



Universidad autónoma del Estado de México.



Plantel Lic. Adolfo López Mateos de la escuela preparatoria.

Materia: Cálculo Diferencial

Docente: Dra. En TIE Leonila De la Rosa Delgado

## **EJERCICIOS REALIZADOS DURANTE EL SEMESTRE**

Equipo 3

Cadena López José Emiliano

Gómez Diego Jacobo

Ocampo Sánchez Ángel Emmanuel

Palma Barrera Sophia

Rodríguez Dávila Evelyn Daniela

Grupo: 26

Quinto semestre

Noviembre de 2024

$$f(x) = \sqrt{x^2 - 4}$$

x	$f(x) = \sqrt{x^2 - 4}$
2.1	0.64031
2.01	0.20025
2.001	0.06325
2.0001	0.02000
2.00001	0.00632

$$\lim_{x \rightarrow 1} \frac{|x + 1|}{x + 1}$$

$x \rightarrow -1^-$	$f(x) = \frac{ x + 1 }{x + 1}$	$x \rightarrow -1^+$	$f(x) = \frac{ x + 1 }{x + 1}$
-1.1	-1	-0.9	1
-1.01	-1	-0.99	1
-1.001	-1	-0.999	1
-1.0001	-1	-0.9999	1
-1.00001	-1	-0.99999	1

$$\lim_{x \rightarrow -2} f(x) \quad \text{si} \quad f(x) = \begin{cases} x^2 - 1 & \text{para } x < -2 \\ 2x + 7 & \text{para } x > -2 \end{cases}$$

$x \rightarrow -2^-$	$f(x) = x^2 - 1$	$x \rightarrow -2^+$	$f(x) = 2x + 7$
-2.2	3.84	-1.8	3.4
-2.1	3.41	-1.9	3.2
-2.01	3.04	-1.99	3.02
-2.001	3.004	-1.999	3.002
-2.0001	3.0004	-1.9999	3.0002
-2.00001	3.00004	-1.99999	3.00002

$$\begin{aligned}\lim_{x \rightarrow 4} (2x^2 + 2)^2 \\ &= (2(4)^2 + 2)^2 \\ &= 1156\end{aligned}$$

$$\begin{aligned}\lim_{x \rightarrow 1} \frac{x^3 - 2x^2 + x - 5}{4x + 3} \\ &= \frac{1^3 - 2(1)^2 + 1 - 5}{4(1) + 3} \\ &= \frac{-5}{7}\end{aligned}$$

$$\begin{aligned}\lim_{x \rightarrow 1} \frac{x^2 - 5x + 4}{3x + 2} \\ &= \frac{1^2 - 5(1) + 4}{3(1) + 2} \\ &= \frac{1 - 5 + 4}{5} \\ &= \frac{0}{5} \\ &= 0\end{aligned}$$

$$f(x) = x^2 + x + 6$$

$$\lim_{h \rightarrow 0} \frac{(x+h)^2 + (x+h) + 6(x^2 + x + 6)}{h}$$

$$\lim_{h \rightarrow 0} \frac{x^2 + 2xh + h^2 + x + h + 6 + x^2 + x + 6}{h}$$

$$\lim_{h \rightarrow 0} \frac{2xh + h^2 + h}{h}$$

$$\lim_{h \rightarrow 0} \frac{h(2x + h + 1)}{h}$$

$$= 2x + 1$$

$$f(x) = 2x^2 - x - 2$$

$$\lim_{h \rightarrow 0} \frac{2(x+h)^2 - (x+h) - 2(2x^2 - x - 2)}{h}$$

$$\lim_{h \rightarrow 0} \frac{2x^2 + 4xh + 2h^2 + x - h - 2 - 2x^2 - x + 2}{h}$$

$$\lim_{h \rightarrow 0} \frac{4xh + 2h^2 - h}{h}$$

$$\lim_{h \rightarrow 0} \frac{h(4x + 2h - 1)}{h + 1}$$

$$= 4x - 1$$

$$f(x) = x - 3$$

$$\lim_{h \rightarrow 0} \frac{(x + h) - 3(x - 3)}{h}$$

$$\lim_{h \rightarrow 0} \frac{x + h - 3 - x + 3}{h}$$

$$\lim_{h \rightarrow 0} \frac{h}{h}$$

$$= 1$$

$$f(x) = 2x + 2$$

$$\lim_{h \rightarrow 0} \frac{2(x + h) + 2(2x + 2)}{h}$$

$$\lim_{h \rightarrow 0} \frac{2x + 2h + 2 + 2x + 2}{h}$$

$$\lim_{h \rightarrow 0} \frac{2h}{h}$$

$$= 2$$

$$f(x) = 5 - 3x$$

$$\lim_{h \rightarrow 0} \left( \frac{5(5 - 3x) - 3(x + h)}{h} \right)$$

$$\lim_{h \rightarrow 0} \frac{5 + 5 - 3x - 3x - 3h}{h}$$

$$\lim_{h \rightarrow 0^+} \frac{-3h}{h}$$

$$= -3$$

$$f(x) = \frac{3}{4}x + \frac{1}{3}$$

$$\lim_{h \rightarrow 0} \frac{\frac{3}{4}(x+h) + \frac{1}{3} - \left(\frac{3}{4}x + \frac{1}{3}\right)}{h}$$

$$\lim_{h \rightarrow 0} \frac{\frac{3}{4}x + \frac{3}{4}h + \frac{1}{3} - \frac{3}{4}x - \frac{1}{3}}{h}$$

$$\lim_{h \rightarrow 0} \frac{\frac{3}{4}h}{h}$$

$$= \frac{3}{4}$$

$$8- f(x) = 3x^5 - 2x^3 + 4x - 5$$

$$f(x) = 15^4 - 6x^2 + 4$$

$$9- f(x) = 7x^{10} + 12x^7 - 5x^4 + 6$$

$$F(x) = 70x^9 + 84x^6 - 20x^3$$

$$11- f(x) = 6\sqrt{x}$$

$$F(x) = x^{1/6}$$

$$F(x) = 1/6 \times 1/6 - 1/6$$

$$F(x) = 1/6 - 5/6$$

$$F(x) = 1/6 \sqrt{x^6}$$

$$12- f(x) = \sqrt{x^7}$$

$$F(x) = x^{7/2}$$

$$F(x) = 7/2 \times 7/7 - 7/7$$

$$F(x) = 7/2 \sqrt{x^5}$$

$$13- f(x) = 2x6^4 + 4/5x^3 - 3x$$

$$F(x) = 12x^5 + 12/5x^2 - 3$$

$$15- f(x) = 38\sqrt{x^3} + 25\sqrt{x^2}$$

$$F(x) = 9/8 \times 3/8 - 8/8 + 4/5x^{3/5}$$

$$F(x) = 9/8x - 5/8 + 4/5x^{3/5}$$

$$F(x) = 9/88\sqrt{x^5} + 4/55\sqrt{x^3}$$

$$16- F(x) = 1/10x^{11}$$

$$F(x) = 1(-10)/x^{11}$$

$$F(x) = -10/x^{11}$$

$$1- F(x) = (x^2 - 1)(x + 1)$$

$$F(x) = (x^2 - 1)dx(x + 1) + (x + 1)dx(x^2 - 1)$$

$$F(x) = (x^2 - 1)(1) + (x + 1)(2x)$$

$$F(x) = 3x^2 + 2x - 1$$

$$2- F(x) = (5x^2 - x)(2x - 1)$$

$$F(x) = (5x^2 - x)dx(2x - 1) + (2x - 1)(5x^2 - x)$$

$$F(x) = (5x^2 - x)(2) + (2x - 1)(10x - 1)$$

$$F(x) = 30x^2 - 14x - 1$$

$$3- F(x) = (2x^3 - 3x^2 + 4x)(x^2 - x)$$

$$F(x) = (2x^3 - 3x^2 + 4x)dx(x^2 - x) + (x^2 - x)dx(2x^3 - 3x^2 + 4x)$$

$$F(x) = (2x^3 - 3x^2 + 4x)(2x - 1) + (x^2 - x)(6x^2 - 6x + 4)$$

$$F(x) = 10x^4 - 20x^3 - 21x^2 - 8x$$

$$f(x) = x^2 + x + 6$$

$$\lim \frac{(x+h)^2 + (x+h) + 6(x^2 + x + 6)}{h}$$

$$h \rightarrow 0$$

$$\lim \frac{x^2 + 2xh + h^2 + x + h + 6 + x^2 + x + 6}{h}$$

$$h \rightarrow 0$$

$$\lim \frac{2xh + h^2 + h}{h}$$

$$\lim \frac{h(2x + h + 1)}{h}$$

$$h \rightarrow 0$$

$$= 4 \times -1$$

$$h \rightarrow 0$$

$$f(x) = 2x^2 - x - 2$$

$$\lim \frac{2(x+h)^2 - (x+h) - 2(2x^2 - x - 2)}{h}$$

$$h \rightarrow 0$$

$$\lim \frac{2x^2 + 4xh + 2h^2 + x - h - 2 - 2x^2 - x + 2}{h}$$

$$h \rightarrow 0$$

$$\lim \frac{4xh + 2h^2 - h}{h}$$

$$\lim \frac{h(4x + 2h - 1)}{h}$$

$$h \rightarrow 0$$

$$= 4x - 1$$

$$h \rightarrow 0$$

$$8. f(x) = 3x^5 - 2x^3 + 4x - 5$$

$$f(x) = 15x^4 - 6x^2 + 4$$

$$15. f(x) = 3\sqrt[8]{x^3} + 2\sqrt[5]{x^2}$$

$$f(x) = 3x^{\frac{3}{8}} + 2x^{\frac{2}{5}}$$

$$9. f(x) = 7x^{10} + 12x^7 - 5x^4 + 6$$

$$f(x) = 70x^9 + 84x^6 - 20x^3$$

$$11. f(x) = 2x^6 + \frac{4}{5}x^3 - 3x$$

$$f(x) = 12x^5 + \frac{12}{5}x^2 - 3$$

$$12. f(x) = \sqrt[6]{x}$$

$$f(x) = x^{\frac{1}{6}}$$

$$f(x) = \frac{1}{6}x^{\frac{1}{6} - \frac{6}{6}}$$

$$f(x) = \frac{1}{6}x^{-\frac{5}{6}}$$

$$f(x) = \frac{1}{6x^{\frac{5}{6}}}$$

$$f(x) = \frac{1}{6\sqrt[6]{x^5}}$$

$$13. f(x) = \sqrt{x^7}$$

$$f(x) = x^{\frac{7}{2}}$$

$$f(x) = \frac{7}{2}x^{\frac{7}{2} - \frac{2}{2}}$$

$$f(x) = \frac{7}{2}x^{\frac{5}{2}}$$

$$f(x) = \frac{7}{2}\sqrt{x^5}$$

$$f(x) = \frac{9}{8}x^{\frac{3}{8} - \frac{8}{8}} + \frac{4}{5}x^{\frac{2}{5} - \frac{5}{5}}$$

$$f(x) = \frac{9}{8}x^{-\frac{5}{8}} + \frac{4}{5}x^{-\frac{3}{5}}$$

$$f(x) = \frac{9}{8x^{\frac{5}{8}}} + \frac{4}{5x^{\frac{3}{5}}}$$

$$f(x) = \frac{9}{8\sqrt[8]{x^5}} + \frac{4}{5\sqrt[5]{x^3}}$$

$$16. f(x) = \frac{1}{x^{10}}$$

$$f(x) = \frac{1}{10x^{11}}$$

$$f(x) = \frac{1(-10)}{x^{11}}$$

$$f(x) = \frac{-10}{x^{11}}$$

$$f(x) = \tan 3x$$

$$f'(x) = 3 \sec^2 3x$$

$$f''(x) = 6 \sec^2 3x \tan 3x$$

$$f(x) = \frac{1}{3} \int 6 \sec^2 3x \tan 3x \, dx$$

$$f(x) = 2 \sec^2 3x \tan 3x$$

$$f(x) = \frac{e^{3x-1}}{2}$$

$$f'(x) = \frac{e^{3x-1} \cdot 3 - 1}{2}$$

$$f''(x) = \frac{3e^{3x-1}}{2}$$

$$f(x) = \frac{1}{2} \int 3e^{3x-1} \, dx$$

$$f(x) = \frac{e^{3x-1}}{2}$$

$$y = \ln\sqrt{2x}$$

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

$$y = \frac{1 \left( \frac{1}{2x} \right) dx 2x}{2}$$

$$y = \frac{2^{x^1} \left( \frac{1}{2x} \right)}{2}$$

$$y' = \frac{1}{2x}$$

$$y = \frac{1 dx 2x - 2x dx 1}{2x^2}$$

$$y = \frac{1(2) - 2x}{2x^2}$$

$$y'' = \frac{-1}{2x^2}$$

$$y = \frac{2}{2x^3}$$

$$y = \frac{2 - 1}{2x^3}$$

$$f(x) = \sqrt{2x} - 1$$

$$f(x) = (2x - 1)^{\frac{1}{2}}$$

$$f(x) = \frac{1(2x - 1)^{-\frac{1}{2}} dx(2x - 1)}{2}$$

$$f(x) = \frac{1(2)}{2\sqrt{2x} - 1}$$

$$f'(x) = \frac{1}{\sqrt{2x} - 1}$$

$$f(x) = \frac{1}{dx\sqrt{2x} - 1}$$

$$f(x) = \frac{1(2x - 1)^{-\frac{1}{2}} \frac{2}{2} dx(2x - 1)}{2}$$

$$f(x) = -\frac{1(2)^{x^2}}{2\sqrt{2x} - 1^3}$$

$$f''(x) = \frac{1}{\sqrt{(2x - 1)^3}}$$

$$f(x) = \frac{3(2x - 1)^{-\frac{5}{2}} \frac{2}{2} dx(2x - 1)}{2}$$

$$f'''(x) = \frac{3}{\sqrt{(2x - 1)^5}}$$

$$f(x) = \frac{-15(2x - 1)^{-\frac{5}{2}} \frac{3}{2} dx(2x - 1)}{2}$$

$$f^{iv}(x) = \frac{-15(2)}{2\sqrt{(2x - 1)^7}}$$

$$f(x) = \frac{105(2x - 1)^{-\frac{7}{2}} \frac{2}{2} dx(2x - 1)}{2}$$

$$f(x) = \frac{105(2)}{2\sqrt{(2x - 1)^4}}$$

$$f^v(x) = \frac{105}{\sqrt{(2x-1)^4}}$$

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

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

$$f(x) = \frac{(4x)(4x^3 - 8x + 8) - (x^4 - 4x^2 + 8x)(4)}{(4x)^2}$$

$$f(x) = \frac{4x^4 - 32x^2 + 32x - 4x^4 + 8x^2 - 32x}{(4x)^2}$$

$$f(x) = \frac{-24x^2}{(4x)^2}$$

$$f(x) = \frac{-24x^2}{32x}$$

$$f(x) = \frac{-3x^2}{4x}$$

$$f(x) = \frac{3}{4}x^2 - 1$$

$$f(x) = \frac{3x^4}{6x^4 + 5x^3 - 4x^2}$$

$$f(x) = \frac{(6x^4 + 5x^3 - 4x^2)dx(3x^4)dx(6x^4 + 5x^3 - 4x^2)}{(6x^4 - 5x^3 - 4x^2)^2}$$

$$f(x) = \frac{(6x^4 + 5x^3 - 4x^2)(12x^3) - (3x^4)(24x^3 + 15x^2 - 8x)}{(6x^4 - 5x^3 - 4x^2)^2}$$

$$f(x) = \frac{72x^7 + 60x^6 - 48x^5 - 72x^7 - 45x^6 + 24x^5}{(6x^4 - 5x^3 - 4x^2)^2}$$

$$f(x) = \frac{15x^6 - 24x^5}{(6x^4 - 5x^3 - 4x^2)^2}$$

$$3^{xy} = x^2y^4 - 5$$

$$3^{xy} \ln 3 dx x y = x^2 dx y^4 + y^4 dx x^2$$

$$3^{xy} \ln 3 x dx y = x^2 4y^3 + y^4 + 2x$$

$$3^{xy} \ln 3 xy'' * y = 4x^2 y^3 y' + 2xy^4$$

$$3^{xy} x \ln 3 y'' - 4x^2 y^3 y'' = 2xy^4 - 3^{xy} y \ln 3$$

$$y'(3^{xy} x \ln 3 - 4x^2 y^3) = 2xy^4 - 3^{xy} y \ln 3$$

$$y'' = \frac{2xy^4 - 3^{xy} y \ln 3}{3^{xy} x \ln 3 - 4x^2 y^3}$$

$$\ln x^2 + 8xy = y^2$$

$$\frac{1}{x^2} * 2x + 8 x dx y + y dx 8x = 2 y y'$$

$$\frac{2}{x} + 8 x y' + 8y = 2 y y'$$

$$8xy' - 2 y y' = -\frac{2}{x} - 8y$$

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

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

$$2x^2 - 3y^2 + 12 = 0$$

$$dx2x^2 - dx3y^2 dx12 = 0$$

$$4x - 6y y' = 0$$

$$y'' = \frac{4x}{-6y}$$

$$y' = \frac{2x}{-3y}$$

$$e^{xy} + x + y = 6$$

$$e^{xy} dx xy + dx x + dxy = dx6$$

$$e^{xy} x dxy + y dxx + 1 + y' = 0$$

$$e^{xy} xy' + y1 + 1 + y' = 0$$

$$e^{xy} xy' + y' = -ye^{xy} - 1$$

$$y'(e^{xy}x + 1) = -ye^{xy} - 1$$

$$y' = \frac{-ye^{xy} - 1}{xe^{xy} + 1}$$

Obtener el valor de la recta tangente:

$$y = x^2 - 3x - 10 \quad \theta = 135$$

$$1. \tan 135 = -1 \quad m = -1$$

$$2. y' = 2x - 3$$

$$1 + 3 = 2x$$

$$4 = 2x$$

$$x = \frac{2}{4} \quad x = \frac{1}{2}$$

$$3. f\left(\frac{1}{2}\right) = \left(\frac{1}{2}\right)^2 - 3\left(\frac{1}{2}\right) - 10$$

$$f\left(\frac{1}{2}\right) = \frac{1}{4} - \frac{3}{2} - 10$$

$$f\left(\frac{1}{2}\right) = -\frac{5}{4} - 10 = -\frac{45}{4}$$

$$y = -\frac{45}{4}$$

#### 4. Recta tangente

$$y - \frac{45}{4} = -1\left(x - \frac{1}{2}\right)$$

$$-\frac{45}{4}y = -x + \frac{1}{2}$$

$$-\frac{45}{4} - \frac{1}{2}y + x = 0$$

$$y + x + \frac{45}{8} = 0$$

Determina los puntos en los cuales  $f(x) = 3x^2 - 6x + 1$  tiene su recta tangente paralela al eje x.

1.  $f(x) = 3x^2 - 6x + 1$

$$f(x) = 6x - 6$$

2.  $6x - 6 = 0$

$$6x = 0$$

$$6x = 6$$

$$x = \frac{6}{6}$$

$$x = 1$$

$$3. f(1) = 3(1)^2 - 6(1) + 1$$

$$f(1) = 3 - 6 + 1$$

$$f(1) = -2$$

$$y = -2$$

$$PT = (1, -2)$$