

Tilgungsplan - Kapitalentnahme

1 Grundaufgabe

Figure 1: 4 Vier wichtige Berechnungen beim Tilgungsplan

Kapitalvermögen:	<input type="text" value="50.000,00"/>	Euro	(1)
Kapitalentnahme:	<input type="text" value="5.861,53"/>	Euro	(2)
Entnahmeintervall:	<input type="text" value="jährlich"/>		
Entnahmeart:	<input type="text" value="nachschüssig"/>		
Dynamik:	<input type="text" value="0,00"/>	% p.a.	
Zinssatz:	<input type="text" value="3,00"/>	% p.a.	(3)
Zinsperiode:	<input type="text" value="jährlich"/>		
Wartezeit:	<input type="text" value="0"/>	Jahre	
	<input type="radio"/> Ewige Rente <input checked="" type="radio"/> Begrenzte Rentendauer		
Rentendauer:	<input type="text" value="10"/>	Jahre	(4)
Restkapital:	<input type="text" value="0,00"/>	Euro	

Quelle: <http://www.zinsen-berechnen.de>

2 Berechnungen

2.1 Berechnung des Barwerts

```
(%i9) kill(all);
(%o0) done
```

```
(%i1) R:5861.53;p:3;n:10;
(%o1) 5861.53
(%o2) 3
(%o3) 10
```

```
(%i4) i:p/100.0;r:1+i;
(%o4) 0.03
(%o5) 1.03
```

```
(%i6) g:B*r**n=R*(r**n-1)/i;
(%o6) 1.343916379344122 B= 67195.87250056501
```

```
(%i7) l:realroots(g),numer;
(%o7) [ B=50000.03941866756 ]
```

```

[ (%i8) B:ev(B,l[1]);B:floor(B*10+0.5)/10.0;
  (%o8) 50000.03941866756
  (%o9) 50000.0

```

2.2 Berechnung der Rentenrate

```

[ (%i10) kill(all);
  (%o0) done

```

```

[ (%i1) B:50000;p:3;n:10;
  (%o1) 50000
  (%o2) 3
  (%o3) 10

```

```

[ (%i4) i:p/100.0;r:1+i;
  (%o4) 0.03
  (%o5) 1.03

```

```

[ (%i6) g:B*r**n=R*(r**n-1)/i;
  (%o6) 67195.81896720608=11.46387931147073 R

```

```

[ (%i7) l:allroots(g);
  (%o7) [ R=5861.52533025798 ]

```

```

[ (%i10) R:ev(R,l[1]);R:floor(R*100+0.5)/100.0;
  (%o10) 5861.52533025798
  (%o11) 5861.53

```

2.3 Berechnung Zinssatz

```

[ (%i12) kill(all);
  (%o0) done

```

```

[ (%i1) B:50000;R:5861.53;n:10;
  (%o1) 50000
  (%o2) 5861.53
  (%o3) 10

```

```

[ (%i4) g:B*r**n=R*(r**n-1)/(r-1)
  /* Achtung: r-1 statt i */;
  (%o4) 50000 r10 =  $\frac{5861.53(r^{10}-1)}{r-1}$ 

```

```

[ (%i7) l:realroots(g),numer;
  (%o7) [ r=-0.75788161158562 , r=1.030000180006027 ]

```

```
(%i11) r:ev(r,l[2]);p:100*(r-1);
      p:floor(p*1000+0.5)/1000.0;
(%o11) 1.030000180006027
(%o12) 3.000018000602722
(%o13) 3.0
```

2.4 Berechnung der Laufzeit

```
(%i14) kill(all);
(%o0) done
```

```
(%i1) B:50000;R:5861.53;p:3;
      i:p/100.0;r:1+i;
(%o1) 50000
(%o2) 5861.53
(%o3) 3
(%o4) 0.03
(%o5) 1.03
```

```
(%i6) g:B*r**n=R*(r**n-1)/i;
(%o6) 50000 1.03n=195384.3333333333(1.03n-1)
```

```
(%i10) l:solve(g),numer;
rat: replaced -195384.3333333333 by -586153/3 = -195384.3333333333
rat: replaced 1.03 by 103/100 = 1.03
rat: replaced 1.03 by 103/100 = 1.03
rat: replaced -195384.3333333333 by -586153/3 = -195384.3333333333
rat: replaced -0.3333333333333333 by -1/3 = -0.3333333333333333
rat: replaced 1.03 by 103/100 = 1.03
rat: replaced 1.03 by 103/100 = 1.03
rat: replaced 1.03 by 103/100 = 1.03
rat: replaced 9.999990730680208 by 1078819/107882 = 9.999990730613078
rat: replaced 9.999990730613078 by 1078819/107882 = 9.999990730613078
rat: replaced -9.269386922748929E-6 by -1/107882 = -9.269386922748929E-6
rat: replaced -9.99999073061308 by -1078809/107881 = -9.99999073052716
(%o10) [n=9.999990730527156]
```

```
(%i11) n:ev(n,l[1]);n:floor(n*100+0.5)/100.0;
(%o11) 9.999990730527156
(%o12) 10.0
```