

Ex.  
#1, 2/139

Given the function

$$f(x) = x \ln x$$

Use Hermite interpolation to construct an approximating polynomial for the following data

x	f(x)	f'(x)
8.3	17.56492	3.116256
8.6	18.50575	3.151762

Use the Hermite polynomial to approximate  $f(8.4)$  and calculate the actual error.

x	f(x)	I <sup>st</sup> DD	II <sup>nd</sup> DD	III <sup>rd</sup> DD
8.3	17.56492			
8.3	17.56492	3.116256		
8.6	18.50575	3.1341	0.05948	
8.6	18.50575	3.151762	0.058873	-0.002022

$$H(x) = 17.56492 + 3.116256(x-8.3) +$$

$$+ 0.05948(x-8.3)^2 - 0.0020222(x-8.3)^2(x-8.6)$$

$$H(8.4) = 17.87714444$$

$$f(8.4) = 17.87714633$$

$$\text{Error} = 1.889134 \times 10^{-6}$$