```
function1[a_, b_, g_] :=
 (
  i = 1;
  While[p[[i]] < 0.999999999999999,
   AppendTo[p, f[p[[i]]]];
   i++
  ];
  i;
  p;

  exactPrint = {};
  For[m = 1, m ≤ i, m++,
   AppendTo[exactPrint, {p[[m]], f[p[[m]]]}]
  ];

  equalPr = {};
  For[m = 2, m ≤ i, m++,
   AppendTo[equalPr, {p[[m]], p[[m]]}]
  ];

  Show[Plot[f[x], {x, 0, 1}, PlotRange → All, PlotStyle → Blue],
   ListPlot[{{1, f[1]}, {0, f[0]}
     }, PlotStyle → Red], Plot[y = x, {x, 0, 1}, PlotStyle → Gray],
   ListPlot[exactPrint, PlotRange → All, PlotStyle → Black],
   ListPlot[equalPr, PlotRange → All, PlotStyle → Black]]
 )

function2[a_, b_, g_] := (
  i = 1;
  While[p[[i]] > 0.0001,
   AppendTo[p, f[p[[i]]]];
   i++
  ];
  i;
  p;

  exactPrint = {};
  For[m = 1, m ≤ i, m++,
   AppendTo[exactPrint, {p[[m]], f[p[[m]]]}]
  ];

  equalPr = {};
  For[m = 2, m ≤ i, m++,
   AppendTo[equalPr, {p[[m]], p[[m]]}]
  ];

  Show[Plot[f[x], {x, 0, 1}, PlotRange → All, PlotStyle → Blue],
   ListPlot[{{1, f[1]}, {0, f[0]}
     }, PlotStyle → Red], Plot[y = x, {x, 0, 1}, PlotStyle → Gray],
   ListPlot[exactPrint, PlotRange → All, PlotStyle → Black],
   ListPlot[equalPr, PlotRange → All, PlotStyle → Black]]
 )

function3[a_, b_, g_] := (
  i = 1;
```

```
  While[p[[i]] ≠ pCenter,
   AppendTo[p, f[p[[i]]]];
   i++
  ];
  i;
  p;

  exactPrint = {};
  For[m = 1, m ≤ i, m++,
   AppendTo[exactPrint, {p[[m]], f[p[[m]]]}]
  ];

  equalPr = {};
  For[m = 2, m ≤ i, m++,
   AppendTo[equalPr, {p[[m]], p[[m]]}]
  ];

  Show[Plot[f[x], {x, 0, 1}, PlotRange → All, PlotStyle → Blue],
   ListPlot[{{1, f[1]}, {0, f[0]}, {pCenter, f[pCenter]}
     }, PlotStyle → Red], Plot[y = x, {x, 0, 1}, PlotStyle → Gray],
   ListPlot[exactPrint, PlotRange → All, PlotStyle → Black],
   ListPlot[equalPr, PlotRange → All, PlotStyle → Black]]
 )

function4[a_, b_, g_] := (
 If[p[[1]] > pCenter,
  i = 1;
  While[p[[i]] < 0.99999999999999,
   AppendTo[p, f[p[[i]]]];
   i++
  ];
  i;
  p;,

  i = 1;
  While[p[[i]] > 0.000000001,
   AppendTo[p, f[p[[i]]]];
   i++
  ];
  i;
  p;
 ];

 exactPrint = {};
 For[m = 1, m ≤ i, m++,
  AppendTo[exactPrint, {p[[m]], f[p[[m]]]}]
 ];

 equalPr = {};
 For[m = 2, m ≤ i, m++,
  AppendTo[equalPr, {p[[m]], p[[m]]}]
 ];

 Show[Plot[f[x], {x, 0, 1}, PlotRange → All, PlotStyle → Blue],
  ListPlot[{{1, f[1]}, {0, f[0]}, {pCenter, f[pCenter]}
```

```
    }, PlotStyle → Red], Plot[y = x, {x, 0, 1}, PlotStyle → Gray],
  ListPlot[exactPrint, PlotRange → All, PlotStyle → Black],
  ListPlot[equalPr, PlotRange → All, PlotStyle → Black]]
)
```

```
biology[a_, b_, g_] :=
 (
```

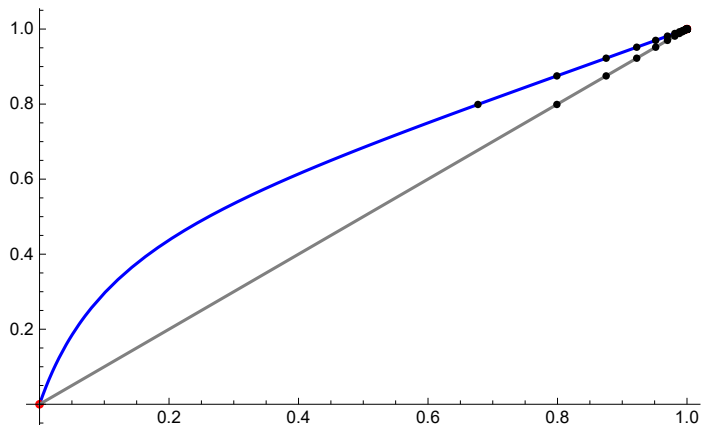$$f[x\_] := \frac{(a - b)\ x^2 + b * x}{(a - 2\,b + g)\ x^2 + 2\ (b - g)\ x + g};$$

$$pCenter = \frac{g - b}{a - 2\,b + g};$$
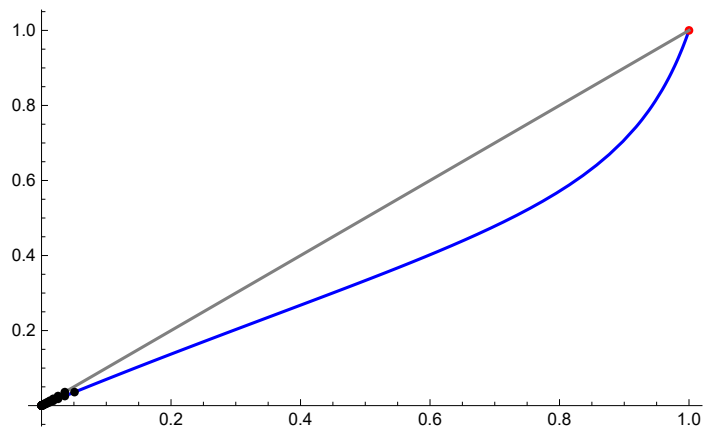
```
   p = {};
   AppendTo[p, RandomReal[]];

   If[a > b > g, function1[a, b, g],
    If[a < b < g, function2[a, b, g],
     If[b > g > a || b > a > g, function3[a, b, g],
      If[b < g < a || b < a < g, function4[a, b, g]
      ]
     ]
    ]
   ]
 )
```
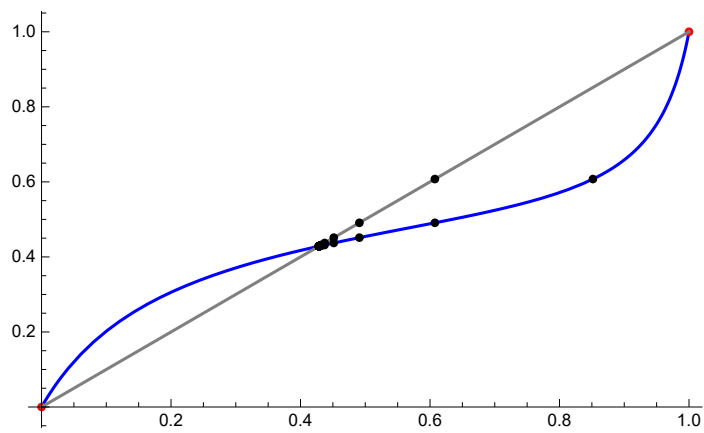
biology[0.8, 0.5, 0.1]

biology[0.1, 0.5, 0.7]

biology[0.1, 0.9, 0.3]

biology[0.9, 0.1, 0.7]