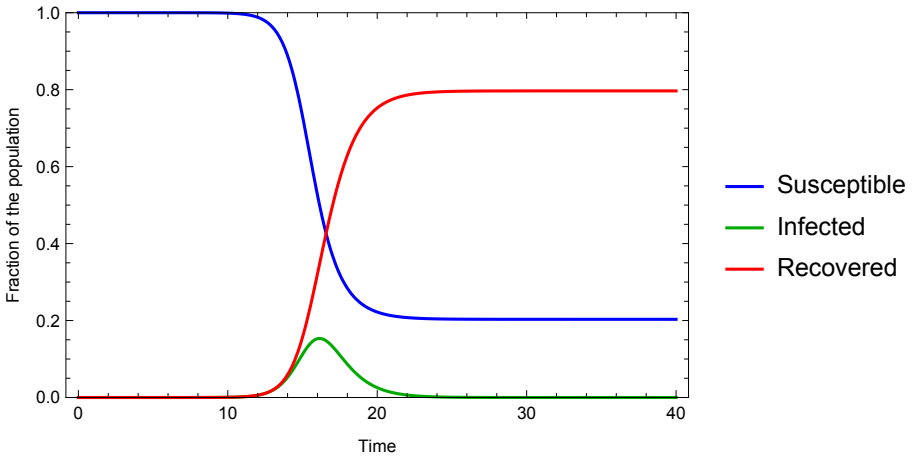
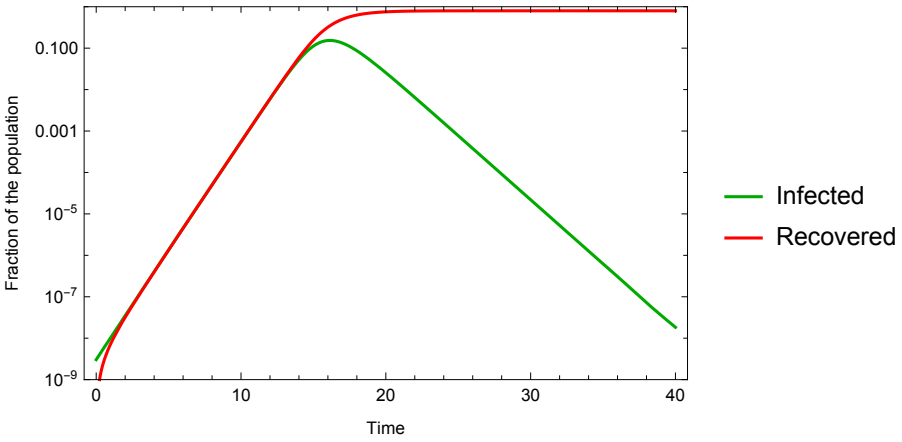
In[1585]:=
```
Clear["Global`*"]
R0 = 2;
k2 = 1.2;
k1 = R0 * k2;
xi0 = 1 / 330 000 000;
tmax = 500;
sol = NDSolve[{
     xs'[t] == -k1 * xs[t] * xi[t],
     xi'[t] == k1 * xs[t] * xi[t] - k2 * xi[t],
     xr'[t] == k2 * xi[t],
     xs[0] == 1 - xi0,
     xi[0] == xi0,
     xr[0] == 0},
    {xs, xi, xr}, {t, 0, tmax}];
Plot[{xs[t] /. sol, xi[t] /. sol, xr[t] /. sol}, {t, 0, 40},
 Frame → True, FrameLabel → {"Time", "Fraction of the population"},
 PlotLegends → {"Susceptible", "Infected", "Recovered"},
 PlotRange → {0, 1}, PlotStyle → {Blue, Darker[Green], Red}]
LogPlot[{xi[t] /. sol, xr[t] /. sol}, {t, 0, 40}, Frame → True,
 FrameLabel → {"Time", "Fraction of the population"}, PlotRange → {0.000000001, 1},
 PlotStyle → {Darker[Green], Red}, PlotLegends → {"Infected", "Recovered"}]
(* This gives the recovered fraction at tmax *)
Print["The fraction recovered t = tmax is xr = ", First[ xr[tmax] /. sol], "."]
(* This part finds the peak of xi and the time at which it occurs *)
Print[ "The peak of infections is xi = ", First[FindMaximum[xi[t] /. sol, {t, 18}] ],
 " and it occured at ", First[Last[FindMaximum[xi[t] /. sol, {t, 18}]]], " weeks."]
```

Out[1592]=



Out[1593]=



The fraction recovered t = tmax is xr = 0.796812.

The peak of infections is xi = 0.153426 and it occured at t → 16.1397 weeks.