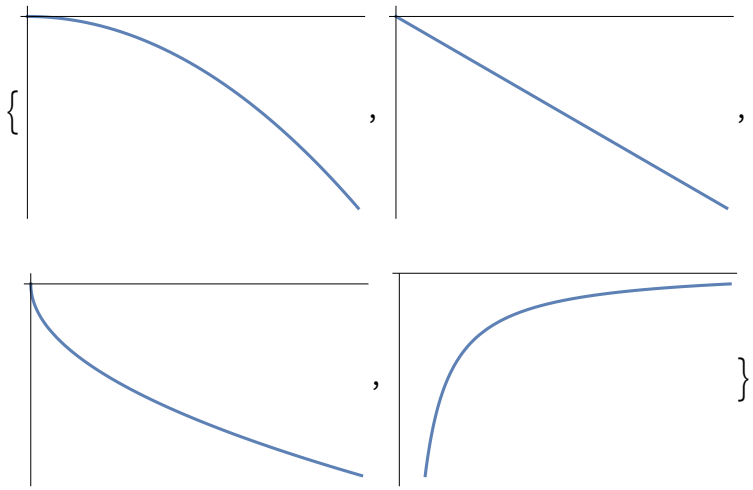
In[23]:=
```
x = Table[Plot[x^n, {x, 0, 4}, Ticks → None], {n, {2, 1, 1/2, -1}}]
```

Out[23]=



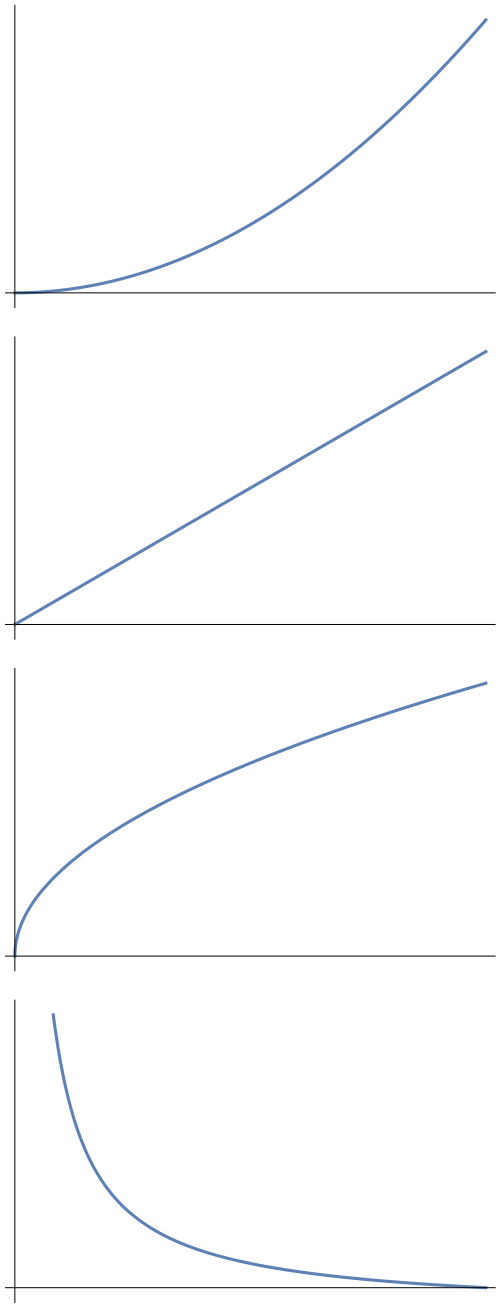
In[24]:=
```
y = Table[Plot[-x^n, {x, 0, 4}, Ticks → None], {n, {2, 1, 1/2, -1}}]
```

Out[24]=



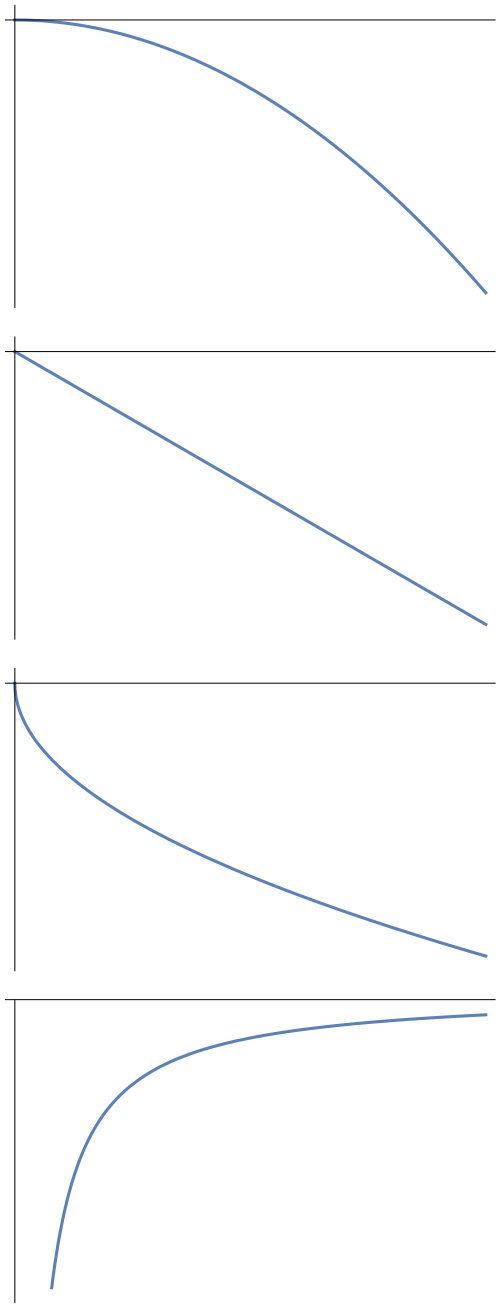
In[25]:=
```
l = GraphicsColumn[x, Frame → None]
```

Out[25]=



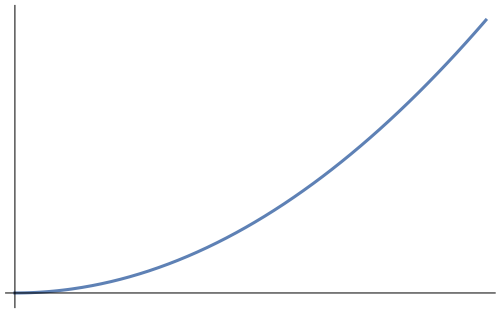
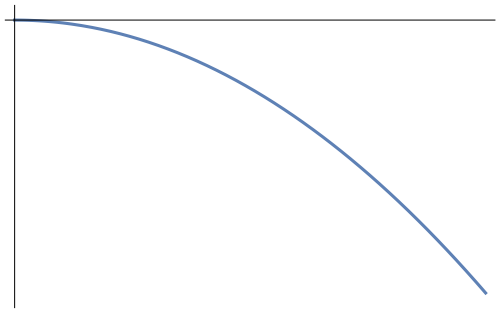
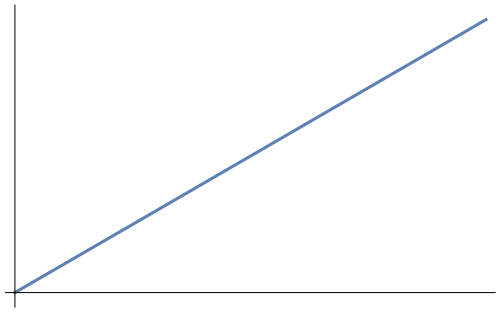
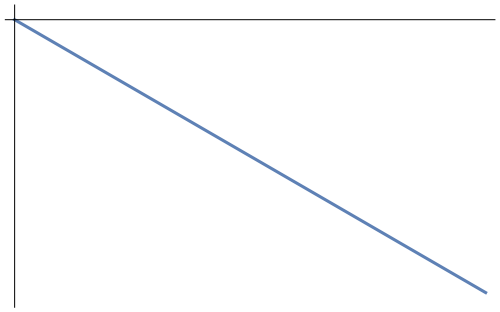
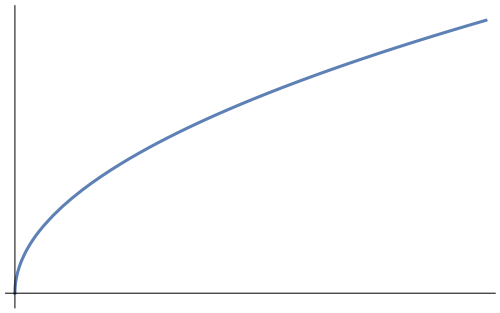
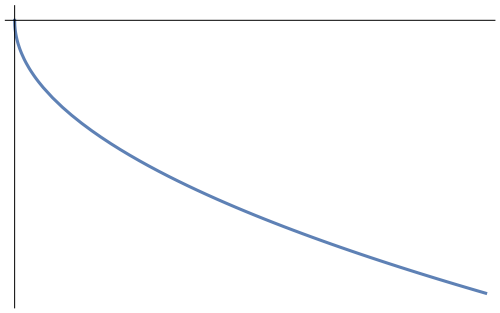
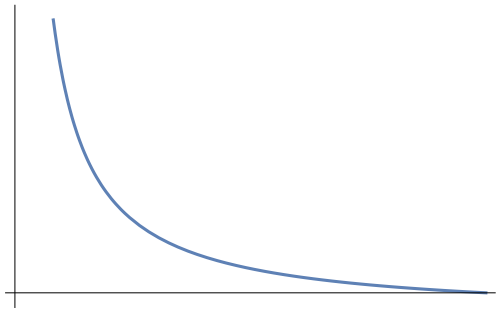
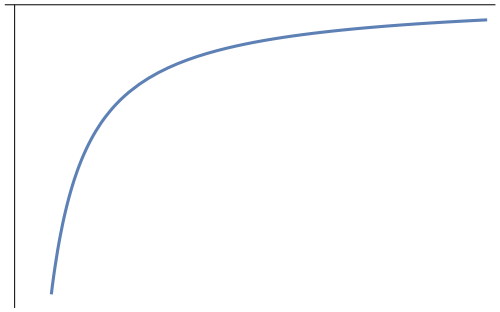
In[26]:=
```
m = GraphicsColumn[y, Frame → None]
```

Out[26]=



In[32]:=
```
Grid[Prepend[{{l, m}},
  {{"Plot of p*x^n looks like"}, {"When:"}, {"Plot of -p*x^n looks like"}, {"When:"}}],
 Dividers → {{Gray, Gray, Gray}, {Gray, Gray, Gray}}]
```

Out[32]=

{Plot of p*x^n looks like}	{When:}	{Plc
		
		
		
		

In[3]:=
```
Grid[Prepend[{GraphicsColumn[Plot[3 x^{2, 1, 1/2, -2}[[i]], {x, 0, 4},
      PlotStyle → {Directive[Green, Dashed], Directive[Blue, Dotted],
        Directive[Red, Thick, Dashing[{0.002, 0.01}]], Directive[Pink, Thick]}[[i]],
      {i, 1, 4}], Frame → All], GraphicsColumn[Plot[-3 x^{2, 1, 1/2, -2}[[i]],
      {x, 0, 4}, PlotStyle → {Directive[Green, Dashed], Directive[Blue, Dotted],
        Directive[Red, Thick, Dashing[{0.002, 0.01}]], Directive[Pink, Thick]}[[i]],
      {i, 1, 4}], Frame → All]}, {"Plot for:3x^n", "Plot for -3x^n"}],
 Dividers → {{False, Thick, False}, {Thick, Thick}}]
```

Plot : Options expected (instead of {i, 1, 4}) beyond position 2 in
Plot[3 x^{2,1,1/2,-2}[[i]], {x, 0, 4}, PlotStyle → {Directive[Green, Dashed], Directive[Blue, Dotted], Directive[Red, Thick, Dashing[{0.002, 0.01}]], Directive[Pink, Thick]}[[i]], {i, 1, 4}]. An option must be a rule or a list of rules.

Plot : Options expected (instead of {{i, 1, 4}}) beyond position 2 in
Plot[{3 x^{2,1,1 Power[≪2≫],-2}[[i]]}, {{x, 0, 4}}, {PlotStyle → {Directive[Green, Dashed], Directive[Blue, Dotted], Directive[Red, Thick, Dashing[{≪2≫}]], Directive[Pink, Thick]}[[i]]}, {{i, 1, 4}}].
An option must be a rule or a list of rules.

GraphicsGrid :
Plot[{3 x^{2,1,1 Power[≪2≫],-2}[[i]]}, {{x, 0, 4}}, {PlotStyle → {Directive[Green, Dashed], Directive[Blue, Dotted], Directive[Red, Thick, Dashing[{≪2≫}]], Directive[Pink, Thick]}[[i]]}, {{i, 1, 4}}] is not a list of lists.

Plot : Options expected (instead of {i, 1, 4}) beyond position 2 in
Plot[-3 x^{2,1,1/2,-2}[[i]], {x, 0, 4}, PlotStyle → {Directive[Green, Dashed], Directive[Blue, Dotted], Directive[Red, Thick, Dashing[{0.002, 0.01}]], Directive[Pink, Thick]}[[i]], {i, 1, 4}]. An option must be a rule or a list of rules.

General : Further output of Plot::nonopt will be suppressed during this calculation.

GraphicsGrid :
Plot[{-3 x^{2,1,1 Power[≪2≫],-2}[[i]]}, {{x, 0, 4}}, {PlotStyle → {Directive[Green, Dashed], Directive[Blue, Dotted], Directive[Red, Thick, Dashing[{≪2≫}]], Directive[Pink, Thick]}[[i]]}, {{i, 1, 4}}] is not a list of lists.

Out[3]=
```
Grid[{{Plot for:3x^n, Plot for -3x^n}, GraphicsGrid[{Plot[{3 x^{2, 1, 1/2, -2}[[i]]}, {{x, 0, 4}}, {PlotStyle → {Directive[Green, Dashed], Directive[Blue, Dotted], Directive[Red, Thick, Dashing[{0.002, 0.01}]], Directive[Pink, Thick]}[[i]]}, {{i, 1, 4}}], Frame → All, MessagesHead → GraphicsColumn],
  GraphicsGrid[{Plot[{-3 x^{2, 1, 1/2, -2}[[i]]}, {{x, 0, 4}}, {PlotStyle → {Directive[Green, Dashed], Directive[Blue, Dotted], Directive[Red, Thick, Dashing[{0.002, 0.01}]], Directive[Pink, Thick]}[[i]]}, {{i, 1, 4}}], Frame → All, MessagesHead → GraphicsColumn]}],
 Dividers → {{False, Thickness[Large], False}, {Thickness[Large], Thickness[Large]}}]
```

In[4]:=
```
GraphicsColumn[Plot[3 x^{-2, 1, 1/2, 2}[[i]], {x, 0, 4},
  PlotStyle → {Directive[Green, Dashed], Directive[Blue, Dotted],
    Directive[Red, Thick, Dashing[{0.002, 0.01}]], Directive[Pink, Thick]}[[i]], {i, 1, 4}]]
```

Plot : Options expected (instead of {i, 1, 4}) beyond position 2 in Plot[3 x^{-2, 1, 1/2, 2}[[i]], {x, 0, 4}, PlotStyle → {Directive[Green, Dashed], Directive[Blue, Dotted], Directive[Red, Thick, Dashing[{0.002, 0.01}]], Directive[Pink, Thick]}[[i]], {i, 1, 4}]. An option must be a rule or a list of rules.

Plot : Options expected (instead of {{i, 1, 4}}) beyond position 2 in Plot[{3 x^{-2, 1, 1 Power[≪2≫], 2}[[i]]}, {{x, 0, 4}}, {PlotStyle → {Directive[Green, Dashed], Directive[Blue, Dotted], Directive[Red, Thick, Dashing[{≪2≫}]], Directive[Pink, Thick]}[[i]]}, {{i, 1, 4}}]. An option must be a rule or a list of rules.

GraphicsGrid : Plot[{3 x^{-2, 1, 1 Power[≪2≫], 2}[[i]]}, {{x, 0, 4}}, {PlotStyle → {Directive[Green, Dashed], Directive[Blue, Dotted], Directive[Red, Thick, Dashing[{≪2≫}]], Directive[Pink, Thick]}[[i]]}, {{i, 1, 4}}] is not a list of lists.

Out[4]=
```
GraphicsGrid[Plot[{3 x^{-2, 1, 1/2, 2}[[i]]}, {{x, 0, 4}},
  {PlotStyle → {Directive[Green, Dashed], Directive[Blue, Dotted],
     Directive[Red, Thick, Dashing[{0.002, 0.01}]], Directive[Pink, Thick]}[[i]]},
  {{i, 1, 4}}], MessagesHead → GraphicsColumn]
```

In[2]:=
```
x = GraphicsGrid[Plot[3 x^{2, 1, 1/2, -2}[[i]], {x, 0, 4},
   PlotStyle → {Blue, Red, Green, Pink}[[i]], {i, 1, 4}], Frame → All]
```

Plot : Options expected (instead of {i, 1, 4}) beyond position 2 in Plot[3 x^{2, 1, 1/2, -2}[[i]], {x, 0, 4}, PlotStyle → {Blue, Red, Green, Pink}[[i]], {i, 1, 4}]. An option must be a rule or a list of rules.

GraphicsGrid : Plot[3 x^{2, 1, 1/2, -2}[[i]], {x, 0, 4}, PlotStyle → {Blue, Red, Green, Pink}[[i]], {i, 1, 4}] is not a list of lists.

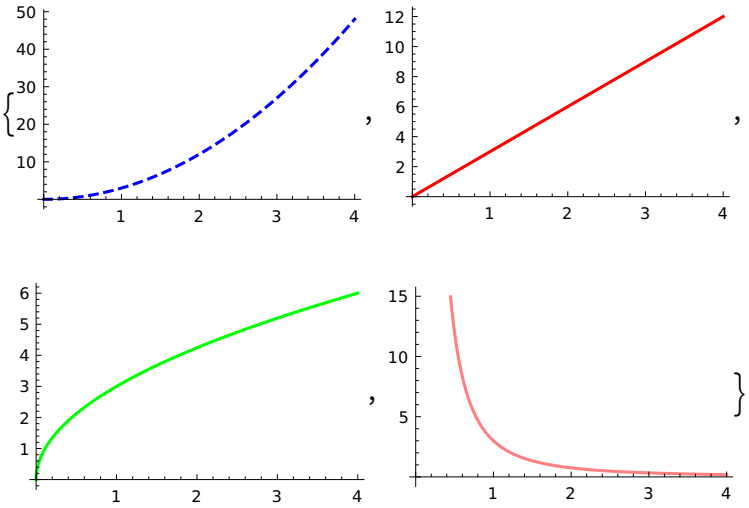
Plot : Options expected (instead of {i, 1, 4}) beyond position 2 in Plot[3 x^{2, 1, 1/2, -2}[[i]], {x, 0, 4}, PlotStyle → {Blue, Red, Green, Pink}[[i]], {i, 1, 4}]. An option must be a rule or a list of rules.

GraphicsGrid : Plot[3 x^{2, 1, 1/2, -2}[[i]], {x, 0, 4}, PlotStyle → {Blue, Red, Green, Pink}[[i]], {i, 1, 4}] is not a list of lists.

Out[2]=
```
GraphicsGrid[Plot[3 x^{2, 1, 1/2, -2}[[i]], {x, 0, 4},
  PlotStyle → {Blue, Red, Green, Pink}[[i]], {i, 1, 4}], Frame → All]
```

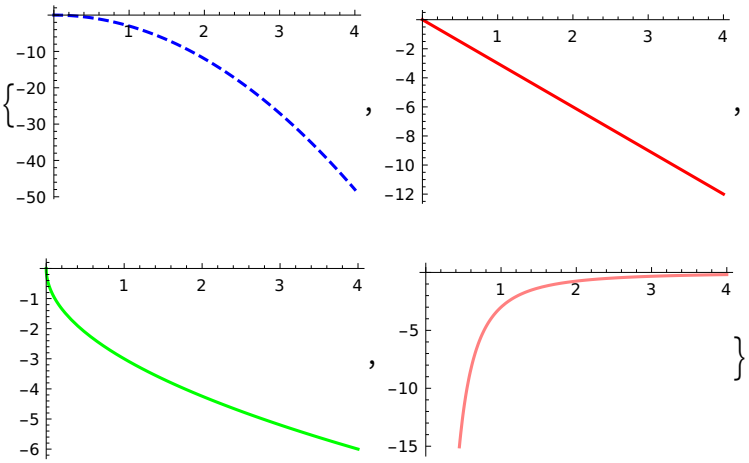
In[6]:=
```
x = Table[Plot[3 x^{2, 1, 1/2, -2}[[i]], {x, 0, 4},
    PlotStyle → {Directive[Blue, Dashed], Red, Green, Pink}[[i]]], {i, 1, 4}]
```

Out[6]=



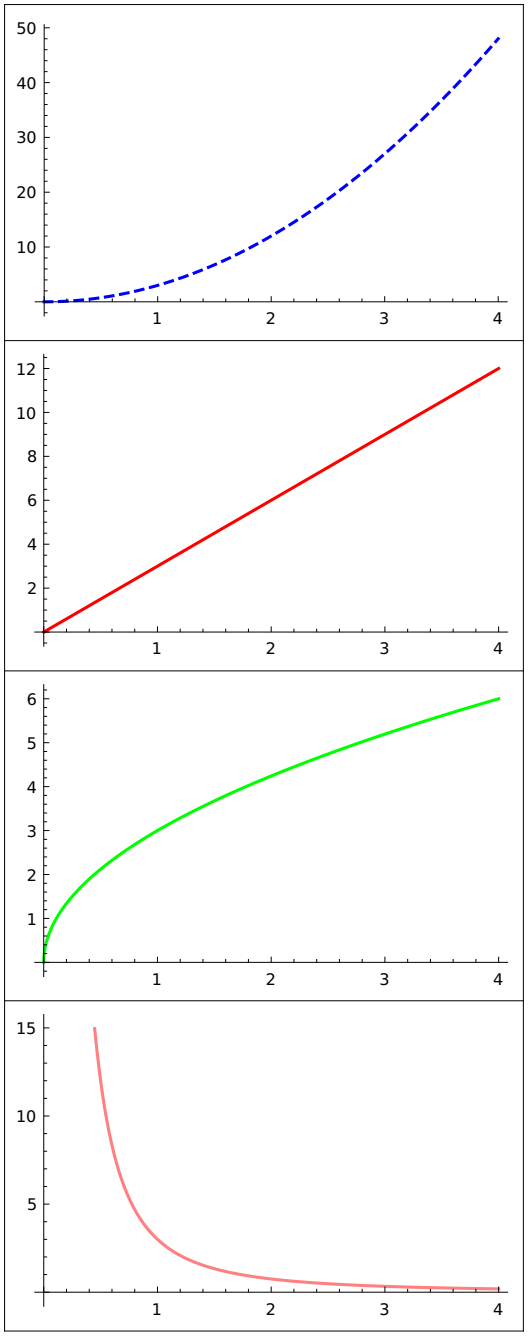
In[3]:=
```
y = Table[Plot[-3 x^{2, 1, 1/2, -2}[[i]], {x, 0, 4},
    PlotStyle → {Directive[Blue, Dashed], Red, Green, Pink}[[i]]], {i, 1, 4}]
```

Out[3]=



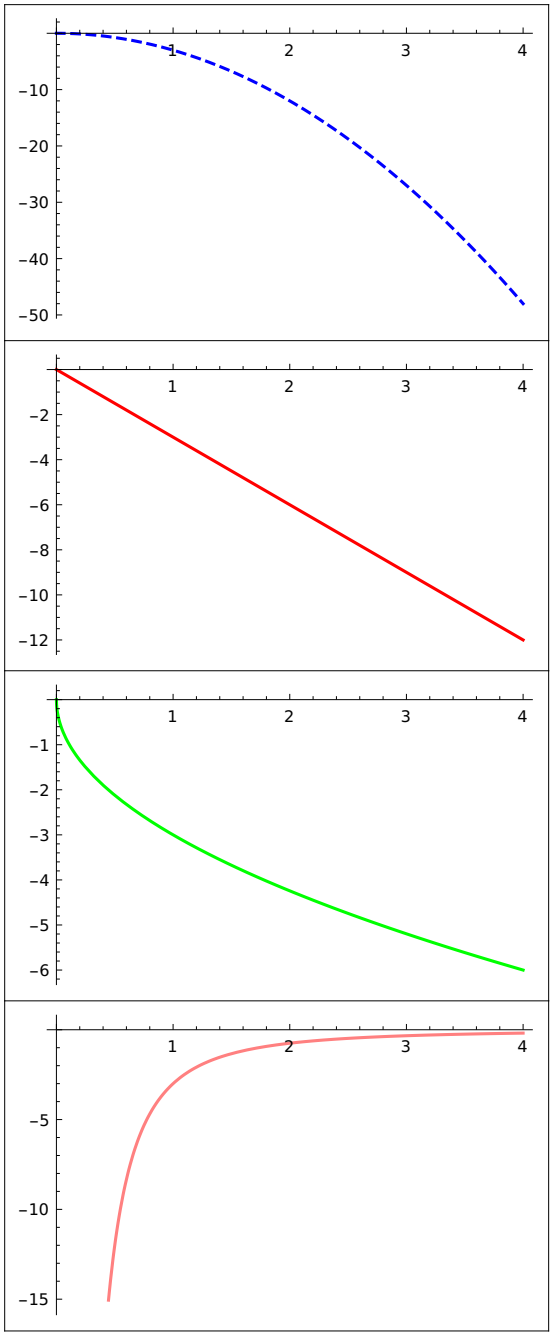
In[7]:=
```
m = GraphicsColumn[x, Frame → All]
```

Out[7]=



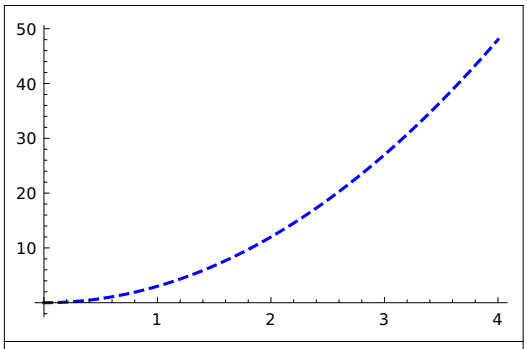
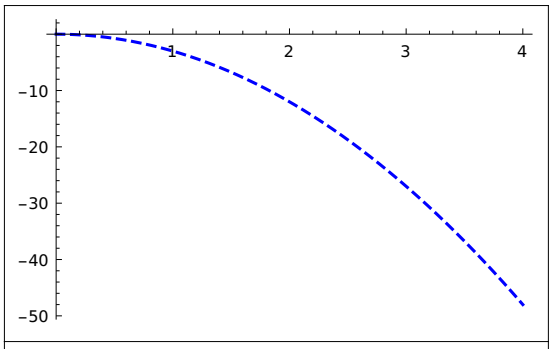
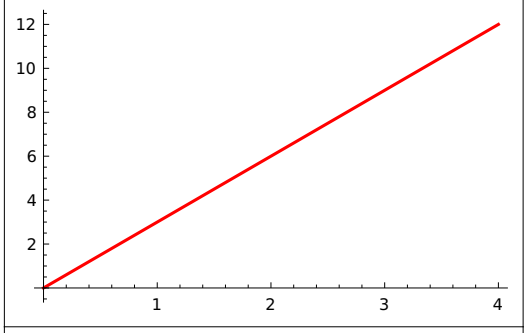
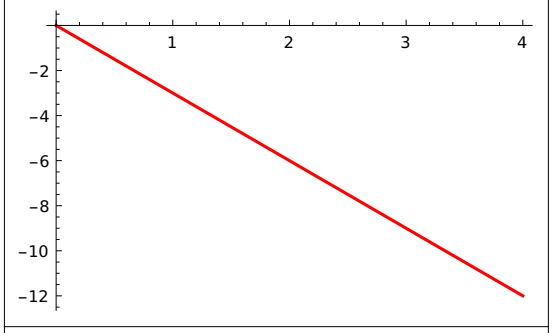
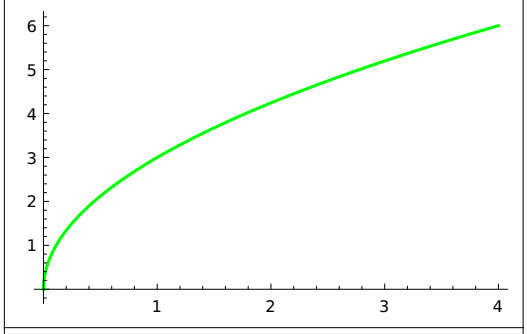
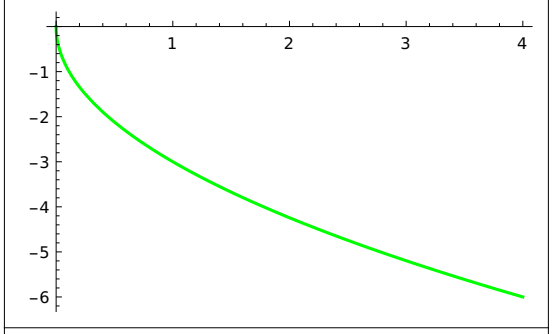
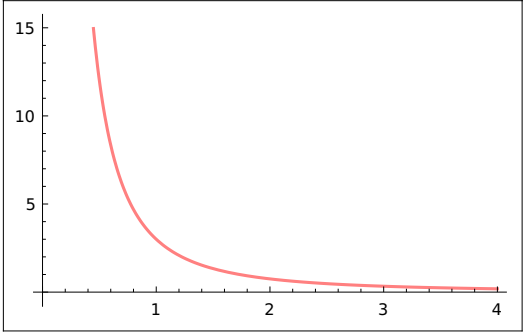
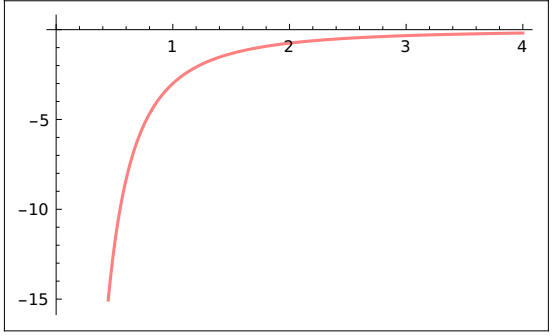
In[8]:=
```
n = GraphicsColumn [y, Frame → All]
```

Out[8]=



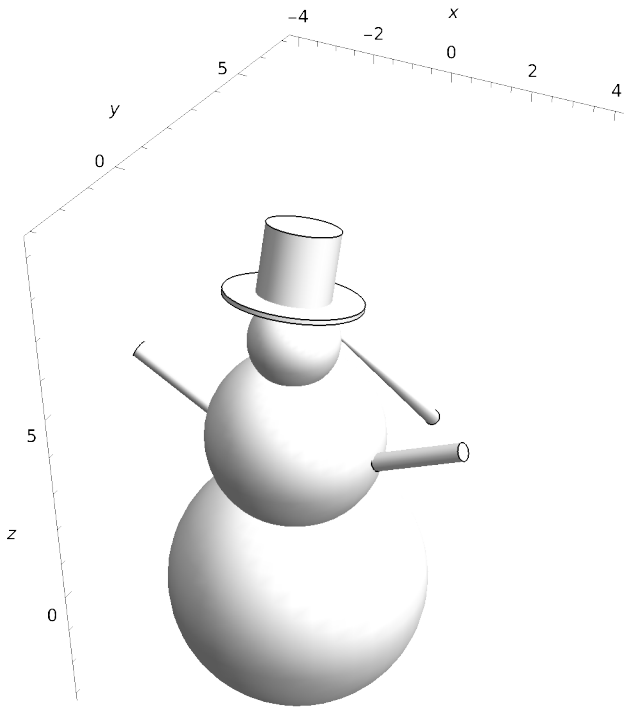
In[9]:=
```
Grid[Prepend[{{m, n}}, {"Plot for :3x^n", "Plot for :-3x^n"}],
 Dividers → {{False, Thick, False}, {Thick, Thick}}]
```

Out[9]=

Plot for :3x^n	Plot for :-3x^n
	
	
	
	

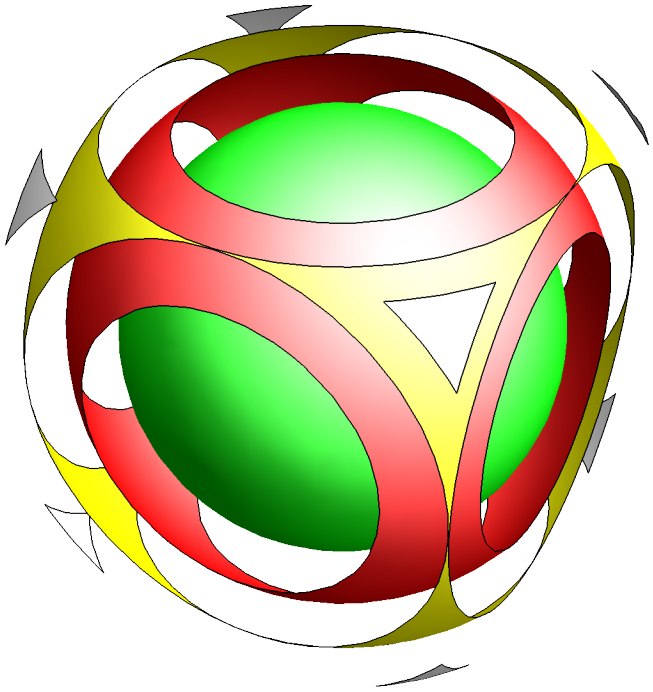
In[31]:=
```
Graphics3D[{{Sphere[{0, 0, 0}, 3]}, Sphere[{0, 0, 4}, 2], Sphere[{0, 0, 6.5}, 1],
  Cone[{{0, 7, 0}, {0, 1, 6.5}}, 0.2], Cylinder[{{0, 0, 7.5}, {0, 0.5, 9}}, 0.8],
  Cylinder[{{0, 0, 7.5}, {0, 0.03, 7.6}}, 1.5], Cylinder[{{2, 0, 4}, {4, 0, 5}}, 0.2],
  Cylinder[{{-2, 0, 4}, {-4, 0, 5}}, 0.2]}, Boxed → False,
 Lighting → "Neutral", Axes → True, AxesLabel → {x, y, z}, Ticks → All]
```

Out[31]=



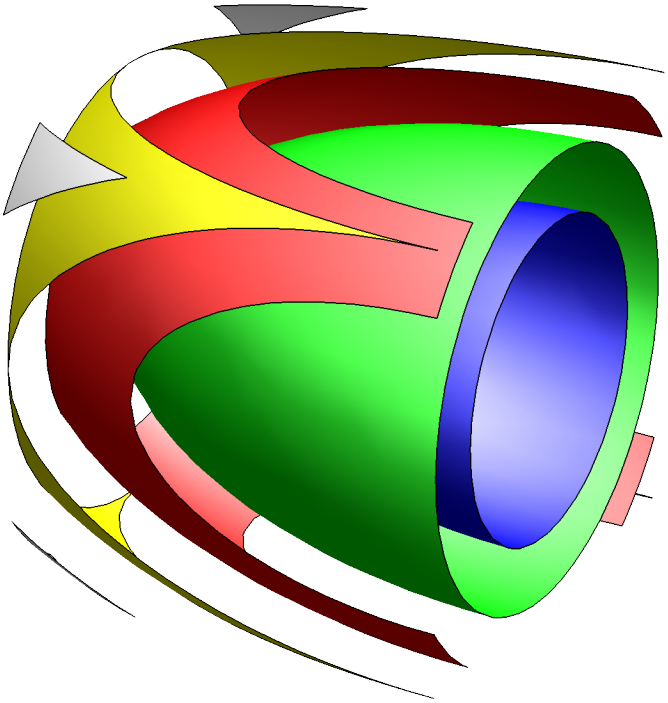
In[5]:=
```
x = ContourPlot3D [x ^ 2 + y ^ 2 + z ^ 2, {x, -2, 2}, {y, -2, 2},
  {z, -2, 2}, Mesh → None, Boxed → False, Axes → False, Contours → 5,
  ContourStyle →{Blue, Green, Red, Yellow, White}, Lighting → "Neutral"]
```

Out[5]=



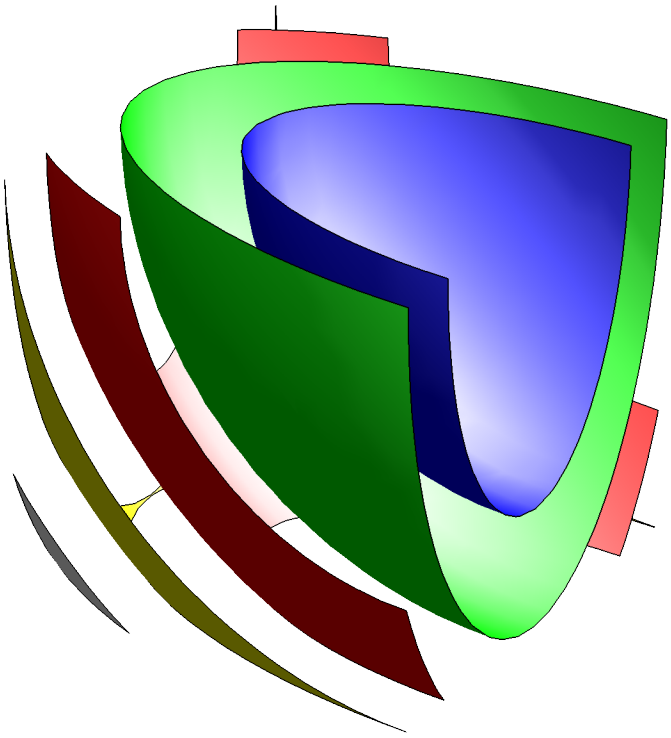
In[30]:=
```
y = ContourPlot3D [x ^ 2 + y ^ 2 + z ^ 2, {x, -2, 2},
  {y, -2, 0}, {z, -2, 2}, Mesh → None, Boxed → False, Axes → False,
  Contours → 5, ContourStyle → {Blue, Green, Red, Yellow, White},
  Lighting → "Neutral", ViewPoint → {9, 5, 5}]
```

Out[30]=



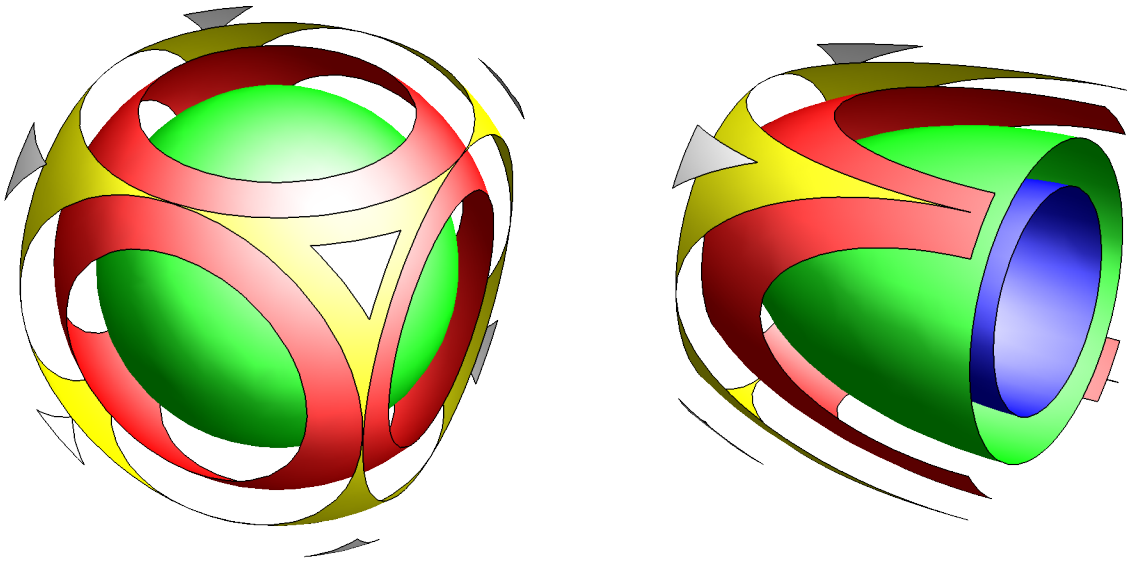
In[25]:=
```
z = ContourPlot3D[x^2 + y^2 + z^2, {x, -2, 2},
  {y, -2, 0}, {z, -2, 0}, Mesh → None, Boxed → False, Axes → False,
  Contours → 5, ContourStyle → {Blue, Green, Red, Yellow, White},
  Lighting → "Neutral", ViewPoint → {9, 6, 6}]
```

Out[25]=



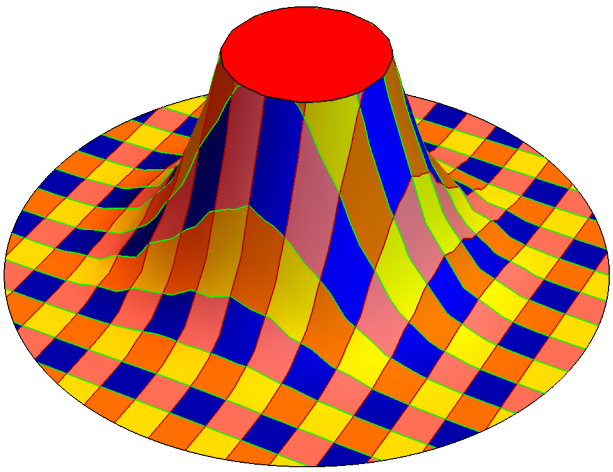
In[31]:=
```
GraphicsRow[{x, y, z}, Dividers → None]
```

Out[31]=



In[3]:=
```
Plot3D[e^-(x^2+y^2), {x, -3, 3}, {y, -3, 3}, ClippingStyle → {Red},
 Boxed → False, Axes → False, MeshStyle → {Darker[Red], Green},
 MeshShading → {{Orange, Yellow}, {Blue, Pink}},
 RegionFunction → Function[{x, y, z}, x^2 + y^2 ≤ 9], MaxRecursion → 9]
```

Out[3]=



```
Plot3D[{x^2 + y^2, -x^2 - y^2}, {x, -2, 2}, {y, -2, 2},
 RegionFunction -> Function[{x, y, z}, x^2 + y^2 <= 4],
 BoxRatios -> Automatic]
```

```
Plot3D[e^-(x^2+y^2), {x, -3, 3}, {y, -3, 3}, ClippingStyle → {Red},
 Boxed → False, Axes → False, MeshStyle → {Darker[Red], Green},
 MeshShading → {{Orange, Yellow}, {Blue, Pink}},
 RegionFunction → Function[{x, y, z}, x^2 + y^2 ≤ 4], MaxRecursion → 9]
```