

HW Given $y = 10 + \sqrt{x}$, $f(x) = 10 + \sqrt{x}$

a) Find the derivative $f'(x)$. $f'(x) = \frac{1}{2} \cdot x^{-\frac{1}{2}}$

b) Fill in the table $= \frac{1}{2\sqrt{x}}$

Point	X	Y	$f'(x)$
	0	10	0
A	1	11	0.5
B	2	11.414	0.35
C	3	11.732	0.29

c) Does the slope increase as x increase? No, it is decrease

d) Approximate the change in Y when $\Delta x = 0.2$ at $x_1 = 3$. Is the approximation under- or over-estimate?

$$\begin{aligned} \text{Approximation} \quad \Delta y &= f'(x_1) \cdot \Delta x \\ &= \frac{1}{2\sqrt{3}} \cdot 0.2 = 0.0577 // \\ \text{Real } \Delta y \quad \Delta y &= y_2 - y_1 \\ &= (10 + \sqrt{3.2}) - (10 + \sqrt{3}) = 0.0568 // \end{aligned}$$

Ans $\therefore$ the approximation is over estimate