```
> 
```
a_n = a_{n-1} +8a_{n-2} -12a_{n-3} +25(-3)^{n-2} + 32n^2 -64n
```
> restart;
> rec := a(n) = a(n-1) + 8·a(n-2) - 12·a(n-3) + 25·(-3)^{n-2} + 32·n^2 - 64·n
```

$$rec := a(n) = a(n-1) + 8\,a(n-2) - 12\,a(n-3) + 25\,(-3)^{n-2} + 32\,n^2 - 64\,n \qquad \textbf{(1)}$$

```
> ICs := a(0) = 130, a(1) = 215, a(2) = 260;
```

$$ICs := a(0) = 130, a(1) = 215, a(2) = 260 \qquad \textbf{(2)}$$

The solution to the recursion is a(k) = ak below:

```
> ak := rsolve({rec, ICs}, a(k));
```

$$ak := -6\,(-3)^k + \left(-\frac{61}{2}\,k - \frac{61}{2}\right) 2^k + 36\,k + 119 + (k+1)\,(-3)^k + \left(\frac{61}{2}\,k + \frac{61}{2}\right) 2^k \qquad \textbf{(3)}$$

$$+ 16\,(k+1)\left(\frac{1}{2}\,k + 1\right)$$

```
> rsolve({rec, ICs}, a, 'genfunc'(z)) :
> expand(%) :
> Az := convert(%, parfrac, z);
```

$$Az := -\frac{83}{-1+z} - \frac{6}{1+3z} - \frac{16}{(-1+z)^3} + \frac{36}{(-1+z)^2} + \frac{1}{(1+3z)^2} \qquad \textbf{(4)}$$

```
> series(Az, z = 0, 6);
```

$$130 + 215\,z + 260\,z^2 + 441\,z^3 + 422\,z^4 + 635\,z^5 + O(z^6) \qquad \textbf{(5)}$$

A(z) = Az is the generating function of the sequence a(k).

```
> 
```