6) Using Newton's divided differences formula, evaluate *f(8)*

x:	4	5	7	10	11
f(x):	48	100	294	900	1210

Later, add a new data point f(13) = 2028 to the interpolated polynomial and evaluate f(12).

Formula

Newton's Divided Difference Interpolation formula

$$y(x) = y_0 + (x - x_0)f[x_0, x_1] + (x - x_0)(x - x_1)f[x_0, x_1, x_2] + \dots$$

$f[x_0,x_1]$ $f[x_0,x_1,x_2]$ $f[x_0,x_1,x_2,x_3]$ $f[x_0,x_1,x_2,x_3,x_4]$

X	f(x)	1ST ORDER	2 ORDER	3. ORDER	4. ORDER
4	48	52	$\frac{97-52}{7-4}=15$	$\frac{21-15}{10-4}=1$	$\frac{1-1}{11-4}=0$
5	100	97	$\frac{202-97}{10-5}=21$	$\frac{27-21}{11-5}=1$	
7	294	202	$\frac{310-202}{11-7}=27$		
10	900	310	$\frac{409-310}{13-10}=33$	$\frac{33-27}{13-7}=1$	$\frac{1-1}{13-4}=0$
11	1210	$\frac{2028-1210}{13-11}=409$			
13	2028				

$$y(x) = 48 + (x-4)\cdot 52 + (x-4)(x-5)\cdot 15 + (x-4)(x-5)(x-7)\cdot 1$$

$$y(8) = 448$$

FUNCTION $y(x)$ IS UNCHANGED DUE TO THE ADDED POINT.
THIS IS PROBABLY NOT A COINCIDENCE.
HOWEVER THE POINT IS PLOTTED IN MATLAB TO DOUBLE CHECK.