```
> Orb((1-x)*(2-x)*(3-x)/12, x, 0.5, 1000.,1010)
```

$$[0.2804250992, 0.2804250992, 0.2804250992, 0.2804250992, 0.2804250992, 0.2804250992, 0.2804250992, 0.2804250992, 0.2804250992, 0.2804250992] \quad (1)$$

```
> `The period is 1`
```

*The period is 1* (2)

```
> #a(n+1)=(1-a(n))(2-a(n))(3-a(n))/r
> f := proc(r) return (1-x)*(2-x)*(3-x)/r end
```

$$f := \mathbf{proc}(r)\ \mathbf{return}\ (1-x)*(2-x)*(3-x)/r\ \mathbf{end\ proc} \quad (3)$$

```
> f(3)
```

$$\frac{(1-x)\ (2-x)\ (3-x)}{3} \quad (4)$$

```
> Orb(f(7), x, 0.5, 1000., 1010)
```

$$[0.3779491930, 0.3779491508, 0.3779491923, 0.3779491515, 0.3779491917, 0.3779491521, 0.3779491911, 0.3779491527, 0.3779491905, 0.3779491532, 0.3779491899] \quad (5)$$

```
> `if r = 7 then the period is 1`
```

*if r = 7 then the period is 1* (6)

```
> Orb(f(6), x, 0.5, 1000., 1010)
```

$$[1.000000000, 0., 1.000000000, 0., 1.000000000, 0., 1.000000000, 0., 1.000000000, 0., 1.000000000] \quad (7)$$

```
> `if r = 6 then the period is 2`
```

*if r = 6 then the period is 2* (8)

```
> Orb(f(3), x, 0.5, 1000., 1010)
```

$$[0.1183980958, 1.593356628, -0.1131337664, 2.440904984, 0.1183980958, 1.593356628, -0.1131337664, 2.440904984, 0.1183980958, 1.593356628, -0.1131337664] \quad (9)$$

```
> `if r = 3 then the period is 4`
```

*if r = 3 then the period is 4* (10)

```
> Orb(f(2.5), x, 0.5, 1000, 1010)
```

$$[0.1194622811, 1.907934981, -0.03651387140, 2.563880338, 0.1538353447, 1.778465010, -0.08426502013, 2.788046846, 0.1194622811, 1.907934981, -0.03651387140] \quad (11)$$

```
> `if r = 2.5 then the period is 8`
```

*if r = 2.5 then the period is 8* (12)

```
> counter := 0 ;
  for i from 1 to 20 do
    T := RT([x,y], 30):
```

```
    ss := evalf(SSg(T, [x,y]));
    orb := evalf(ORB(T, [x,y], [100., 200.], 1000, 1020));
    if(not member(orb[-1], ss)) then
      counter := counter + 1;
      print(`Maple couldn't do it! T=`, T, `ss=`, ss, `orb[-1]=`,
  orb[-1]):
    else print(`Maple did it! T=`, T, `ss=`, ss, `orb[-1]=`, orb
  [-1])
    end ;
  end:
```

$$counter := 0$$

*Maple couldn't do it! T=*, $\left[\frac{22+4x+26y}{10+5x+25y}, \frac{9+27x+5y}{15+12x+10y}\right]$, *ss=*, [[0.8727471962, −3.098322583]], *orb[-1]=*, [1.261495406, 1.169175360]

*Maple couldn't do it! T=*, $\left[\frac{12+25x+5y}{12+5x+2y}, \frac{4+9x+29y}{10+12x+13y}\right]$, *ss=*, [[3.246698318, 1.005645962]], *orb[-1]=*, [3.246698318, 1.005645964]

*Maple couldn't do it! T=*, $\left[\frac{11+3x+23y}{17+20x+27y}, \frac{9+21x+15y}{16+11x+25y}\right]$, *ss=*, [[0.6133131968, 0.7933253086]], *orb[-1]=*, [0.6133131969, 0.7933253086]

*Maple did it! T=*, $\left[\frac{10+29x+28y}{7+11x+25y}, \frac{22+x+28y}{21+18x+17y}\right]$, *ss=*, [[1.893569497, 0.6317141065]], *orb[-1]=*, [1.893569497, 0.6317141065]

*Maple did it! T=*, $\left[\frac{3+3x+11y}{26+27x+9y}, \frac{9+28x+18y}{27+2x+19y}\right]$, *ss=*, [[0.2946748442, 0.7333581111]], *orb[-1]=*, [0.2946748442, 0.7333581111]

*Maple couldn't do it! T=*, $\left[\frac{26+13x+21y}{3+15x+8y}, \frac{18+13x+3y}{27+17x+10y}\right]$, *ss=*, [[1.797031011, 0.6747681354]], *orb[-1]=*, [1.797031011, 0.6747681359]

*Maple couldn't do it! T=*, $\left[\frac{7+6x+22y}{8+10x+4y}, \frac{21+19x+8y}{11+x+10y}\right]$, *ss=*, [[1.857329429, 2.142067497]], *orb[-1]=*, [1.857329429, 2.142067498]

*Maple did it! T=*, $\left[\frac{22+15x+8y}{10+9x+23y}, \frac{24+18x+10y}{19+7x+20y}\right]$, *ss=*, [[1.035045005, 1.109282716]], *orb[-1]=*, [1.035045005, 1.109282716]

*Maple couldn't do it! T=*, $\left[\frac{23+12x+16y}{23+16x+11y}, \frac{21+2x+5y}{29+6x+20y}\right]$, *ss=*, [[0.975312670,

0.5592644082 ]], *orb[-1]*=, [0.9753126700, 0.5592644082 ]

*Maple couldn't do it! T*=, $\left[\frac{12+17x+11y}{7+10x+21y}, \frac{1+20x+28y}{28+26x+7y}\right]$, *ss*=, [[1.191549661, 0.6929977477 ]], *orb[-1]*=, [1.191549661, 0.6929977491 ]

*Maple couldn't do it! T*=, $\left[\frac{8+12x+28y}{18+18x+27y}, \frac{7+9x+25y}{14+22x+17y}\right]$, *ss*=, [[−0.9602263784, 0.05257687179 ]], *orb[-1]*=, [0.7355208360, 0.7555593291 ]

*Maple couldn't do it! T*=, $\left[\frac{15+20x+28y}{8+11x+26y}, \frac{24+15x+5y}{27+22x+17y}\right]$, *ss*=, [[1.51520146, 0.6957491605 ]], *orb[-1]*=, [1.515201464, 0.6957491605 ]

*Maple couldn't do it! T*=, $\left[\frac{18+23x+6y}{13+26x+23y}, \frac{21+20x+28y}{22+4x+20y}\right]$, *ss*=, [[−0.9879704114, 0.6008333408 ]], *orb[-1]*=, [0.6680127978, 1.396566462 ]

*Maple couldn't do it! T*=, $\left[\frac{3+7x+22y}{22+23x+2y}, \frac{17+5x+24y}{16+23x+4y}\right]$, *ss*=, [[0.8441384978, 1.282568839 ]], *orb[-1]*=, [0.8441384988, 1.282568839 ]

*Maple couldn't do it! T*=, $\left[\frac{19+2x+24y}{13+8x+3y}, \frac{20+11x+25y}{2+16x+18y}\right]$, *ss*=, [[0.2147285764, −0.6965768172 ]], *orb[-1]*=, [1.759737809, 1.342386606 ]

*Maple couldn't do it! T*=, $\left[\frac{2+14x+3y}{18+9x+9y}, \frac{1+19x+26y}{2+15x+9y}\right]$, *ss*=, [[0.2855625494, −0.28803304 ]], *orb[-1]*=, [0.3229077775, 2.451838408 ]

*Maple couldn't do it! T*=, $\left[\frac{17+18x+27y}{24+23x+y}, \frac{1+30x+9y}{18+29x+2y}\right]$, *ss*=, [[1.159877840, 0.8088796496 ]], *orb[-1]*=, [1.159877840, 0.8088796482 ]

*Maple couldn't do it! T*=, $\left[\frac{21+12x+3y}{17+28x+4y}, \frac{1+15x+22y}{13+4x+25y}\right]$, *ss*=, [[0.7793085192, 0.83975498 ]], *orb[-1]*=, [0.7793085192, 0.8397549553 ]

*Maple couldn't do it! T*=, $\left[\frac{26+30x+20y}{15+8x+14y}, \frac{5+4x+22y}{28+20x+24y}\right]$, *ss*=, [[2.820789627, 0.2389307054 ]], *orb[-1]*=, [2.820789626, 0.2389307054 ]

*Maple couldn't do it! T*=, $\left[\frac{12+11x+25y}{29+25x+7y}, \frac{16+19x+21y}{3+25x+2y}\right]$, *ss*=, [[1.144948346, 2.436317762 ]], *orb[-1]*=, [1.144948346, 2.436317763 ] **(13)**

> counter

**(14)**

(14)

```
> `Maple couldn't find it 17/20 times, but it was mostly off by a
  few decimals.`
```

*Maple couldn't find it 17/20 times, but it was mostly off by a few decimals.* (15)

```
> counter2 := 0 ;
  for i from 1 to 20 do
    T := RT([x,y,z], 30):
    ss := evalf(SSg(T, [x,y,z]));
    orb := evalf(ORB(T, [x,y,z], [100., 200.,300.], 1000, 1020));
    if(not member(orb[-1], ss)) then
      counter2 := counter2 + 1;
      print(`Maple couldn't do it! T=`, T, `ss=`, ss, `orb[-1]=`,
  orb[-1]):
    else print(`Maple did it! T=`, T, `ss=`, ss, `orb[-1]=`, orb
  [-1])
    end ;
  end:
```

$$counter2 := 0$$

*Maple couldn't do it! T=*, $\left[\frac{6+24x+12y+11z}{1+28x+10y+25z}, \frac{1+7x+3y+14z}{1+x+27y+5z}, \frac{18+7x+22y+17z}{3+12x+26y+z}\right]$, *ss=*, $[[0.7005091347, 0.9760409576, 2.034013920]]$, *orb[-1]=*, $[0.7005091349, 0.9760409576, 2.034013921]$

*Maple couldn't do it! T=*, $\left[\frac{2+18x+12y+27z}{15+x+13y+23z}, \frac{24+21x+2y+16z}{26+3x+14y+8z}, \frac{4+2x+10y+20z}{26+30x+13y+17z}\right]$, *ss=*, $[[1.122721052, 0.3214353045, -2.780169806]]$, *orb[-1]=*, $[1.190619259, 1.162235153, 0.2914071920]$

*Maple couldn't do it! T=*, $\left[\frac{19+8x+13y+16z}{26+4x+10y+30z}, \frac{20+27x+22y+11z}{10+19x+9y+15z}, \frac{5+12x+9y+8z}{17+17x+23y+9z}\right]$, *ss=*, $[[0.2210801347, -1.654801222, 0.3233409344]]$, *orb[-1]=*, $[0.9272921180, 1.763989601, 0.4606054981]$

*Maple couldn't do it! T=*, $\left[\frac{26+13x+30y+16z}{20+11x+14y+29z}, \frac{21+28x+17y+12z}{2+26x+21y+18z}, \frac{24+21x+5y+15z}{14+12x+19y+21z}\right]$, *ss=*, $[[1.179945002, 1.146297174, 0.981336244]]$, *orb[-1]=*,

$[1.179945002, 1.146297170, 0.9813362447]$

*Maple couldn't do it! T=,* $\left[\frac{13+15x+25y+2z}{26+12x+y+3z}, \frac{1+3x+23y+9z}{5+17x+24y+4z}, \frac{2+19x+18y+8z}{22+x+y+29z}\right]$, *ss=,* $[[0.4137188223, -0.2674955855, 0.2392955636]]$, *orb[-1]=,* $[1.104704783, 0.6240222938, 0.8484592240]$

*Maple couldn't do it! T=,* $\left[\frac{15+4x+16y+29z}{15+23x+14y+7z}, \frac{25+12x+11y+6z}{12+19x+17y+22z}, \frac{21+24x+27y+2z}{2+5x+y+15z}\right]$, *ss=,* $[[1.287306255, 0.657618177, 1.931320181]]$, *orb[-1]=,* $[1.287306255, 0.6576181538, 1.931320207]$

*Maple couldn't do it! T=,* $\left[\frac{13+5x+6y+30z}{7+25x+24y+16z}, \frac{10+2x+12y+27z}{11+5x+6y+7z}, \frac{14+3x+3y+23z}{9+7x+27y+15z}\right]$, *ss=,* $[[-4.212106126, 3.753403726, 0.2070737674]]$, *orb[-1]=,* $[0.5915351465, 1.622738133, 0.4982726322]$

*Maple couldn't do it! T=,* $\left[\frac{20+7x+22y+24z}{1+29x+22y+20z}, \frac{12+24x+18y+16z}{23+13x+29y+22z}, \frac{14+x+10y+5z}{12+13x+11y+26z}\right]$, *ss=,* $[[0.989621701, 0.8264389819, 0.540634879]]$, *orb[-1]=,* $[0.9896216943, 0.8264389819, 0.5406348489]$

*Maple couldn't do it! T=,* $\left[\frac{1+29x+6y+28z}{12+20x+14y+3z}, \frac{29+25x+15y+30z}{16+16x+4y+26z}, \frac{28+26x+18y+22z}{3+5x+6y+18z}\right]$, *ss=,* $[[0.1405772004, -29.23581858, 4.165667074]]$, *orb[-1]=,* $[1.704466482, 1.487262437, 2.389802735]$

*Maple couldn't do it! T=,* $\left[\frac{6+5x+22y+17z}{29+18x+19y+25z}, \frac{7+2x+25y+26z}{8+6x+14y+17z}, \frac{17+27x+25y+18z}{29+23x+13y+13z}\right]$, *ss=,* $[[-0.839321763, 0.8451451580, -1.19880447]]$, *orb[-1]=,* $[0.6267730104, 1.441623745, 1.176752939]$

*Maple couldn't do it! T=,* $\left[\frac{23+7x+18y+6z}{3+23x+17y+z}, \frac{13+23x+29y+4z}{12+19x+24y+20z}, \frac{11+28x+10y+21z}{6+26x+6y+2z}\right]$, *ss=,* $[[0.5474342244, -0.184711434, -3.06116232]]$,

*orb[-1]*=, $[1.240872921, 0.7557200139, 2.057089324]$

*Maple couldn't do it! T*=, $\left[\frac{17+x+3y+17z}{26+4x+21y+19z}, \frac{24+26x+8y+7z}{12+8x+16y+2z}, \frac{24+10x+8y+19z}{25+10x+16y+14z}\right]$, *ss*=, $[[0.4984315169, 1.365287851, 0.8830527254]]$, *orb[-1]*=, $[0.4984315013, 1.365287851, 0.8830527318]$

*Maple couldn't do it! T*=, $\left[\frac{4+29x+20y+13z}{1+21x+20y+18z}, \frac{26+23x+23y+14z}{2+6x+11y+19z}, \frac{16+24x+7y+27z}{11+10x+27y+9z}\right]$, *ss*=, $[[0.4073711760, -0.738801817, -0.5584141651]]$, *orb[-1]*=, $[1.083875711, 2.289638998, 0.8966686498]$

*Maple couldn't do it! T*=, $\left[\frac{1+6x+26y+2z}{6+16x+8y+14z}, \frac{19+x+19y+13z}{7+17x+16y+22z}, \frac{14+6x+29y+9z}{24+23x+12y+3z}\right]$, *ss*=, $[[0.0281113989, 0.4758074257, -8.248886185]]$, *orb[-1]*=, $[0.7847140433, 0.8830509398, 0.9529679284]$

*Maple couldn't do it! T*=, $\left[\frac{12+22x+5y+4z}{11+3x+24y+22z}, \frac{30+3x+25y+23z}{26+23x+3y+z}, \frac{11+11x+16y+11z}{26+19x+24y+9z}\right]$, *ss*=, $[[0.07597554572, -4.55244971, 0.7055234]]$, *orb[-1]*=, $[0.4266736887, 2.437031667, 0.6268636963]$

*Maple couldn't do it! T*=, $\left[\frac{20+10x+15y+13z}{22+2x+3y+15z}, \frac{24+9x+26y+14z}{8+29x+22y+13z}, \frac{25+12x+15y+10z}{21+14x+7y+23z}\right]$, *ss*=, $[[0.43508055, -1.30209122, 0.5300420052]]$, *orb[-1]*=, $[1.441771093, 0.8986024279, 0.9428593186]$

*Maple couldn't do it! T*=, $\left[\frac{28+5x+14y+24z}{18+12x+7y+30z}, \frac{26+4x+17y+29z}{22+12x+15y+22z}, \frac{3+25x+23y+3z}{27+11x+3y+24z}\right]$, *ss*=, $[[1.06961864, 1.05417847, 0.8940362942]]$, *orb[-1]*=, $[1.069618637, 1.054178468, 0.8940362942]$

*Maple couldn't do it! T*=, $\left[\frac{21+10x+23y+24z}{5+21x+7y+22z}, \frac{8+27x+26y+21z}{11+11x+18y+12z}, \frac{7+22x+3y+7z}{24+23x+17y+16z}\right]$, *ss*=, $[[0.5030631759, -1.480599449, 0.8226606733]]$,

*orb[-1]*=, [1.459361799, 1.608573267, 0.5103760224]

*Maple couldn't do it! T*=, $\left[\frac{29+2x+20y+23z}{27+20x+24y+9z}, \frac{29+8x+19y+18z}{7+19x+29y+27z}, \frac{9+15x+y+11z}{18+14x+4y+15z}\right]$, *ss*=, [[0.04012521313, −0.2293575709, −1.042383604]], *orb[-1]*=, [0.8899615404, 0.9498208047, 0.6924822725]

*Maple couldn't do it! T*=, $\left[\frac{27+x+9y+16z}{16+27x+16y+23z}, \frac{21+16x+18y+13z}{24+13x+16y+18z}, \frac{9+9x+16y+5z}{5+13x+5y+20z}\right]$, *ss*=, [[0.712256037, 0.9440596963, 0.9342175114]], *orb[-1]*=, [0.7122560380, 0.9440596974, 0.9342175114] **(16)**

```
> counter2
```

20 **(17)**

```
> `Seems like most of those are very minor floating point errors too`
```

*Seems like most of those are very minor floating point errors too* **(18)**