Newton Backward Interpolation Method

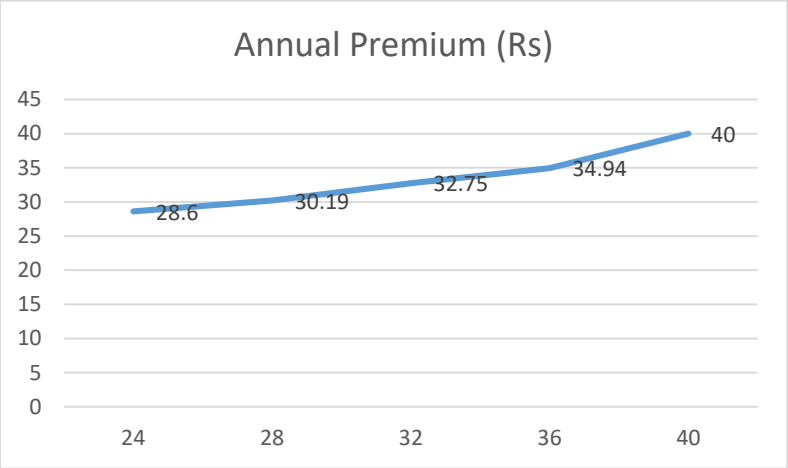
$$y = y_n + \frac{v}{1!}\Delta y_{n-1} + \frac{v(v+1)}{2!}\Delta^2 y_{n-2} + \frac{v(v+1)(v+2)}{3!}\Delta^3 y_{n-3} + \ldots\ldots + \frac{v(v+1)(v+2)\ldots(v+n+1)}{n!}\Delta^n y_0$$

Now, $v = \frac{x-xn}{h}$

Example 1:

Age (Years)	Annual Premium
24	28.06
28	30.19
32	32.75
36	34.94
40	40

Using Newton's Backward Interpolation Formula, find out the annual premium at the age of 33.



Can we apply Newton Forward Interpolation Method? Yes.
Why? Because $x_1-x_0 = x_2-x_1 = x_3-x_2 = x_n - x_{n-1} = h = 4$

	A	B	C	D	E	F	G	H
1		x= 33						
2		h= 4						
3		v= -1.75						
4	Age in years		Annual Premium (Rs)					
5	x_0	24	y_0	28.06	Δy	$\Delta^2 y$	$\Delta^3 y$	$\Delta^4 y$
6					2.13			
7	x_1	28	y_1	30.19		0.43		
8					2.56		-0.8	
9	x_2	32	y_2	32.75		-0.37	$\Delta^4 y_{n-4}$ =	4.04
10					2.19	$\Delta^3 y_{n-3}$ =	3.24	
11	x_3	36	y_3	34.94	Δy^2_{n-2} =	2.87		
12				Δy_{n-1} =	5.06			
13	x_4	40	$y_4 = \Delta y_n$ =	40				
14								
15		y= 33.27467						

$$y = y_n + \frac{v}{1!}\Delta y_{n-1} + \frac{v(v+1)}{2!}\Delta^2 y_{n-2} + \frac{v(v+1)(v+2)}{3!}\Delta^3 y_{n-3} + \ldots\ldots + \frac{v(v+1)(v+2)\ldots(v+n+1)}{n!}\Delta^n y_0$$

y = 33.27467