

Jonathan David Melgar Lopez

$$1: y = 2x^3 - 6x^2 - 7x + 11$$

$$2(x + \Delta x)^3 - 6(x + \Delta x)^2 - 7(x + \Delta x) + 11$$

$$2(x^3 + 3x^2\Delta x + 3x\Delta x^2 + \Delta x^3) - 6(x^2 + 2x\Delta x + \Delta x^2) - 7(x + \Delta x) + 11$$

$$\frac{2x^3}{2x^3} + \frac{6x^2\Delta x}{6x^2} + \frac{6x\Delta x^2}{6x^2} + \frac{2\Delta x^3}{6x^2} - \frac{6x^2}{6x^2} + \frac{12x\Delta x}{6x^2} + \frac{6\Delta x^2}{6x^2} - \frac{7x + x\Delta x}{7x}$$

$$\frac{\Delta y}{\Delta x} = \frac{6x^2\Delta x}{\Delta x} + \frac{6x\Delta x^2}{\Delta x} + \frac{2\Delta x}{\Delta x} + \frac{12x\Delta x}{\Delta x} + \frac{6\Delta x^2}{\Delta x} + \frac{7\Delta x}{\Delta x}$$

$$\frac{\Delta y}{\Delta x} = 6x^2 + 6x\Delta x + 2\Delta x + 12x + 6\Delta x + 7$$

$$\frac{\Delta y}{\Delta x} = 6x^2 + 6x\Delta x + 2\Delta x + 12x + 6\Delta x + 7$$

$$\lim_{\Delta x \rightarrow 0}$$

$$\frac{dy}{dx} = 6x^2 - 12 - 7$$

$$2y = \frac{11}{4x^3} + \frac{7}{5x^2}$$

$$y + Dy = \frac{11}{4(x+Dx)}$$

$$y + Dy = \frac{11}{4(x^3 + 3x^2Dx + 3xDx^2 + Dx^3)}$$

$$-y + y + Dx = \frac{11}{4x^3 + 12x^2Dx + 12xDx^2 + 4Dx^3} = \frac{-11}{4x^3}$$

$$Dy = \frac{44x^2 - 44x^2 - 132xDx^2 - 44Dx}{(4x^3 + 12x^2Dx + 12xDx^2 + 44x^3)} [Dx]$$

$$Dy = \frac{-132x^2 - 132xDx^2 - 44Dx}{(4x^3 + 12xDx^2 + 12xDx^2 + 44x^3)} [Dx^3]$$

$$Dy = \frac{-13x^2 - 132xDx - 44}{(4x^3 + 12xDx^2 + 12xDx^2 + 44x^3)} [Dx^3]$$

$$Dy = \frac{-132x^2 - 44}{(4x^3)} [Dx^3]$$

$$Dy = \frac{-132x^2 - 44}{(4x^3)^2}$$

$$y = \frac{7}{3x^2}$$

$$y + \Delta y = \frac{7}{3(x + \Delta x)^2}$$

$$y + \Delta y = \frac{7}{3(x^2 + 2x\Delta x + \Delta x)^2}$$

$$-y + y + \Delta y = \frac{7}{3x^2 + 6x\Delta x + 3\Delta x} - \frac{7}{3x^2}$$

$$\Delta y = \frac{2\Delta x^2 - 21\Delta x^2 - 42x\Delta x - 21\Delta x^2}{3x^2 + 6x\Delta x + 3\Delta x} (3x^2) \quad \boxed{8x}$$

$$\Delta y = \frac{-42x\Delta x + 2 + \Delta x^2}{3x^2 + 6x\Delta x + 3\Delta x} (3x^2)$$

$$\Delta y = \frac{-42x - 2 + \Delta x}{3x^2 + 6x\Delta x + 3\Delta x} (3x^2)$$

$$\Delta y = \frac{-42x}{3x^2(3x^2)}$$

$$\frac{x}{x^2 - 8x} = \frac{x}{x(x-8)} = \frac{1}{x-8}$$

$$y = \frac{1}{(x + \Delta x) + 8}$$

$$y = \frac{1}{x + \Delta x + 8} - \frac{1}{x + 8}$$

$$= \frac{x + 8 - x - \Delta x - 8}{(x + \Delta x + 8)(x + 8)}$$

$$= \frac{-\Delta x}{(x + \Delta x + 8)(x + 8)} \quad [\text{cancel}] = \frac{1}{(x + \Delta x + 8)(x + 8)}$$

$$\lim_{\Delta x \rightarrow 0} = \frac{1}{(x + 8)(x + 8)} = \frac{1}{(x + 8)^2}$$

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

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

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

$$-y + y + \Delta y = \frac{3x^2 + 6x\Delta x + 3\Delta x^2 + 2}{2x + 2\Delta x} - \frac{3x^2 + 2}{2x}$$

$$\Delta y = \frac{\cancel{6x^3} + 12x\Delta x + 6x\Delta x^2 + \cancel{3x} - \cancel{6x^3} - \cancel{6x\Delta x^2} - \cancel{4x} - 4\Delta x}{(2x + 2\Delta x)(2x)}$$

$$\frac{\Delta y}{\Delta x} = \frac{12x^2\Delta x + 6x\Delta x^2 - 6x^2\Delta x - \cancel{4x\Delta x}}{(2x + 2\Delta x)(2x)}$$

$$\frac{\Delta y}{\Delta x} = \frac{12x^2 + \cancel{6x\Delta x} - 6x^2 - 4}{(2x + 2\Delta x)(2x)} \quad \text{Lim} \rightarrow 0$$

$$\frac{\Delta y}{\Delta x} = \frac{12x^2 - 6x^2 - 4}{(2x)^2}$$

$$y = \frac{3}{5x^2} - \frac{3}{4x} + \frac{1}{0}$$

$$y = \frac{3}{5x^2}$$

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

$$y + \Delta y = \frac{3}{5x^2 + 10x\Delta x + 5\Delta x^2} - \frac{3}{5x^2}$$

$$\Delta y = \frac{\cancel{15x^2} - \cancel{15x^2} - 30x\Delta x - 15\Delta x^2}{(5x^2 + 10x\Delta x + 5\Delta x^2)(5x^2)}$$

$$\frac{\Delta y}{\Delta x} = \frac{-30x\Delta x - 15\Delta x^2}{(5x^2 + 10x\Delta x + 5\Delta x^2)(5x^2)}$$

$$\frac{\Delta y}{\Delta x} = \frac{-30x - 15\Delta x}{(5x^2 + 10x\Delta x + 5\Delta x^2)(5x^2)}$$

$$\frac{\Delta y}{\Delta x} = \frac{-30}{(5x^2)(5x^2)}$$

$$\frac{\Delta y}{\Delta x} = \frac{-30x}{(5x^2)}$$

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

$$y + D1 = \frac{3}{4(x+Dx)}$$

$$y + Dy = -\frac{3}{4x + 4Dx} - \frac{3}{4x}$$

$$-y + y + Dy = \frac{12x - 12x - 12Dx}{(4x + 4Dx)(4x)}$$

$$\frac{Dy}{Dx} = \frac{2x \cdot D}{(4x + 4Dx)(4x)} \cdot [x]$$

$$\frac{Dy}{Dx} = \frac{-12}{(4x + 4Dx)(4x)}$$

$$\frac{-12}{(4x)(4x)}$$

$$\frac{Dy}{Dx} = \frac{-30x - 12}{(5x^2)(4x)^2}$$