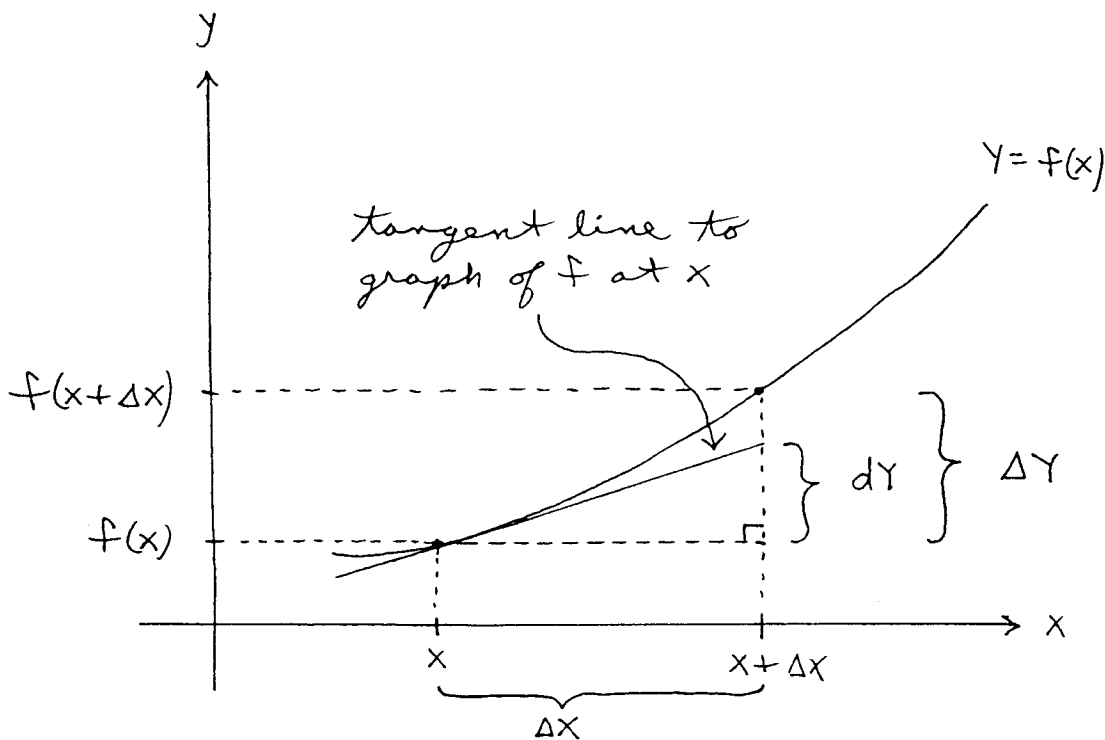


Math 16A
Kouba
The Differential



Define the exact change in y to be

$$\Delta Y = f(x + \Delta x) - f(x)$$

Define dY to be the height of the right triangle in the diagram. Then

$$\Delta Y \approx dY \quad \text{for } \Delta x \text{ small.}$$

In addition, the slope of the tangent line to the graph of f at x is

$$f'(x) = \frac{\text{rise}}{\text{run}} = \frac{dY}{\Delta x} \quad \text{so that}$$

$$dY = f'(x) \cdot \Delta x ;$$

dY is called the differential of Y .