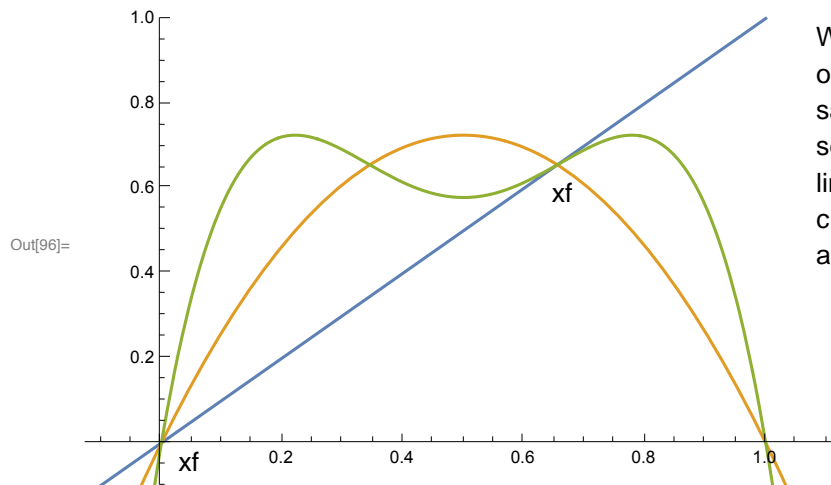


```

In[93]:= f[x_, r_] := r * x * (1 - x)
         f2[x_, r_] := f[f[x, r], r]
         f4[x_, r_] := f2[f2[x, r], r]
         Plot[{x, f[x, 2.9], f2[x, 2.9]}, {x, -0.1, 1.1}, PlotRange -> {-0.1, 1}]

```

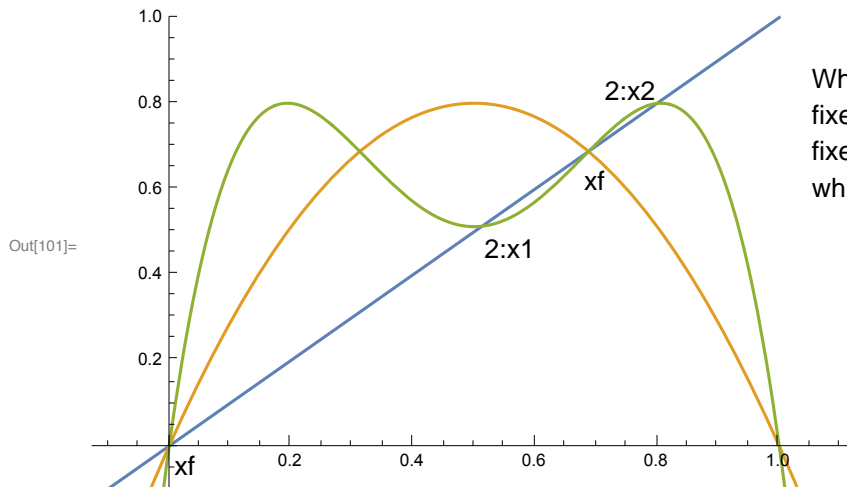


When $r=2.9$ this is just less than the PD bif that occurs when $r_{PD}=3$. Thus, f and $f2$ have the same fixed points. However, the $f2$ map can be seen to becoming almost tangent to the reference line. Once it passes tangent and has two new crossings these new fixed points of $f2$ represent a P2 orbit in f .

```

In[101]:= Plot[{x, f[x, 3.2], f2[x, 3.2]}, {x, -0.1, 1.1}, PlotRange -> {-0.1, 1}]

```

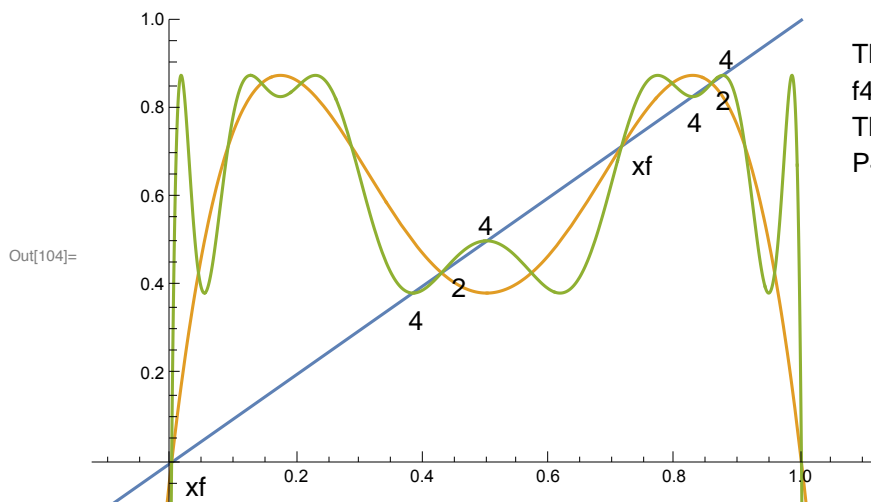


When $r=3.2 > r_{PD}$ there are now clearly four fixed points of the $f2$ map. Two represent the original fixed points of f . The other two represent the P2 orbit, which in f would look like a rectangle.

```

In[104]:= Plot[{x, f2[x, 3.5], f4[x, 3.5]}, {x, -0.1, 1.1}, PlotRange -> {-0.1, 1}]

```



This shows $f2$ and $f4$ for $r = 3.5$. Now the $f4$ map has just added additional fixed points. These new fixed points (labeled "4") make up a P4 orbit of the original f map.