

# 1998-CE-A-MATH-1-Q01

$$\begin{aligned}& \frac{d}{dx}(\sqrt{x}) \\&= \lim_{\Delta x \rightarrow 0} \frac{\sqrt{(x + \Delta x)} - \sqrt{x}}{\Delta x} \\&= \lim_{\Delta x \rightarrow 0} \frac{(\sqrt{(x + \Delta x)} - \sqrt{x})(\sqrt{(x + \Delta x)} + \sqrt{x})}{\Delta x(\sqrt{(x + \Delta x)} + \sqrt{x})} \\&= \lim_{\Delta x \rightarrow 0} \frac{(\sqrt{(x + \Delta x)})^2 - (\sqrt{x})^2}{\Delta x(\sqrt{(x + \Delta x)} + \sqrt{x})} \\&= \lim_{\Delta x \rightarrow 0} \frac{x + \Delta x - x}{\Delta x(\sqrt{(x + \Delta x)} + \sqrt{x})} \\&= \lim_{\Delta x \rightarrow 0} \frac{\Delta x}{\Delta x(\sqrt{(x + \Delta x)} + \sqrt{x})} \\&= \lim_{\Delta x \rightarrow 0} \frac{1}{\sqrt{(x + \Delta x)} + \sqrt{x}} \\&= \frac{1}{2\sqrt{x}}\end{aligned}$$