TITULO

PRÁCTICA 1

FECHA

Hallar la serie de Taylor para la función dada en el punto indicado $x = a$

a) $f(x) = e^{3x}$; $a = 0$

Derivar $f(x)$	Evaluar $x=0$	
$f(x) = e^{3x}$	$f(0) = 1$	
$f'(x) = 3e^{3x}$	$f'(0) = 3$	$a_n = \frac{3^n}{n!}$
$f''(x) = 9e^{3x}$	$f''(0) = 9$	
$f'''(x) = 27e^{3x}$	$f'''(0) = 27$	
$f''''(x) = 81e^{3x}$	$f''''(0) = 81$	

$$f(x) = 1 + 3x + \left(\frac{9}{2}\right)x^2 + \left(\frac{27}{6}\right)x^3 + \left(\frac{81}{24}\right)x^4 + \dots$$

$$f(x) = \sum_{n=0}^{\infty} \left(\frac{3n}{n!}\right)x^n \longrightarrow f(x) = e^{3x} \text{ en } a = 0$$

b) $f(x) = \ln(2x)$; $a = \frac{1}{2}$

Derivar $f(x)$	Evaluar $x = \frac{1}{2}$	
$f(x) = \ln(2x)$	$f(1/2) = \ln(1) = 0$	
$f'(x) = 1/x$	$f'(1/2) = 1/(1/2) = 2$	$a_n = (-1)^{n+1} \cdot (n-1)!/2n$
$f''(x) = 1/x^2$	$f''(1/2) = -1/(1/2) = -4$	
$f'''(x) = 2/x^3$	$f'''(1/2) = 2/(1/2) = 16$	
$f''''(x) = 6/x^4$	$f''''(1/2) = -6/(1/2) = -96$	

$$f(x) = \sum_{n=0}^{\infty} (-1)^{(n+1)} \cdot (n-1)!/2^n \cdot (x - 1/2)^n$$

$$f(x) = 2(x - 1/2) - 2/2!\,(x - 1/2)^2 + 8/3!\,(x - 1/2)^3 - 32/4!\,(x - 1/2)^4 + \dots$$