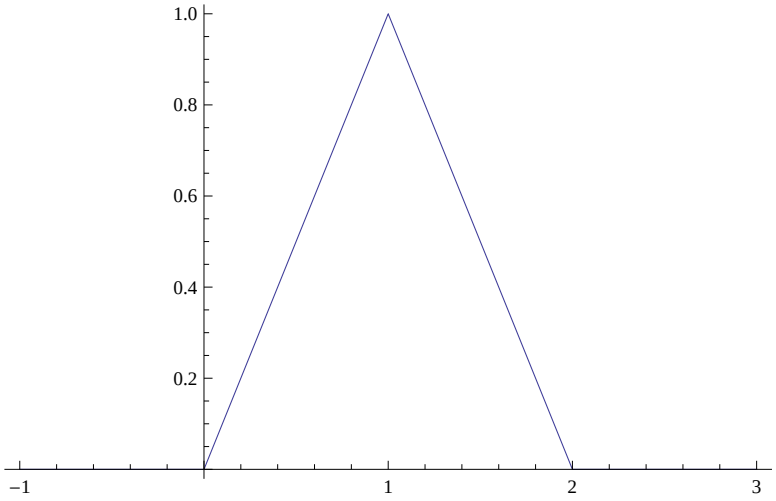
■ Acceleration

In[1]:=
```
accel = Piecewise[{{a0/t0 #, 0 < # < t0}, {2 a0 - a0/t0 #, t0 < # < 2 t0}}, 0] &;
```

In[2]:=
```
Plot[accel[x] /. {a0 → 1, t0 → 1}, {x, -1, 3}]
```

Out[2]=



■ Velocity

In[23]:=
```
v0 = Assuming[0 > t, Integrate[accel[tt], {tt, 0, t}]]
v1 = Assuming[0 < t < t0, Integrate[accel[tt], {tt, 0, t}]]
v2 = Assuming[t0 < t < 2 t0, Integrate[accel[tt], {tt, 0, t}]]
v3 = Assuming[{t > 2 t0, t0 > 0}, Integrate[accel[tt], {tt, 0, t}]]
```

Out[23]= 0

Out[24]= $\frac{a0\ t^2}{2\ t0}$

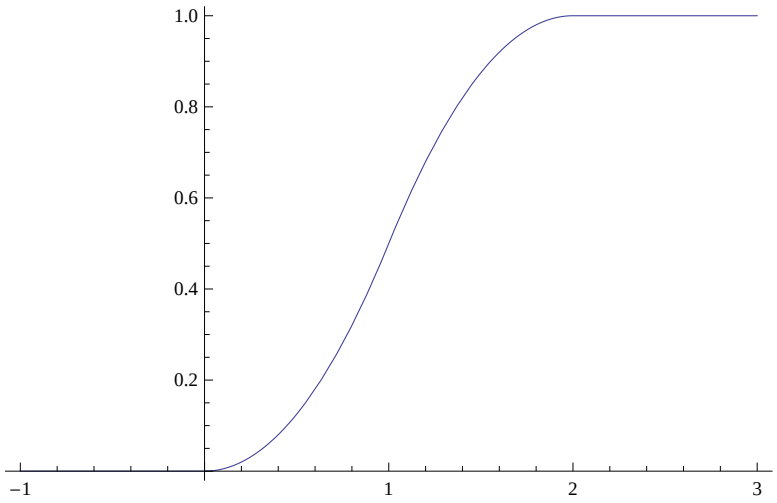
Out[25]= $\frac{-a0\ t^2 + 4\ a0\ t\ t0 - 2\ a0\ t0^2}{2\ t0}$

Out[26]= a0 t0

In[27]:=
```
vel[t_] := Piecewise[{{v0, t < 0}, {v1, 0 < t < t0}, {v2, t0 < t < 2 t0}, {v3, 2 t0 < t}}]
```

In[29]:=
```
Plot[vel[t] /. {a0 → 1, t0 → 1}, {t, -1, 3}]
```

Out[29]=



■ Position

In[30]:=
```
x0 = Assuming[0 > t, Integrate[vel[tt], {tt, 0, t}]]
x1 = Assuming[0 < t < t0, Integrate[vel[tt], {tt, 0, t}]]
x2 = Assuming[t0 < t < 2 t0, Integrate[vel[tt], {tt, 0, t}]]
x3 = Assuming[{t > 2 t0, t0 > 0}, Integrate[vel[tt], {tt, 0, t}]]
```

Out[30]= 0

Out[31]= $\frac{a0\ t^3}{2\ t0}$

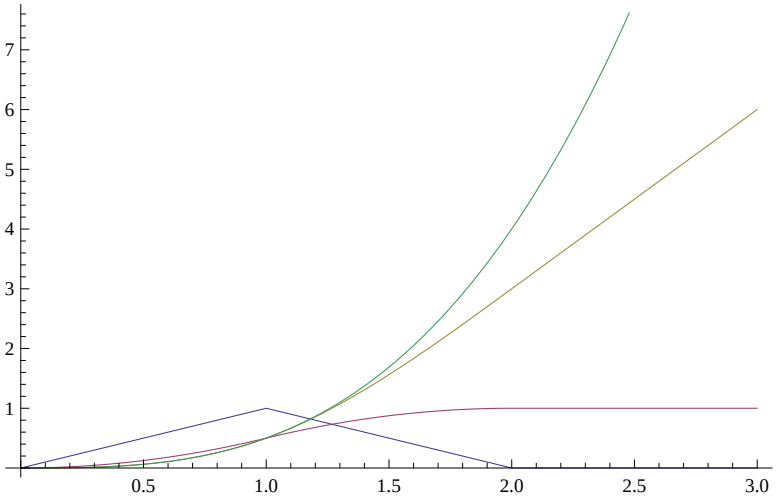
Out[32]= $\frac{-a0\ t^3 + 6\ a0\ t^2\ t0 - 6\ a0\ t\ t0^2 + 2\ a0\ t0^3}{2\ t0}$

Out[33]= $3\ \left(a0\ t\ t0 - a0\ t0^2\right)$

In[34]:=
```
pos[t_] := Piecewise[{{x0, t < 0}, {x1, 0 < t < t0}, {x2, t0 < t < 2 t0}, {x3, 2 t0 < t}}]
```

In[39]:=
```
Plot[{accel[t] /. {a0 → 1, t0 → 1}, vel[t] /. {a0 → 1, t0 → 1},
  pos[t] /. {a0 → 1, t0 → 1}, a0 t^3/(2 t0) /. {a0 → 1, t0 → 1}}, {t, 0, 3}]
```

Out[39]=



In[38]:=
```
Plot[{accel[t] /. {a0 → 1, t0 → 1}, vel[t] /. {a0 → 1, t0 → 1},
  pos[t] /. {a0 → 1, t0 → 1}, a0 t^3/(2 t0) /. {a0 → 1, t0 → 1}}, {t, 0, 2}]
```

Out[38]=