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TAREA 4: SERIES de TAYLOR

1: e^x $a=2$

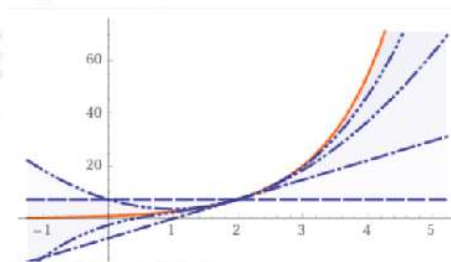
$$f'(x) = e^x \quad f'(2) = e^2$$

$$f''(x) = e^x \quad f''(2) = e^2$$

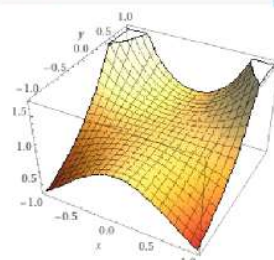
$$f'''(x) = e^x \quad f'''(2) = e^2$$

$$e^2 + \frac{e^2}{1}(x-2) + \frac{e^2}{2}(x-2)^2 + \frac{e^2}{6}(x-2)^3$$

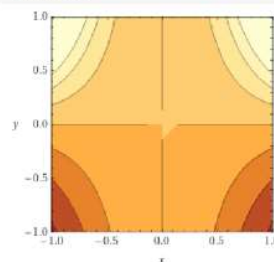
$$\sum_{n=0}^{\infty} \frac{e^2 (x-2)^n}{n!}$$



3D plot



Contour plot



2: a $f(x,y) = e^{xy}$, $(a,b) = (1,2)$

$$\frac{\partial f}{\partial x} = y e^{xy}$$

$$\frac{\partial f}{\partial y} = x e^{xy}$$

$$\frac{\partial^2 f}{\partial x^2} = y^2 e^{xy}$$

$$\frac{\partial^2 f}{\partial y^2} = x^2 e^{xy}$$

$$\frac{\partial^2 f}{\partial x \partial y} = x y e^{xy}$$

$$P_2(x,y) = e^2 + y e^2 (x-1) + e^2 (x-2) +$$

$$\frac{1}{2} (2 e^2 (x-1)^2 + 4 e^2 (x-1)(y-2) + e^2 (y-2)^2)$$

3: a

$$P_2(x) = e^2 + [(x-1), (y-2)] \cdot \begin{bmatrix} 2xy e^{xy} \\ x^2 e^{xy} \end{bmatrix} +$$

$$\frac{1}{2} [(x-1), (y-2)] \begin{bmatrix} 20e^2 & 6e^2 \\ 6e^2 & e^2 \end{bmatrix} \begin{bmatrix} (x-1) \\ (y-2) \end{bmatrix}$$