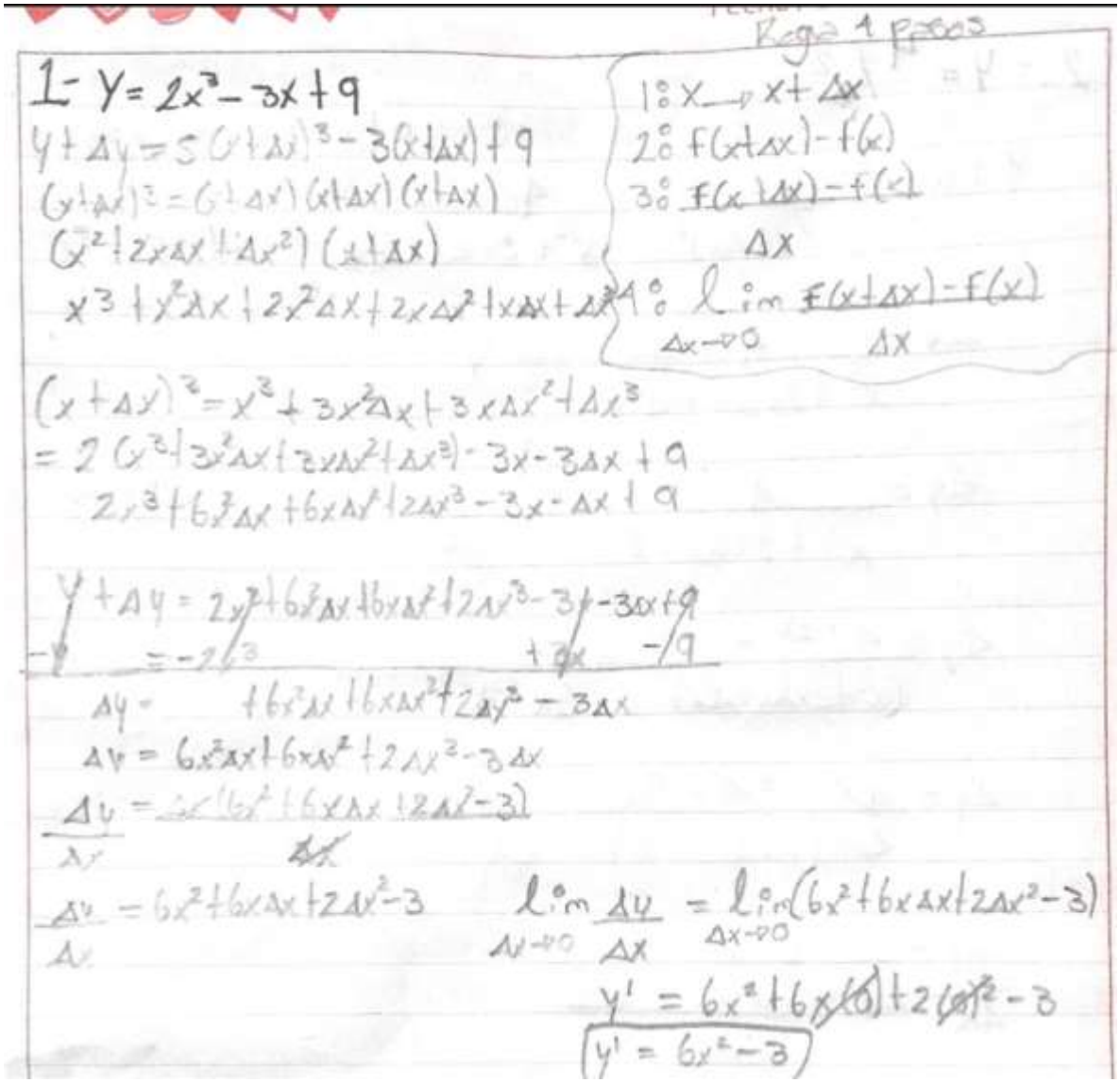
Alumna: Ingrid Anzueto.

NSTRUCCIONES: Resuelve de forma clara y correcta las siguientes derivadas, aplicando el método general (método de los cuatro pasos).



2.- $y = 4/x^2$

$$y + \Delta y = \frac{4}{(x+\Delta x)^2} = \frac{4}{x^2 + 2x\Delta x + \Delta^2 x}$$

$$\Delta y = \frac{4}{x^2 + 2x\Delta x + \Delta^2 x} - y$$

$$\Delta y = \frac{4}{x^2 + 2x\Delta x + \Delta^2 x} - \frac{4}{x^2}$$

$$\Delta y = \frac{4(x^2) - 4(x^2 + 2x\Delta x + \Delta^2 x)}{(x^2 + 2x\Delta x + \Delta^2 x)(x^2)}$$

$$\Delta y = \frac{4x^2 - 4x^2 - 8x\Delta x - 4\Delta^2 x}{(x^2 + 2x\Delta x + \Delta^2 x)(x^2)}$$

$$\frac{\Delta y}{\Delta x} = \frac{-8x\Delta x - 4\Delta^2 x}{(x^2 + 2x\Delta x + \Delta^2 x)(x^2)}$$

$$\frac{\Delta y}{\Delta x} = \frac{-8x\Delta x - 4\Delta^2 x}{\Delta x (x^2 + 2x\Delta x + \Delta^2 x)(x^2)}$$

$$\frac{\Delta y}{\Delta x} = \frac{\Delta x(-8x - 4\Delta x)}{\Delta x (x^2 + 2x\Delta x + \Delta^2 x)(x^2)}$$

$$\frac{\Delta y}{\Delta x} = \frac{-8x - 4\Delta x}{(x^2 + 2x\Delta x + \Delta^2 x)(x^2)}$$

$$\lim_{\Delta x \to 0} \frac{\Delta y}{\Delta x} = \lim_{\Delta x \to 0} \frac{-8x - 4\Delta x}{(x^2 + 2x\Delta x + \Delta^2 x)(x^2)}$$

$$= \frac{-8x - 4(0)}{(x^2 + 2x(0) + 0^2)(x^2)}$$

$$= \frac{-8x}{(x^2)(x^2)}$$

$$= \frac{-8x}{(x^2)^2}$$

3.- $y = 5/4+x^2 = 4+\Delta y = \frac{5}{4+(x+\Delta x)^2} = \frac{5}{4+(x^2+2x\Delta x+\Delta^2 x)}$

$$\Delta y = \frac{5}{4+x^2+2x\Delta x+\Delta^2 x} - 4$$

$$\Delta y = \frac{5}{4+x^2+2x\Delta x+\Delta^2 x} - \frac{5}{4+x^2}$$

$$\Delta y = \frac{5(4+x^2) - 5(4+x^2+2x\Delta x+\Delta^2 x)}{(4+x^2+2x\Delta x+\Delta^2 x)(4+x^2)}$$

$$\Delta y = \frac{5(2c+x^2) - 5(2c+x^2 - 10x\Delta x - 5\Delta^2 x)}{(4+x^2+2x\Delta x+\Delta^2 x)(4+x^2)}$$

$$\frac{\Delta y}{\Delta x} = \frac{\frac{-10x\Delta x - 5\Delta^2 x}{(4+x^2+2x\Delta x+\Delta^2 x)(4+x^2)}}{\frac{\Delta x}{1}}$$

$$\frac{\Delta y}{\Delta x} = \frac{-10x\Delta x - 5\Delta^2 x}{\Delta x(4+x^2+2x\Delta x+\Delta^2 x)(4+x^2)}$$

$$\frac{\Delta y}{\Delta x} = \frac{\Delta x(-10x - 5\Delta x)}{\Delta x(4+x^2+2x\Delta x+\Delta^2 x)(4+x^2)}$$

$$\frac{\Delta y}{\Delta x} = \frac{-10x - 5\Delta x}{(4+x^2+2x\Delta x+\Delta^2 x)(4+x^2)}$$

$$\lim_{\Delta x \to 0} \frac{\Delta y}{\Delta x} = \lim_{\Delta x \to 0} \frac{-10x - 5\Delta x}{(4+x^2+2x\Delta x+\Delta^2 x)(4+x^2)}$$

$$= \frac{-10x - 5(0)}{(4+x^2+2(x)(0)+0^2)(4+x^2)}$$

$$= \frac{-10x}{(4+x^2)(4+x^2)}$$

$$= \frac{-10x}{(4+x^2)^2}$$

4.- $y = x + 2/x = y + \Delta y = \frac{x+2}{x} = \frac{x+\Delta x+2}{x+\Delta x}$

$\Delta y = \frac{x+\Delta x+2}{x+\Delta x} - y$

$\Delta y = \frac{x+\Delta x+2}{x+\Delta x} - \frac{x+2}{x}$

$\Delta y = \frac{x^2+\Delta x+2(x) - x+2(x+\Delta x)}{(x+\Delta x)\quad (x)}$

$\Delta y = \frac{x^2+\Delta x^2+2x - x^2+\Delta x^2+2x+2\Delta x}{(x+\Delta x)\quad (x)}$

$\frac{\Delta y}{\Delta x} = \frac{\frac{2\Delta x}{(x+\Delta x)(x)}}{\frac{\Delta x}{1}}$

$\frac{\Delta y}{\Delta x} = \frac{\Delta x(2\Delta x)}{\Delta x(x+\Delta x)(x)}$

$\frac{\Delta y}{\Delta x} = \frac{2\Delta x}{\Delta x(x+\Delta x)(x)}$

$\lim_{\Delta x \to 0} \frac{\Delta y}{\Delta x} = \lim_{\Delta x \to 0} \frac{2\Delta x}{(x+\Delta x)(x)}$

$= \frac{2(0)}{(x+(0)(x)} = \frac{2}{(x)(x)} = \frac{2}{(x)^2}$

5.- $y=(a-bx)^2=(a-bx)(a-bx)=a^2+abx-abx^2-bx^2$

$=a^2+abx^2-bx^2$

$y+\Delta y=\dfrac{a^2+ab(x^2+2x\Delta x+\Delta^2x)-b(x^2+2x\Delta x+\Delta^2x)}{-b \qquad +b}$

$\Delta y=+ab(x^2+2x\Delta x+\Delta^2x)-(x^2+2x\Delta x+\Delta^2x)$

$\dfrac{\Delta y}{\Delta x}=\dfrac{\Delta x(ab(x^2+2x+\Delta x-x^2+2x+\Delta x)}{\Delta x}$

$\dfrac{\Delta y}{\Delta x}=abx^2+2x+\Delta x-x^2+2x+\Delta x$

$\lim_{\Delta x\to 0}\dfrac{\Delta y}{\Delta x}=\lim_{\Delta x\to 0}(abx^2+2x+\Delta x-x^2+2x+\Delta x)$

$y'=abx^2+2x+(0)-x^2+2x+(0)$

$y'=abx^2+2x-x^2+2x$

$y'=abx^2+2x^2-x^2$

6.- $y=2/x^2+4 \rightarrow y+\Delta y=\dfrac{2}{(x+\Delta x)^2+4}=\dfrac{2}{x^2+2x\Delta x+\Delta^2x+4}$

$\Delta y=\dfrac{2}{x^2+2x\Delta x+\Delta^2x+4}-y$

$\Delta y=\dfrac{2}{x^2+2x\Delta x+\Delta^2x+4}-\dfrac{2}{x^2+4}$

$\Delta y=\dfrac{2(x^2)-2(x^2+2x\Delta x+\Delta^2x+4)}{(x^2+2x\Delta x+\Delta^2x+4)(x^2+4)}$

$\Delta y=\dfrac{2x^2-2x^2-4x\Delta x-2\Delta^2x+4}{(x^2+2x\Delta x+\Delta^2x+4)(x^2+4)}$

$\Delta y=\dfrac{-4x\Delta x-2\Delta^2x+4}{(x^2+2x\Delta x+\Delta^2x+4)(x^2+4)}$

$\dfrac{\Delta x}{1}$

$\dfrac{\Delta y}{\Delta x}=\dfrac{-4x\Delta x-2\Delta^2x+4}{(x^2+2x\Delta x+\Delta^2x+4)(x^2+4)}=\dfrac{\Delta y}{\Delta x}=\dfrac{\Delta x(-4x-2\Delta x+4)}{\Delta x(x^2+2x+\Delta x+4)(x^2+4)}$

$\dfrac{\Delta y}{\Delta x}=\dfrac{-4x-2\Delta x+4}{(x^2+2x+\Delta x+4)(x^2+4)}=\lim_{\Delta x\to 0}\dfrac{\Delta y}{\Delta x}=\lim_{\Delta x\to 0}\dfrac{-4x-2\Delta x+4}{(x^2+2x+\Delta x+4)(x^2+4)}$

$=\dfrac{-4x-2(0)+4}{(x^2+2x(0)+0^2+4)(x^2+4)}=\dfrac{-4x+4}{(x^2+4)(x^2+4)}$

$=\dfrac{-4x+4}{}$

7.- $y=(1+2x)^2=(1+2x)(1+2x)$

$1+3x+3x+4x=1+3x^2+4x$

$y=1+3x^2+4x$

$y+\Delta y=\frac{1+3(x^2+2x\Delta x+\Delta^2x)+4x\Delta x}{-1 \quad -2x}$

$\Delta y=(3x^2+x\Delta x+\Delta^2x)+(4x\Delta x)$

$\frac{\Delta y}{\Delta x}=\frac{\Delta x(3x^2+x+\Delta x)+(4x)}{\Delta x}$

$\frac{\Delta y}{\Delta x}=3x^2+x+\Delta x+4x$

$\lim_{\Delta x\to 0}\frac{\Delta y}{\Delta x}=\lim_{\Delta x\to 0}(3x^2+x+\Delta x+4x)$

$y'=3x^2+x+(0)+4x$

$y'=3x^2+x+4x$

8.- $y = \frac{2-x}{x-2}$

$y + \Delta y = \frac{2-(x+\Delta x)}{(x+\Delta x)-2} - y$

$\Delta y = \frac{2-x-\Delta x}{x+\Delta x-2} - \frac{2-x}{x-2}$

$\Delta y = \frac{2(x-2) - 2-x(x+\Delta x-2)}{(x+\Delta x-2)(x-2)}$

$\Delta y = \frac{2x-4-2x-x\Delta x+4+2x+\Delta x-2x}{(x+\Delta x-2)(x-2)}$

$\frac{\Delta y}{\Delta x} = \frac{-4-\Delta x+4+\Delta x-}{(x+\Delta x-2)(x-2)}$

$\frac{\Delta x}{1}$

$\frac{\Delta y}{\Delta x} = \frac{-4-\Delta x+4+\Delta x}{(x+\Delta x-2)(x-2)} = \frac{\Delta y}{\Delta x} = \frac{\Delta x(-4+4)}{\Delta x(x-2)(x-2)}$

$\frac{\Delta y}{\Delta x} = \frac{-4+4}{(x-2)(x-2)} = \lim_{\Delta x \to 0} \frac{\Delta y}{\Delta x} = \lim_{\Delta x \to 0} \frac{-4+4}{(x-2)(x-2)}$

$= \frac{-4+4}{(x-2)^2}$