In[86]:=
```
B = {1, x, x^2}
```
Out[86]=
$$\{1,\ x,\ x^2\}$$

In[89]:=
```
KK = {{a[0], a[1], a[2]}, {b[0], b[1], b[2]}, {c[0], c[1], c[2]}}
```
Out[89]=
$$\{\{a[0],\ a[1],\ a[2]\},\ \{b[0],\ b[1],\ b[2]\},\ \{c[0],\ c[1],\ c[2]\}\}$$

In[91]:=
```
fce = KK.B
```
Out[91]=
$$\{a[0] + x\,a[1] + x^2\,a[2],\ b[0] + x\,b[1] + x^2\,b[2],\ c[0] + x\,c[1] + x^2\,c[2]\}$$

In[97]:=
```
rovs = {(fce[[1]] /. {x → 1}) == (fce[[2]] /. {x → 1}),
   (fce[[2]] /. {x → 3}) == (fce[[3]] /. {x → 3}),
   (D[fce[[1]], x] /. {x → 1}) == (D[fce[[2]], x] /. {x → 1})}
```
Out[97]=
$$\{a[0] + a[1] + a[2] == b[0] + b[1] + b[2],\ b[0] + 3\,b[1] + 9\,b[2] == c[0] + 3\,c[1] + 9\,c[2],\ a[1] + 2\,a[2] == b[1] + 2\,b[2]\}$$

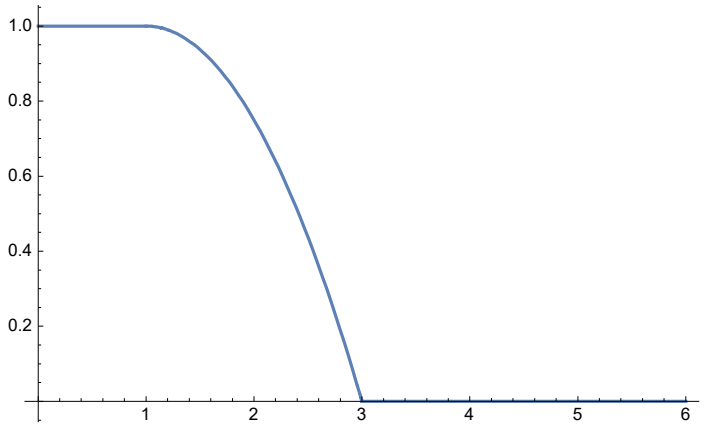
In[104]:=
```
res = Solve[rovs, {b[0], b[1], b[2]}][[1]]
```
Out[104]=
$$\{b[0] \to \frac{1}{4}(3\,a[0] - 3\,a[1] - 9\,a[2] + c[0] + 3\,c[1] + 9\,c[2]),\ b[1] \to \frac{1}{2}(a[0] + 5\,a[1] + 9\,a[2] - c[0] - 3\,c[1] - 9\,c[2]),\ b[2] \to \frac{1}{4}(-a[0] - 3\,a[1] - 5\,a[2] + c[0] + 3\,c[1] + 9\,c[2])\}$$

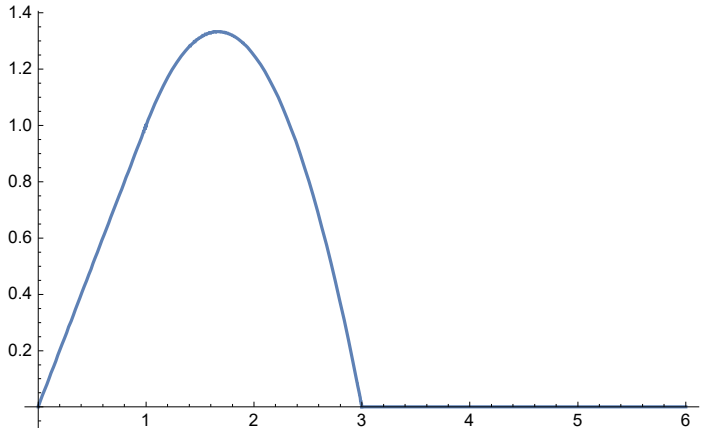
In[111]:=
```
OF = Simplify[fce /. res];
```

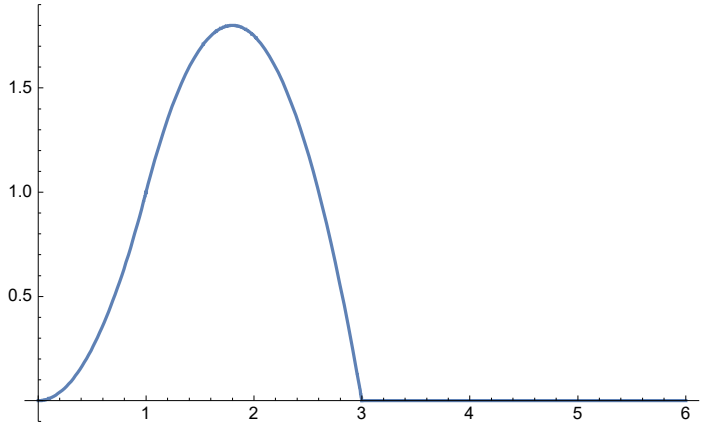
In[112]:=
```
M = IdentityMatrix[6];
```

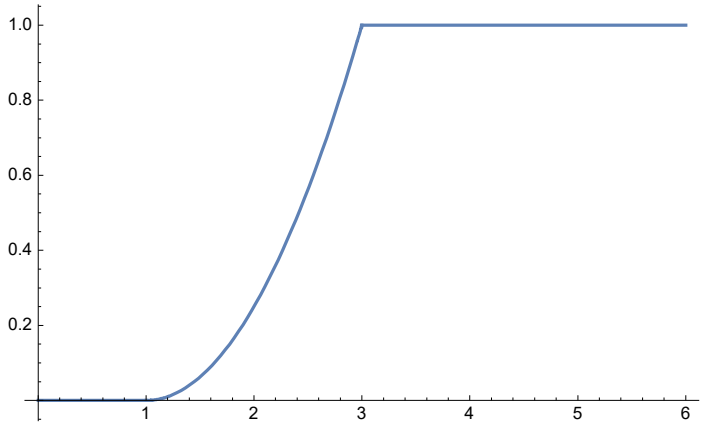
In[114]:=
```
BF = Table[OF /. {a[0] → M[[i]][[1]], a[1] → M[[i]][[2]], a[2] → M[[i]][[3]],
     c[0] → M[[i]][[4]], c[1] → M[[i]][[5]], c[2] → M[[i]][[6]]}, {i, 1, 6}]
```
Out[114]=
$$\{\{1, \frac{1}{4}(3 + 2\,x - x^2), 0\}, \{x, \frac{1}{4}(-3 + 10\,x - 3\,x^2), 0\}, \{x^2, \frac{1}{4}(-9 + 18\,x - 5\,x^2), 0\}, \{0, \frac{1}{4}(1 - 2\,x + x^2), 1\}, \{0, \frac{1}{4}(3 - 6\,x + 3\,x^2), x\}, \{0, \frac{1}{4}(9 - 18\,x + 9\,x^2), x^2\}\}$$

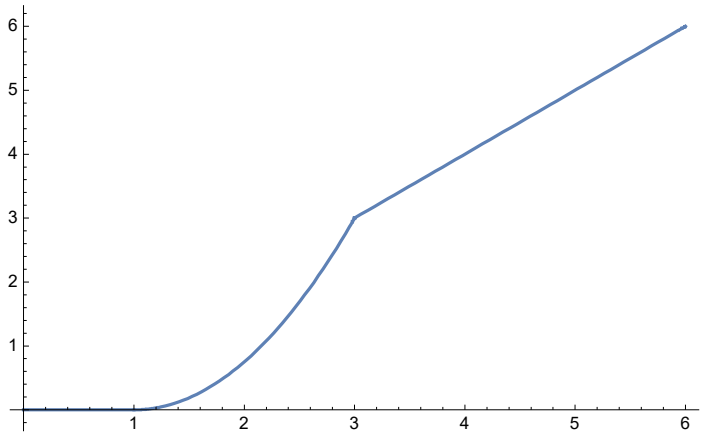
In[121]:=
```
For[i = 1, i < 7, i++,
 Print[Show[Plot[BF[[i]][[1]], {x, 0, 1}], Plot[BF[[i]][[2]], {x, 1, 3}],
   Plot[BF[[i]][[3]], {x, 3, 6}], PlotRange -> All]]]
```

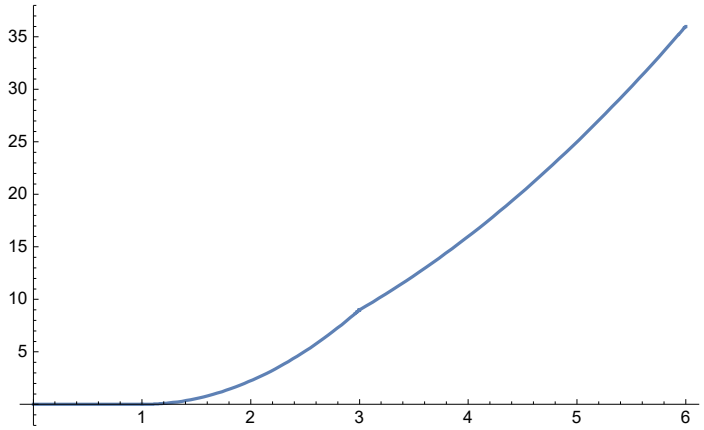



1.4
1.2
1.0
0.8
0.6
0.4
0.2
1
2
3
4
5
6


1.5
1.0
0.5
1
2
3
4
5
6


1.0
0.8
0.6
0.4
0.2
1
2
3
4
5
6


6
5
4
3
2
1
1
2
3
4
5
6



In[122]:=
```
knots = {0, 0, 0, 1, 3, 3, 6, 6, 6}
```

Out[122]=
```
{0, 0, 0, 1, 3, 3, 6, 6, 6}
```

In[123]:=
```
p = 2
```

Out[123]=
```
2
```

In[124]:=
```
m = Length[knots] - 1
```

Out[124]=
```
8
```

In[125]:=
```
n = m - p - 1
```

Out[125]=
```
5
```

In[131]:=
```
Plot[Evaluate[Table[BSplineBasis[{p, knots}, i, t], {i, 0, n}]],
 {t, First[knots], Last[knots]} , Filling → Axis,
 PlotRange → Full, PlotTheme → "Scientific"]
```

Out[131]=