```
> restart : with(cl) :
> local gamma; gamma := (P, j) → product( piecewise( j = k, alpha[k], beta[k]), k = 1 ..P)
```

$$\gamma := (P, j) \mapsto \prod_{k=1}^{P} \begin{cases} \alpha_k & j = k \\ \beta_k & \mathit{otherwise} \end{cases} \tag{1}$$

```
>
> times := {T[0] = 65, T[1] = 67, T[2] = 86, T[3] = 140, T[4] = 141, T[5] = 149, T[6] = 151,
      T[7] = 163, T[8] = 201, T[9] = 205};
```

$$\mathit{times} := \{T_0 = 65, T_1 = 67, T_2 = 86, T_3 = 140, T_4 = 141, T_5 = 149, T_6 = 151, T_7 = 163, T_8 = 201, T_9 = 205\} \tag{2}$$

```
> ps1 := {Z = 20.340000000000000799360577730112709 11, alpha[1] = 1, beta[1] = 1, alpha[2]
      = 0.48023806813840372011863138653926576437, beta[2]
      = 0.48023806813840372011863138653926576437, alpha[3]
      = 0.23062860208930609432672412549423284407, beta[3]
      = 0.23062860208930609432672412549423284407, alpha[4]
      = 0.11075663432482897869501128131129642770, beta[4]
      = 0.11075663432482897869501128131129642769 8, alpha[5]
      = 0.053189552101667483377280611088708706813, beta[5]
      = 0.053189552101667483377280611088708706813, alpha[6]
      = 0.025543647746451763677841903980777976968, beta[6]
      = 0.025543647746451763677841903980777976968, alpha[7]
      = 0.012267032046963884717348189620176689913, beta[7]
      = 0.0122670320469638847173481896201766899129, alpha[8]
      = 0.0058910957720258241325482920374763785 10, beta[8]
      = 0.0058910957720258241325482920374763785104, alpha[9]
      = 0.0028291284527759997979462825404589261182, beta[9]
      = 0.0028291284527759997979462825404589261182, alpha[10]
      = 0.0013586551826765372822917792248176448973, beta[10]
      = 0.0013586551826765372822917792248176448973, alpha[11]
      = 0.00065247794019481026501866613194651284101, beta[11]
      = 0.00065247794019481026501866613194651284101, alpha[12]
      = 0.00031334474550208059951743583524739013510, beta[12]
      = 0.00031334474550208059951743583524739013510, alpha[13]
      = 0.00015048007524123895554964886216992144608, beta[13]
      = 0.00015048007524123895554964886216992144608, alpha[14]
      = 7.2266260627174232156620276476268624 65e-5, beta[14]
      = 7.2266260627174232156620276476268624 65e-5, alpha[15]
      = 3.4705009395180540860142288501418589742e-5, beta[15]
      = 3.4705009395180540860142288501418589742e-5, alpha[16]
      = 1.7800000000000000266453525910037569701671600341796875, beta[16]
      = 0.33333333333333333333333333333333333333} :

>
> unassign('A') : A := (j, i) ↦ 1 + sum(e^(-β[j]·(T[i] - T[k])), k = 0 .. i - 1)
```

$$A := (j, i) \mapsto 1 + \left(\sum_{k=0}^{i-1} e^{-\beta_j \left(T_i - T_k\right)} \right) \tag{3}$$

```
> Arec := proc (j, i) options operator, arrow, remember; if i = 0 then return 1; else return 1
      + exp(-beta[j]·(T[i] − T[i − 1]))·Arec(j, i − 1); end if: end proc:
>
> A(j, 5)
```

$$1+e^{-\beta_j\left(T_5-T_0\right)}+e^{-\beta_j\left(T_5-T_1\right)}+e^{-\beta_j\left(T_5-T_2\right)}+e^{-\beta_j\left(T_5-T_3\right)}+e^{-\beta_j\left(T_5-T_4\right)} \tag{4}$$

```
> Arec(j, 5)
```

$$1+e^{-\beta_j\left(T_5-T_4\right)}\left(1+e^{-\beta_j\left(T_4-T_3\right)}\left(1+e^{-\beta_j\left(T_3-T_2\right)}\left(1+e^{-\beta_j\left(T_2-T_1\right)}\left(1+e^{-\beta_j\left(T_1-T_0\right)}\right)\right)\right)\right) \tag{5}$$

```
> is((4) = (5))
```

$$true \tag{6}$$

```
>
> Acol := j→evalf(eval(eval(flist(i→A(j, i), 0..nops(times) − 1), times), ps1))
```

$$Acol := j \mapsto evalf(eval(eval(cl{:-}flist(i \mapsto A(j,i), 0..nops(times)-1), times), ps1)) \tag{7}$$

```
> Acol(1)
```

$$[1., 1.135335283, 1.000000007, 1., 1.367879441, 1.000458873, 1.135397385, 1.000006976, 1., 1.018315639] \tag{8}$$

```
> Acol(2)
```

$$[1., 1.382710620, 1.000150661, 1., 1.618636097, 1.034724123, 1.395999910, 1.004386402, 1.000000012, 1.146467421] \tag{9}$$

```
> Acol(3)
```

$$[1., 1.630490492, 1.020382827, 1.000003982, 1.794037476, 1.283495178, 1.809231506, 1.113648939, 1.000174037, 1.397587443] \tag{10}$$

```
>
> Acol(15)
```

$$[1., 1.999930592, 2.998612282, 3.992997934, 4.992859360, 5.991473334, 6.991057480, 7.988146590, 8.977618843, 9.976372655] \tag{11}$$

```
> Acol(16)
```

$$[1., 1.513417119, 1.002687986, 1.000000015, 1.716531322, 1.119270520, 1.574652645, 1.028840770, 1.000003246, 1.263597994] \tag{12}$$

```
> Acol(17)
```

$$\begin{aligned}\Big[&1., 1+e^{-2.\,\beta_{17}}, 1+e^{-21.\,\beta_{17}}+e^{-19.\,\beta_{17}}, 1+e^{-75.\,\beta_{17}}+e^{-73.\,\beta_{17}}+e^{-54.\,\beta_{17}}, 1+e^{-76.\,\beta_{17}}\\ &+e^{-74.\,\beta_{17}}+e^{-55.\,\beta_{17}}+e^{-\beta_{17}}, 1+e^{-84.\,\beta_{17}}+e^{-82.\,\beta_{17}}+e^{-63.\,\beta_{17}}+e^{-9.\,\beta_{17}}+e^{-8.\,\beta_{17}}, 1\\ &+e^{-86.\,\beta_{17}}+e^{-84.\,\beta_{17}}+e^{-65.\,\beta_{17}}+e^{-11.\,\beta_{17}}+e^{-10.\,\beta_{17}}+e^{-2.\,\beta_{17}}, 1+e^{-98.\,\beta_{17}}+e^{-96.\,\beta_{17}}\\ &+e^{-77.\,\beta_{17}}+e^{-23.\,\beta_{17}}+e^{-22.\,\beta_{17}}+e^{-14.\,\beta_{17}}+e^{-12.\,\beta_{17}}, 1+e^{-136.\,\beta_{17}}+e^{-134.\,\beta_{17}}+e^{-115.\,\beta_{17}}\\ &+e^{-61.\,\beta_{17}}+e^{-60.\,\beta_{17}}+e^{-52.\,\beta_{17}}+e^{-50.\,\beta_{17}}+e^{-38.\,\beta_{17}}, 1+e^{-140.\,\beta_{17}}+e^{-138.\,\beta_{17}}+e^{-119.\,\beta_{17}}\\ &+e^{-65.\,\beta_{17}}+e^{-64.\,\beta_{17}}+e^{-56.\,\beta_{17}}+e^{-54.\,\beta_{17}}+e^{-42.\,\beta_{17}}+e^{-4.\,\beta_{17}}\Big]\end{aligned} \tag{13}$$

```
>
> Lambda
```

$:= unapply\left(\frac{1}{Z}\left(sum\left(\frac{\text{alpha}[j]}{\text{beta}[j]}\cdot(1-\exp(-\text{beta}[j]\cdot(T[n+1]-T[n])))\cdot A(j,n), j=1..P\right)\right), P, n\right)$

$$\Lambda := (P,n) \mapsto \frac{\sum_{j=1}^{P} \frac{\alpha_j \left(1-e^{-\beta_j (T_{n+1}-T_n)}\right)\left(1+\left(\sum_{k=0}^{n-1} e^{-\beta_j (T_n - T_k)}\right)\right)}{\beta_j}}{Z} \tag{14}$$

> $LambdaS$

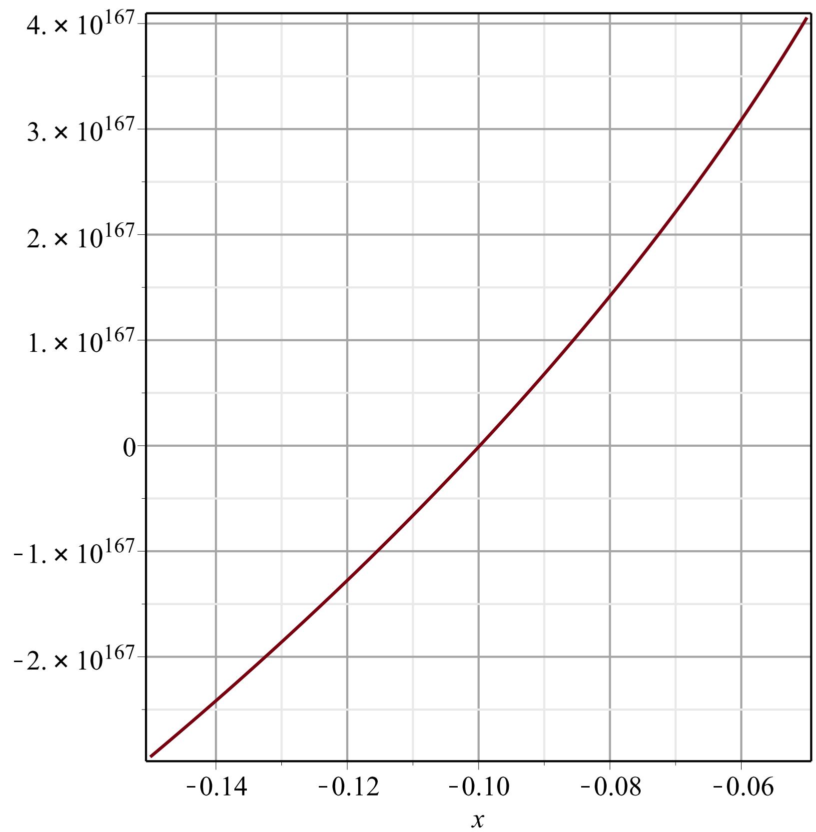
$:= unapply\left(\frac{1}{Z}\left(sum\left(\frac{\text{alpha}[j]}{\text{beta}[j]}\cdot(1-\exp(-\text{beta}[j]\cdot(T[n+1]-T[n])))\cdot aye(j, n), j=1..P\right)\right), P, n\right)$

$$LambdaS := (P,n) \mapsto \frac{\sum_{j=1}^{P} \frac{\alpha_j \left(1-e^{-\beta_j (T_{n+1}-T_n)}\right) aye(j,n)}{\beta_j}}{Z} \tag{15}$$

> $evalf(eval(eval(eval(eval(solve(\text{Lambda}(16,n)=y, T[n+1]), n=9), times), ps1), y=1))$

$$240.2849923 \tag{16}$$

> $pgl\big((-7.735394640\ 10^{79}\ e^{205} + 1.023421385\ 10^{78}\ e^{353.4657463\ \_Z}\ e^{149}$
$+ 1.023421385\ 10^{78}\ e^{353.4657463\ \_Z}\ e^{151} + 1.023421385\ 10^{78}\ e^{353.4657463\ \_Z}\ e^{163}$
$+ 1.023421385\ 10^{78}\ e^{353.4657463\ \_Z}\ e^{65} + 1.023421385\ 10^{78}\ e^{353.4657463\ \_Z}\ e^{67}$
$+ 1.023421385\ 10^{78}\ e^{353.4657463\ \_Z}\ e^{86} + 1.023421385\ 10^{78}\ e^{353.4657463\ \_Z}\ e^{140}$
$+ 1.023421385\ 10^{78}\ e^{353.4657463\ \_Z}\ e^{201} + 1.023421385\ 10^{78}\ e^{353.4657463\ \_Z}\ e^{141}$
$+ 1.012997717\ 10^{79}\ e^{0.05318955208\ \_Z}\ e^{205} + 1.018395768\ 10^{79}\ e^{0.02554364775\ \_Z}\ e^{205}$
$+ 6.905651712\ 10^{78}\ e^{117.8219154\ \_Z}\ e^{205} + 1.021003312\ 10^{79}\ e^{0.01226703205\ \_Z}\ e^{205}$
$- 1.023421385\ 10^{78}\ e^{151} - 1.023421385\ 10^{78}\ e^{65} - 1.023421385\ 10^{78}\ e^{67}$
$- 1.023421385\ 10^{78}\ e^{86} - 1.023421385\ 10^{78}\ e^{163} - 1.023421385\ 10^{78}\ e^{201}$
$- 1.023421385\ 10^{78}\ e^{140} - 1.023421385\ 10^{78}\ e^{141} - 1.023421385\ 10^{78}\ e^{149}$
$+ 7.112514665\ 10^{78}\ e^{2.082300564\ \_Z}\ e^{205} + 8.513636350\ 10^{78}\ e^{\_Z}\ e^{205}$
$+ 5.189371679\ 10^{78}\ e^{4.335975638\ \_Z}\ e^{205} + 3.301767694\ 10^{78}\ e^{9.028804515\ \_Z}\ e^{205}$
$+ 9.793452579\ 10^{78}\ e^{0.2306286021\ \_Z}\ e^{205} + 1.001893058\ 10^{79}\ e^{0.1107566343\ \_Z}\ e^{205}$
$+ 9.347763594\ 10^{78}\ e^{0.4802380682\ \_Z}\ e^{205} + 1.023421385\ 10^{78}\ e^{353.4657463\ \_Z}\ e^{205}$
$+ 2.139621465\ 10^{78}\ e^{18.80068473\ \_Z}\ e^{205} + 1.696597543\ 10^{78}\ e^{39.14867640\ \_Z}\ e^{205}$
$+ 1.430320876\ 10^{78}\ e^{81.51931096\ \_Z}\ e^{205} + 1.173319276\ 10^{78}\ e^{169.7477071\ \_Z}\ e^{205}), -0.15 ..$
$-0.05\big)$



> $$solve\Big(\big(-7.735394640\ 10^{79}\ e^{205} + 1.023421385\ 10^{78}\ e^{353.4657463\ \_Z}\ e^{149} + 1.023421385\ 10^{78}\ e^{353.4657463\ \_Z}\ e^{151} + 1.023421385\ 10^{78}\ e^{353.4657463\ \_Z}\ e^{163} + 1.023421385\ 10^{78}\ e^{353.4657463\ \_Z}\ e^{65} + 1.023421385\ 10^{78}\ e^{353.4657463\ \_Z}\ e^{67} + 1.023421385\ 10^{78}\ e^{353.4657463\ \_Z}\ e^{86} + 1.023421385\ 10^{78}\ e^{353.4657463\ \_Z}\ e^{140} + 1.023421385\ 10^{78}\ e^{353.4657463\ \_Z}\ e^{201} + 1.023421385\ 10^{78}\ e^{353.4657463\ \_Z}\ e^{141} + 1.012997717\ 10^{79}\ e^{0.05318955208\ \_Z}\ e^{205} + 1.018395768\ 10^{79}\ e^{0.02554364775\ \_Z}\ e^{205} + 6.905651712\ 10^{78}\ e^{117.8219154\ \_Z}\ e^{205} + 1.021003312\ 10^{79}\ e^{0.01226703205\ \_Z}\ e^{205} - 1.023421385\ 10^{78}\ e^{151} - 1.023421385\ 10^{78}\ e^{65} - 1.023421385\ 10^{78}\ e^{67} - 1.023421385\ 10^{78}\ e^{86} - 1.023421385\ 10^{78}\ e^{163} - 1.023421385\ 10^{78}\ e^{201} - 1.023421385\ 10^{78}\ e^{140} - 1.023421385\ 10^{78}\ e^{141} - 1.023421385\ 10^{78}\ e^{149} + 7.112514665\ 10^{78}\ e^{2.082300564\ \_Z}\ e^{205} + 8.513636350\ 10^{78}\ e^{\_Z}\ e^{205} + 5.189371679\ 10^{78}\ e^{4.335975638\ \_Z}\ e^{205} + 3.301767694\ 10^{78}\ e^{9.028804515\ \_Z}\ e^{205} + 9.793452579\ 10^{78}\ e^{0.2306286021\ \_Z}\ e^{205} + 1.001893058\ 10^{79}\ e^{0.1107566343\ \_Z}\ e^{205} + 9.347763594\ 10^{78}\ e^{0.4802380682\ \_Z}\ e^{205} + 1.023421385\ 10^{78}\ e^{353.4657463\ \_Z}\ e^{205} + 2.139621465\ 10^{78}\ e^{18.80068473\ \_Z}\ e^{205} + 1.696597543\ 10^{78}\ e^{39.14867640\ \_Z}\ e^{205} + 1.430320876\ 10^{78}\ e^{81.51931096\ \_Z}\ e^{205} + 1.173319276\ 10^{78}\ e^{169.7477071\ \_Z}\ e^{205} \big) = 0, \_Z \Big)$$

$$-0.09982577436 \tag{17}$$

> 205.0000000 - 353.4657463 ·**(17)**

$$240.2849918 \tag{18}$$

>

> *phi16* := *solve*(*LambdaS*(16, *n*), *T*[*n* + 1]) :

> phi := *unapply*(*sum*((exp(beta[*j*]·(−*t*)) − 1)·gamma(*P*, *j*)·'*A*'(*j*, *n*), *j* = 1 ..*P*) + y ·product(beta[j], j = 1 ..P)·Z, P, y, t, n)

$$\phi := (P, y, t, n) \mapsto \left(\sum_{j=1}^{P}\left(e^{-\beta_j t} - 1\right)\left(\prod_{k=1}^{P}\begin{cases}\alpha_k & j = k\\ \beta_k & otherwise\end{cases}\right) A(j, n)\right) + y\left(\prod_{j=1}^{P}\beta_j\right) Z \tag{19}$$

> *phidt* := *unapply*(*simp*(*diff*(phi(*P*, *y*, *t*, *n*), *t*)), *P*, *y*, *t*, *n*)

$$phidt := (P, y, t, n) \mapsto -\left(\sum_{j=1}^{P}\beta_j e^{-\beta_j t}\left(\prod_{k=1}^{P}\begin{cases}\alpha_k & j = k\\ \beta_k & otherwise\end{cases}\right)\left(1 + \left(\sum_{k=0}^{n-1} e^{\beta_j\left(-T_n + T_k\right)}\right)\right)\right) \tag{20}$$

> *phidelta* := *unapply*$\left(\frac{\text{phi}(P, y, t, n)}{phidt(P, y, t, n)}, P, y, t, n\right)$

$$phidelta := (P, y, t, n) \mapsto -\frac{\left(\sum_{j=1}^{P}\left(e^{-\beta_j t} - 1\right)\left(\prod_{k=1}^{P}\begin{cases}\alpha_k & j = k\\ \beta_k & otherwise\end{cases}\right)\left(1 + \left(\sum_{k=0}^{n-1} e^{-\beta_j\left(T_n - T_k\right)}\right)\right)\right) + y\left(\prod_{j=1}^{P}\beta_j\right) Z}{\sum_{j=1}^{P}\beta_j e^{-\beta_j t}\left(\prod_{k=1}^{P}\begin{cases}\alpha_k & j = k\\ \beta_k & otherwise\end{cases}\right)\left(1 + \left(\sum_{k=0}^{n-1} e^{\beta_j\left(-T_n + T_k\right)}\right)\right)} \tag{21}$$

> *Digits* := 20 :; *simp*(*eval*(*eval*(*phidelta*(16, 1, 40, 9), *ps1*), *times*)); *Digits* := 10 :

$$4.8963233710073894098 \tag{22}$$

> *Nphi* := *unapply*$\left(t - \frac{\text{phi}(P, y, t - T[n], n)}{phidt(P, y, t - T[n], n)}, P, y, t, n\right)$

$$Nphi := (P, y, t, n) \mapsto t + \left(\left(\sum_{j=1}^{P}\left(e^{-\beta_j\left(-T_n + t\right)} - 1\right)\left(\prod_{k=1}^{P}\begin{cases}\alpha_k & j = k\\ \beta_k & otherwise\end{cases}\right)\left(1 + \left(\sum_{k=0}^{n-1} e^{-\beta_j\left(T_n - T_k\right)}\right)\right)\right) + y\left(\prod_{j=1}^{P}\beta_j\right) Z\right) \Bigg/ \left(\sum_{j=1}^{P}\beta_j e^{-\beta_j\left(-T_n + t\right)}\left(\prod_{k=1}^{P}\begin{cases}\alpha_k & j = k\\ \beta_k & otherwise\end{cases}\right)\left(1 + \left(\sum_{k=0}^{n-1} e^{\beta_j\left(-T_n + T_k\right)}\right)\right)\right) \tag{23}$$

> Phi, phi

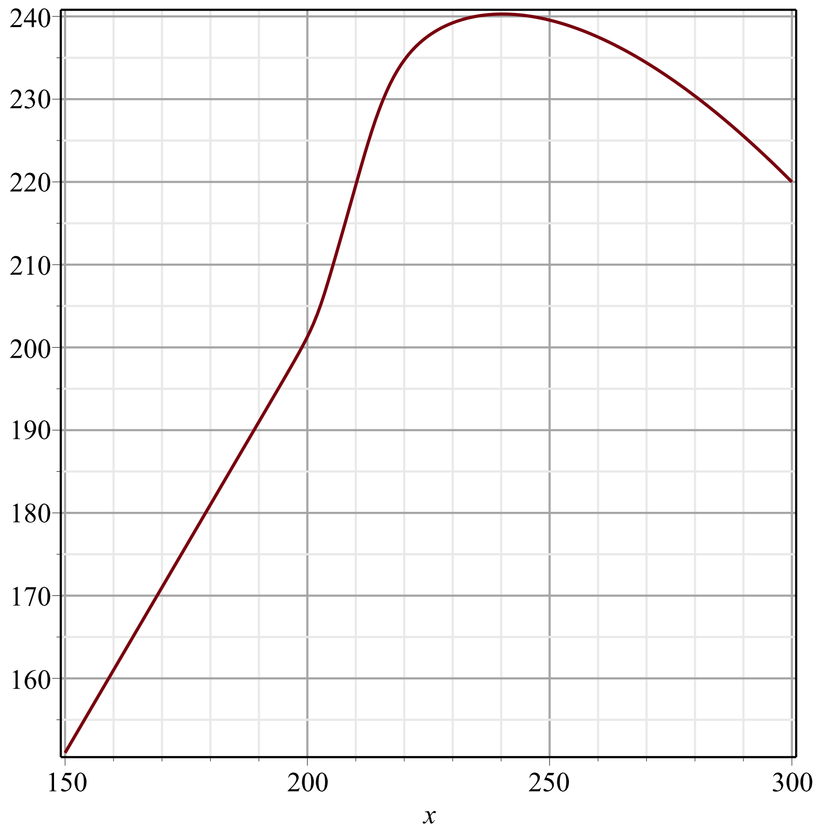
$$\Phi, \phi \tag{24}$$

> *Np* := *to1pf*(*simp*(*eval*(*eval*(*Nphi*(16, 1, *t*, 9), *ps1*), *times*)))

$$
\begin{aligned}
Np := t \mapsto \big(& -9.002294320\ 10^{-33} + 1.190748362\ 10^{-34}\ t\ \mathrm{e}^{205 - t} \\
& + 6.555990173\ 10^{-35}\ t\ \mathrm{e}^{98.44880396 - 0.4802380681\,t} \\
& + 3.838063439\ 10^{-35}\ t\ \mathrm{e}^{47.27886343 - 0.2306286021\,t} \\
& + 2.186321820\ 10^{-35}\ t\ \mathrm{e}^{22.70511003 - 0.1107566343\,t} \\
& + 1.324124388\ 10^{-35}\ t\ \mathrm{e}^{10.90385818 - 0.05318955210\,t} \\
& + 9.812844923\ 10^{-36}\ t\ \mathrm{e}^{5.236447789 - 0.02554364775\,t} \\
& + 7.406615205\ 10^{-36}\ t\ \mathrm{e}^{2.514741570 - 0.01226703205\,t} \\
& + 4.875113859\ 10^{-36}\ t\ \mathrm{e}^{1.207674633 - 0.005891095772\,t} \\
& + 2.802420280\ 10^{-36}\ t\ \mathrm{e}^{0.5799713329 - 0.002829128453\,t} \\
& + 1.477687081\ 10^{-36}\ t\ \mathrm{e}^{0.2785243125 - 0.001358655183\,t} \\
& + 7.434763587\ 10^{-37}\ t\ \mathrm{e}^{0.1337579777 - 0.0006524779402\,t} \\
& + 3.652660337\ 10^{-37}\ t\ \mathrm{e}^{0.06423567283 - 0.0003133447455\,t} \\
& + 1.773588936\ 10^{-37}\ t\ \mathrm{e}^{0.03084841542 - 0.0001504800752\,t} \\
& + 8.562836951\ 10^{-38}\ t\ \mathrm{e}^{0.01481458343 - 0.00007226626063\,t} \\
& + 4.122729325\ 10^{-38}\ t\ \mathrm{e}^{0.007114526927 - 0.00003470500940\,t} \\
& + 2.678236482\ 10^{-34}\ t\ \mathrm{e}^{68.33333333 - 0.3333333333\,t} + 1.190748362\ 10^{-34}\ t\ \mathrm{e}^{141 - t} \\
& + 1.190748362\ 10^{-34}\ t\ \mathrm{e}^{149 - t} + 1.190748362\ 10^{-34}\ t\ \mathrm{e}^{67 - t} + 1.190748362\ 10^{-34}\ t\ \mathrm{e}^{86 - t} \\
& + 1.190748362\ 10^{-34}\ t\ \mathrm{e}^{140 - t} + 1.190748362\ 10^{-34}\ t\ \mathrm{e}^{151 - t} \\
& + 1.190748362\ 10^{-34}\ t\ \mathrm{e}^{163 - t} + 1.190748362\ 10^{-34}\ t\ \mathrm{e}^{201 - t} \\
& + 1.190748362\ 10^{-34}\ t\ \mathrm{e}^{65 - t} + 1.190748362\ 10^{-34}\ \mathrm{e}^{141 - t} + 1.190748362\ 10^{-34}\ \mathrm{e}^{149 - t} \\
& + 1.190748362\ 10^{-34}\ \mathrm{e}^{67 - t} + 1.190748362\ 10^{-34}\ \mathrm{e}^{86 - t} + 1.190748362\ 10^{-34}\ \mathrm{e}^{140 - t} \\
& + 1.190748362\ 10^{-34}\ \mathrm{e}^{151 - t} + 1.190748362\ 10^{-34}\ \mathrm{e}^{163 - t} + 1.190748362\ 10^{-34}\ \mathrm{e}^{201 - t} \\
& + 6.037821683\ 10^{-34}\ \mathrm{e}^{2.514741570 - 0.01226703205\,t} \\
& + 3.841598906\ 10^{-34}\ \mathrm{e}^{5.236447789 - 0.02554364775\,t} \\
& + 2.489444516\ 10^{-34}\ \mathrm{e}^{10.90385818 - 0.05318955210\,t} \\
& + 1.973987230\ 10^{-34}\ \mathrm{e}^{22.70511003 - 0.1107566343\,t} + 1.190748362\ 10^{-34}\ \mathrm{e}^{205 - t} \\
& + 1.664174957\ 10^{-34}\ \mathrm{e}^{47.27886343 - 0.2306286021\,t} \\
& + 1.365154204\ 10^{-34}\ \mathrm{e}^{98.44880396 - 0.4802380681\,t} + 1.190748362\ 10^{-34}\ \mathrm{e}^{65 - t} \\
& + 1.178620449\ 10^{-33}\ \mathrm{e}^{0.03084841542 - 0.0001504800752\,t} \\
& + 1.184901070\ 10^{-33}\ \mathrm{e}^{0.01481458343 - 0.00007226626063\,t} \\
& + 1.165700205\ 10^{-33}\ \mathrm{e}^{0.06423567283 - 0.0003133447455\,t} \\
& + 1.139465893\ 10^{-33}\ \mathrm{e}^{0.1337579777 - 0.0006524779402\,t} \\
& + 8.275393996\ 10^{-34}\ \mathrm{e}^{1.207674633 - 0.005891095772\,t} \\
& + 1.087610086\ 10^{-33}\ \mathrm{e}^{0.2785243125 - 0.001358655183\,t} \\
& + 8.034709455\ 10^{-34}\ \mathrm{e}^{68.33333333 - 0.3333333333\,t} \\
& + 9.905595762\ 10^{-34}\ \mathrm{e}^{0.5799713329 - 0.002829128453\,t}
\end{aligned} \tag{25}
$$

$$+ 1.187934940\ 10^{-33}\ e^{0.007114526927 - 0.00003470500940\,t}\Big) \Big/ \Big(1.212557679\ 10^{-34}\ e^{205 - t}$$
$$+ 6.555990173\ 10^{-35}\ e^{98.44880396 - 0.4802380681\,t}$$
$$+ 3.838063439\ 10^{-35}\ e^{47.27886343 - 0.2306286021\,t}$$
$$+ 2.186321820\ 10^{-35}\ e^{22.70511003 - 0.1107566343\,t}$$
$$+ 1.324124388\ 10^{-35}\ e^{10.90385818 - 0.05318955210\,t}$$
$$+ 9.812844923\ 10^{-36}\ e^{5.236447789 - 0.02554364775\,t}$$
$$+ 7.406615205\ 10^{-36}\ e^{2.514741570 - 0.01226703205\,t}$$
$$+ 4.875113859\ 10^{-36}\ e^{1.207674633 - 0.005891095772\,t}$$
$$+ 2.802420280\ 10^{-36}\ e^{0.5799713329 - 0.002829128453\,t}$$
$$+ 1.477687081\ 10^{-36}\ e^{0.2785243125 - 0.001358655183\,t}$$
$$+ 7.434763587\ 10^{-37}\ e^{0.1337579777 - 0.0006524779402\,t}$$
$$+ 3.652660337\ 10^{-37}\ e^{0.06423567283 - 0.0003133447455\,t}$$
$$+ 1.773588936\ 10^{-37}\ e^{0.03084841542 - 0.0001504800752\,t}$$
$$+ 8.562836951\ 10^{-38}\ e^{0.01481458343 - 0.00007226626063\,t}$$
$$+ 4.122729325\ 10^{-38}\ e^{0.007114526927 - 0.00003470500940\,t}$$
$$+ 2.678236482\ 10^{-34}\ e^{68.33333333 - 0.3333333333\,t}\Big)$$

> $pgl(Np, 150..300)$



\>

\> *iterate*($t \to simp(Np(t))$, *eval*($T[9]$, *times*), 30)

$$[205, 209.3567721, 218.2683110, 233.1529494, 239.8030332, 240.2829835, 240.2849913, 240.2849914] \quad \textbf{(26)}$$

\> *simp*(*eval*(*eval*(phi(16, 1, t, 9), *ps1*), *times*))

$$9.905595762\ 10^{-34}\ e^{0.002829128453\,t} + 8.275393996\ 10^{-34}\ e^{0.005891095772\,t} + 6.037821683\ 10^{-34}\ e^{0.01226703205\,t} + 3.841598906\ 10^{-34}\ e^{0.02554364775\,t} + 2.489444516\ 10^{-34}\ e^{0.05318955210\,t} + 1.973987230\ 10^{-34}\ e^{0.1107566343\,t} + 1.664174957\ 10^{-34}\ e^{0.2306286021\,t} + 1.365154204\ 10^{-34}\ e^{0.4802380681\,t} + 1.187934940\ 10^{-33}\ e^{0.00003470500940\,t} + 8.034709455\ 10^{-34}\ e^{0.3333333333\,t} + 1.190748362\ 10^{-34}\ e^{t-119} + 1.190748362\ 10^{-34}\ e^{t-138} + 1.190748362\ 10^{-34}\ e^{t-4} + 1.190748362\ 10^{-34}\ e^{t-56} + 1.190748362\ 10^{-34}\ e^{t-64} + 1.190748362\ 10^{-34}\ e^{t} + 1.190748362\ 10^{-34}\ e^{-65+t} + 1.190748362\ 10^{-34}\ e^{t-54} + 1.190748362\ 10^{-34}\ e^{t-42} \quad \textbf{(27)}$$

$$- 9.002294320\ 10^{-33} + 1.139465893\ 10^{-33}\ e^{0.0006524779402\,t} + 1.165700205\ 10^{-33}\ e^{0.0003133447455\,t} + 1.178620449\ 10^{-33}\ e^{0.0001504800752\,t} + 1.184901070\ 10^{-33}\ e^{0.00007226626063\,t} + 1.087610086\ 10^{-33}\ e^{0.001358655183\,t} + 1.190748362\ 10^{-34}\ e^{-140 + t}$$

> $fsolve(\mathbf{(27)} = 0)$

$$-35.28499147 \tag{28}$$

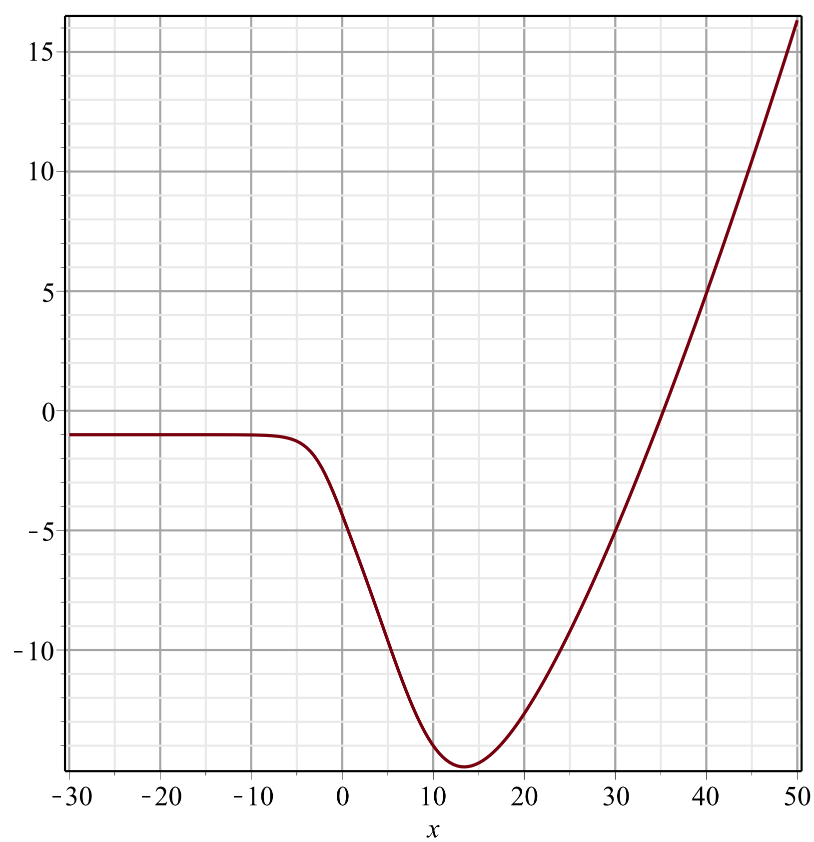
> $205 + \mathbf{(28)}$

$$240.2849915 \tag{29}$$

> $pd := to1pf(simp(eval(eval(phidelta(16, 1, t, 9), ps1), times)))$

$$pd := t \mapsto \big(-6.037821683\ 10^{-34}\ e^{-0.01226703205\,t} - 2.489444516\ 10^{-34}\ e^{-0.05318955210\,t} - 1.973987230\ 10^{-34}\ e^{-0.1107566343\,t} - 1.190748362\ 10^{-34}\ e^{-t-42} - 1.190748362\ 10^{-34}\ e^{-t-56} - 1.190748362\ 10^{-34}\ e^{-t-64} - 1.190748362\ 10^{-34}\ e^{-t-140} - 1.664174957\ 10^{-34}\ e^{-0.2306286021\,t} - 1.365154204\ 10^{-34}\ e^{-0.4802380681\,t} - 1.190748362\ 10^{-34}\ e^{-t-54} - 1.190748362\ 10^{-34}\ e^{-t-65} - 1.190748362\ 10^{-34}\ e^{-t-119} - 1.190748362\ 10^{-34}\ e^{-t-138} - 1.190748362\ 10^{-34}\ e^{-t-4} - 1.087610086\ 10^{-33}\ e^{-0.001358655183\,t} - 1.190748362\ 10^{-34}\ e^{-t} - 1.139465893\ 10^{-33}\ e^{-0.0006524779402\,t} - 3.841598906\ 10^{-34}\ e^{-0.02554364775\,t} - 1.178620449\ 10^{-33}\ e^{-0.0001504800752\,t} - 1.184901070\ 10^{-33}\ e^{-0.00007226626063\,t} + 9.002294320\ 10^{-33} - 8.034709455\ 10^{-34}\ e^{-0.3333333333\,t} - 1.187934940\ 10^{-33}\ e^{-0.00003470500940\,t} - 8.275393996\ 10^{-34}\ e^{-0.005891095772\,t} - 1.165700205\ 10^{-33}\ e^{-0.0003133447455\,t} - 9.905595762\ 10^{-34}\ e^{-0.002829128453\,t} \big) \Big/ \big(1.212557679\ 10^{-34}\ e^{-t} + 6.555990173\ 10^{-35}\ e^{-0.4802380681\,t} + 3.838063439\ 10^{-35}\ e^{-0.2306286021\,t} + 2.186321820\ 10^{-35}\ e^{-0.1107566343\,t} + 1.324124388\ 10^{-35}\ e^{-0.05318955210\,t} + 9.812844923\ 10^{-36}\ e^{-0.02554364775\,t} + 7.406615205\ 10^{-36}\ e^{-0.01226703205\,t} + 4.875113859\ 10^{-36}\ e^{-0.005891095772\,t} + 2.802420280\ 10^{-36}\ e^{-0.002829128453\,t} + 1.477687081\ 10^{-36}\ e^{-0.001358655183\,t} + 7.434763587\ 10^{-37}\ e^{-0.0006524779402\,t} + 3.652660337\ 10^{-37}\ e^{-0.0003133447455\,t} + 1.773588936\ 10^{-37}\ e^{-0.0001504800752\,t} + 8.562836951\ 10^{-38}\ e^{-0.00007226626063\,t} + 4.122729325\ 10^{-38}\ e^{-0.00003470500940\,t} + 2.678236482\ 10^{-34}\ e^{-0.3333333333\,t} \big) \tag{30}$$

> $pgl(pd, -30 .. 50)$



> $invLambda := (P, n, y) \to T[n] + RootOf(\mathrm{phi}(\mathrm{P}, \mathrm{y}, \mathrm{t}, \mathrm{n}), \mathrm{t})$

$$invLambda := (P, n, y) \mapsto T_n + RootOf(\phi(P, y, t, n), t) \tag{31}$$

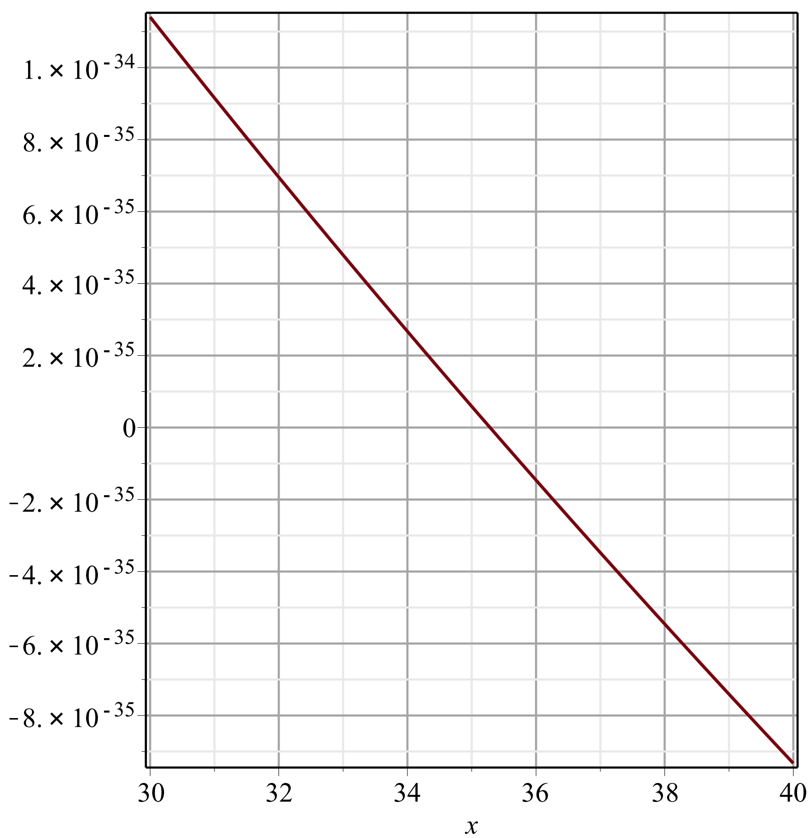
> $eval\left(\dfrac{\mathrm{phi}(P, y, t, n)}{phid(P, y, t, n)}\right)$

> $eval(eval(invLambda(16, 9, 1), ps1), times)$

$$\begin{aligned}
&205 + RootOf\big(-9.000113380\ 10^{-33} - 1.190748362\ 10^{-34}\ \mathrm{e}^{-140} - 1.190748362\ 10^{-34}\ \mathrm{e}^{-138} \\
&\quad - 1.190748362\ 10^{-34}\ \mathrm{e}^{-119} + 1.190748362\ 10^{-34}\ \mathrm{e}^{-42}\ \mathrm{e}^{-_Z} \\
&\quad + 1.190748362\ 10^{-34}\ \mathrm{e}^{-4}\ \mathrm{e}^{-_Z} - 1.190748362\ 10^{-34}\ \mathrm{e}^{-42} - 1.190748362\ 10^{-34}\ \mathrm{e}^{-4} \\
&\quad + 1.184901070\ 10^{-33}\ \mathrm{e}^{-0.000072266260627174232156620276476268624 65\ _Z} \\
&\quad + 1.187934939\ 10^{-33}\ \mathrm{e}^{-0.0000347050093951805408601422885014185897 42_Z} \\
&\quad + 8.275393997\ 10^{-34}\ \mathrm{e}^{-0.0058910957720258241325482920374763785104_Z} \\
&\quad - 1.190748362\ 10^{-34}\ \mathrm{e}^{-56} - 1.190748362\ 10^{-34}\ \mathrm{e}^{-54} - 1.190748362\ 10^{-34}\ \mathrm{e}^{-65} \\
&\quad - 1.190748362\ 10^{-34}\ \mathrm{e}^{-64} + 1.190748362\ 10^{-34}\ \mathrm{e}^{-64}\ \mathrm{e}^{-_Z} \\
&\quad + 1.190748362\ 10^{-34}\ \mathrm{e}^{-56}\ \mathrm{e}^{-_Z} + 1.190748362\ 10^{-34}\ \mathrm{e}^{-54}\ \mathrm{e}^{-_Z} \\
&\quad + 1.190748362\ 10^{-34}\ \mathrm{e}^{-140}\ \mathrm{e}^{-_Z} + 1.190748362\ 10^{-34}\ \mathrm{e}^{-138}\ \mathrm{e}^{-_Z}
\end{aligned} \tag{32}$$

$$+ 1.190748362\ 10^{-34}\ \mathrm{e}^{-119}\ \mathrm{e}^{-\_Z} + 1.190748362\ 10^{-34}\ \mathrm{e}^{-65}\ \mathrm{e}^{-\_Z}$$
$$+ 1.664174958\ 10^{-34}\ \mathrm{e}^{-0.2306286020893060943267241254942328 4407\ \_Z}$$
$$+ 1.973987231\ 10^{-34}\ \mathrm{e}^{-0.1107566343248289786950112813112964 27698\ \_Z}$$
$$+ 1.165700204\ 10^{-33}\ \mathrm{e}^{-0.00031334474550208059951743583524739013510\ \_Z}$$
$$+ 1.190748362\ 10^{-34}\ \mathrm{e}^{-\_Z}$$
$$+ 6.037821682\ 10^{-34}\ \mathrm{e}^{-0.012267032046963884717348189620176689 9129\ \_Z}$$
$$+ 1.178620449\ 10^{-33}\ \mathrm{e}^{-0.00015048007524123895554964886216992144608\ \_Z}$$
$$+ 8.034709451\ 10^{-34}\ \mathrm{e}^{-0.33333333333333333333333333333333333333\ \_Z}$$
$$+ 2.489444516\ 10^{-34}\ \mathrm{e}^{-0.053189552101667483377280611088708706813\ \_Z}$$
$$+ 9.905595770\ 10^{-34}\ \mathrm{e}^{-0.0028291284527759997979462825404589261182\ \_Z}$$
$$+ 1.087610086\ 10^{-33}\ \mathrm{e}^{-0.0013586551826765372822917792248176448973\ \_Z}$$
$$+ 1.139465893\ 10^{-33}\ \mathrm{e}^{-0.00065247794019481026501866613194651284101\ \_Z}$$
$$+ 3.841598909\ 10^{-34}\ \mathrm{e}^{-0.025543647746451763677841903980777976968\ \_Z}$$
$$+ 1.365154204\ 10^{-34}\ \mathrm{e}^{-0.48023806813840372011863138653926576437\ \_Z})$$

> $pgl(op(op(2, \mathbf{(32)})), 30 ..40)$



> $op(1, \mathbf{(32)}) + fsolve(op(op(2, \mathbf{(32)}))=0)$

$$240.2849918 \tag{33}$$

>

> $eval(eval(eval(invLambda(4, 2, y), aye = A), ps1), times)$

$$\begin{aligned}
&86 + RootOf\big(0.01226703204\, e^{-_Z} + 0.01226888020\, e^{-0.4802380681384037201186313865392657 6437\,_Z} \\
&\quad + 0.01251706883\, e^{-0.2306286020893060943267241254942328 4407\,_Z} \\
&\quad + 0.01496109609\, e^{-0.1107566343248289786950112813112964 27698\,_Z} + 0.2495114317\, y \\
&\quad + 0.01226703204\, e^{-21}\, e^{-_Z} + 0.01226703204\, e^{-19}\, e^{-_Z} - 0.01226703204\, e^{-21} \\
&\quad - 0.01226703204\, e^{-19} - 0.05201407717\big)
\end{aligned} \tag{34}$$

> $eval(eval(eval(invLambda(16, 9, 1), aye = A), ps1), times)$

$$\begin{aligned}
&205 + RootOf\big(-9.000113380\, 10^{-33} - 1.190748362\, 10^{-34}\, e^{-140} - 1.190748362\, 10^{-34}\, e^{-138} \\
&\quad - 1.190748362\, 10^{-34}\, e^{-119} + 1.190748362\, 10^{-34}\, e^{-42}\, e^{-_Z} \\
&\quad + 1.190748362\, 10^{-34}\, e^{-4}\, e^{-_Z} - 1.190748362\, 10^{-34}\, e^{-42} - 1.190748362\, 10^{-34}\, e^{-4} \\
&\quad + 1.184901070\, 10^{-33}\, e^{-0.00007226626062717423215662027647626862465\,_Z} \\
&\quad + 1.187934939\, 10^{-33}\, e^{-0.00003470500939518054086014228850141858 9742\,_Z} \\
&\quad + 8.275393997\, 10^{-34}\, e^{-0.00589109577202582413254829203747637 85104\,_Z} \\
&\quad - 1.190748362\, 10^{-34}\, e^{-56} - 1.190748362\, 10^{-34}\, e^{-54} - 1.190748362\, 10^{-34}\, e^{-65} \\
&\quad - 1.190748362\, 10^{-34}\, e^{-64} + 1.190748362\, 10^{-34}\, e^{-64}\, e^{-_Z} \\
&\quad + 1.190748362\, 10^{-34}\, e^{-56}\, e^{-_Z} + 1.190748362\, 10^{-34}\, e^{-54}\, e^{-_Z} \\
&\quad + 1.190748362\, 10^{-34}\, e^{-140}\, e^{-_Z} + 1.190748362\, 10^{-34}\, e^{-138}\, e^{-_Z} \\
&\quad + 1.190748362\, 10^{-34}\, e^{-119}\, e^{-_Z} + 1.190748362\, 10^{-34}\, e^{-65}\, e^{-_Z} \\
&\quad + 1.664174958\, 10^{-34}\, e^{-0.2306286020893060943267241254942328 4407\,_Z} \\
&\quad + 1.973987231\, 10^{-34}\, e^{-0.1107566343248289786950112813112964 27698\,_Z} \\
&\quad + 1.165700204\, 10^{-33}\, e^{-0.00031334474550208059951743583524739013510\,_Z} \\
&\quad + 1.190748362\, 10^{-34}\, e^{-_Z} \\
&\quad + 6.037821682\, 10^{-34}\, e^{-0.01226703204696388471734818962017668 99129\,_Z} \\
&\quad + 1.178620449\, 10^{-33}\, e^{-0.00015048007524123895554964886216992144608\,_Z} \\
&\quad + 8.034709451\, 10^{-34}\, e^{-0.33333333333333333333333333333333333333\,_Z} \\
&\quad + 2.489444516\, 10^{-34}\, e^{-0.05318955210166748337728061108870870 6813\,_Z} \\
&\quad + 9.905595770\, 10^{-34}\, e^{-0.00282912845277599979794628254045892 61182\,_Z} \\
&\quad + 1.087610086\, 10^{-33}\, e^{-0.00135865518267653728229177922481764 48973\,_Z} \\
&\quad + 1.139465893\, 10^{-33}\, e^{-0.00065247794019481026501866613194651284101\,_Z} \\
&\quad + 3.841598909\, 10^{-34}\, e^{-0.02554364774645176367784190398077797 6968\,_Z} \\
&\quad + 1.365154204\, 10^{-34}\, e^{-0.4802380681384037201186313865392657 6437\,_Z}\big)
\end{aligned} \tag{35}$$

>

> $op(1, \mathbf{(35)}) + fsolve(op(op(2, \mathbf{(35)}))=0, \_Z)$

$$240.2849918 \tag{36}$$

>

>

>

>

>

> $flist(n \to simp(eval(eval(\mathrm{Lambda}(16, n), ps1), times)), 0..9)$

$$\Big[0.2382488394, 0.8140372164, 0.7691873660, 0.1474944401, 0.7851261447, 0.2871643820, 0.8965467740, 0.9641748823, 0.3811080680, -0.1586138394\, e^{-0.02554364775\, T_{10} + 5.236447789} - 0.2492925738\, e^{-0.01226703205\, T_{10} + 2.514741570} - 0.3416785683\, e^{-0.005891095772\, T_{10} + 1.207674633} - 0.4089871466\, e^{-0.002829128453\, T_{10} + 0.5799713329} - 0.4490578422\, e^{-0.001358655183\, T_{10} + 0.2785243125} - 0.4704683248\, e^{-0.0006524779402\, T_{10} + 0.1337579777} - 0.4813000775\, e^{-0.0003133447455\, T_{10} + 0.06423567283} - 0.4866346518\, e^{-0.0001504800752\, T_{10} + 0.03084841542} - 0.4892278256\, e^{-0.00007226626063\, T_{10} + 0.01481458343} - 0.4904804649\, e^{-0.00003470500940\, T_{10} + 0.007114526927} - 0.3317410658\, e^{-0.3333333333\, T_{10} + 68.33333333} - 0.04916420846\, e^{-T_{10} + 140} - 0.04916420846\, e^{-T_{10} + 67} - 0.04916420846\, e^{-T_{10} + 65} - 0.04916420846\, e^{-T_{10} + 141} - 0.04916420846\, e^{-T_{10} + 149} - 0.04916420846\, e^{-T_{10} + 86} - 0.04916420846\, e^{-T_{10} + 163} - 0.04916420846\, e^{-T_{10} + 201} - 0.04916420846\, e^{-T_{10} + 205} - 0.1027854188\, e^{-0.05318955210\, T_{10} + 10.90385818} - 0.08150296299\, e^{-0.1107566343\, T_{10} + 22.70511003} - 0.06871128034\, e^{-0.2306286021\, T_{10} + 47.27886343} - 0.04916420846\, e^{-T_{10} + 151} + 4.716911889 - 0.05636516328\, e^{-0.4802380681\, T_{10} + 98.44880396}\Big] \tag{37}$$

> $simp((\mathbf{37})[10])$

$$-0.1586138394\, e^{-0.02554364775\, T_{10} + 5.236447789} - 0.2492925738\, e^{-0.01226703205\, T_{10} + 2.514741570} - 0.3416785683\, e^{-0.005891095772\, T_{10} + 1.207674633} \tag{38}$$

$$- 0.4089871466\, e^{-0.002829128453\, T_{10} + 0.5799713329}$$
$$- 0.4490578422\, e^{-0.001358655183\, T_{10} + 0.2785243125}$$
$$- 0.4704683248\, e^{-0.0006524779402\, T_{10} + 0.1337579777}$$
$$- 0.4813000775\, e^{-0.0003133447455\, T_{10} + 0.06423567283}$$
$$- 0.4866346518\, e^{-0.0001504800752\, T_{10} + 0.03084841542}$$
$$- 0.4892278256\, e^{-0.00007226626063\, T_{10} + 0.01481458343}$$
$$- 0.4904804649\, e^{-0.00003470500940\, T_{10} + 0.007114526927}$$
$$- 0.3317410658\, e^{-0.3333333333\, T_{10} + 68.33333333} - 0.04916420846\, e^{-T_{10} + 140}$$
$$- 0.04916420846\, e^{-T_{10} + 67} - 0.04916420846\, e^{-T_{10} + 65} - 0.04916420846\, e^{-T_{10} + 141}$$
$$- 0.04916420846\, e^{-T_{10} + 149} - 0.04916420846\, e^{-T_{10} + 86} - 0.04916420846\, e^{-T_{10} + 163}$$
$$- 0.04916420846\, e^{-T_{10} + 201} - 0.04916420846\, e^{-T_{10} + 205}$$
$$- 0.1027854188\, e^{-0.05318955210\, T_{10} + 10.90385818}$$
$$- 0.08150296299\, e^{-0.1107566343\, T_{10} + 22.70511003}$$
$$- 0.06871128034\, e^{-0.2306286021\, T_{10} + 47.27886343} - 0.04916420846\, e^{-T_{10} + 151}$$
$$+ 4.716911889 - 0.05636516328\, e^{-0.4802380681\, T_{10} + 98.44880396}$$

> *times*

$$\{T_0 = 65, T_1 = 67, T_2 = 86, T_3 = 140, T_4 = 141, T_5 = 149, T_6 = 151, T_7 = 163, T_8 = 201, T_9 = 205\} \quad \textbf{(39)}$$

> $fsolve(\mathbf{(37)}[10] = 1, T[10] = 0..500)$

$$240.2849917 \quad \textbf{(40)}$$

> $(\mathbf{(40)} - \mathbf{(18)})$

$$-1.\, 10^{-7} \quad \textbf{(41)}$$

>

>

> $eval(\mathbf{(38)}, T[10] = \mathbf{(40)})$

$$1.000000001 \quad \textbf{(42)}$$

>