NEWTON INTERPOLATION METHOD:

- **FORWARD DIFFERENCE:**

Formula:

P=$\frac{x-x_o}{h}$

Y(x)=$y_o + p\Delta y_o + \frac{p(p-1)}{2!}.\Delta^2 y_o + \frac{p(p-1)(p-2)}{3!}.\Delta^3 y_o + \frac{p(p-1)(p-2)(p-3)}{4!}.\Delta^4 y_o$..

EXAMPLE:

Find solution using Newton's Forward Difference Formula

x	F(x)
1891	46
1901	66
1911	81
1921	93
1931	101

X=1895

SOLUTION:

The value of table for x and y

x	1891	1901	1911	1921	1931
y	46	66	81	93	101

Newton's forward difference table is

x	y	Δy	$\Delta^2 y$	$\Delta^3 y$	$\Delta^4 y$
1891	46				
		20			
1901	66		-5		
		15		2	
1911	81		-3		-3
		12		-1	
1921	93		-4		
		8			

1931	101				

The value of x at you want to find the f(x):x=1895

h=$x_1 - x_0$

=1901-1891=10

P=$\frac{x-x_o}{h}$=$\frac{1895-1891}{10}$=0.4

Newton's forward difference interpolation formula is

y(x)=$y_o + p\Delta y_o + \frac{p(p-1)}{2!}.\Delta^2 y_o + \frac{p(p-1)(p-2)}{3!}.\Delta^3 y_o + \frac{p(p-1)(p-2)(p-3)}{4!}.\Delta^4 y_o$

y (1895) =$46 + 0.4 \times 20 + \frac{0.4(0.4\times1)}{2} \times -5 + \frac{0.4(0.4-1)(0.4-2)}{6} \times 2 + \frac{0.4(0.4-1)(0.4-2)(0.4-3)\times-3}{24}$

y (1895) =46+8+0.6+0.128+0.1248

y (1895) =54.8528

Solution for newton's forward interpolation method y (1895) =54.8528