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

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

b) Fill in the table

Point	X	Y	$f'(x)$
	0	10	DNE
A	1	11	0.5
B	2	11.414	0.353
C	3	11.732	0.289

; because $2\sqrt{x} \neq 0$

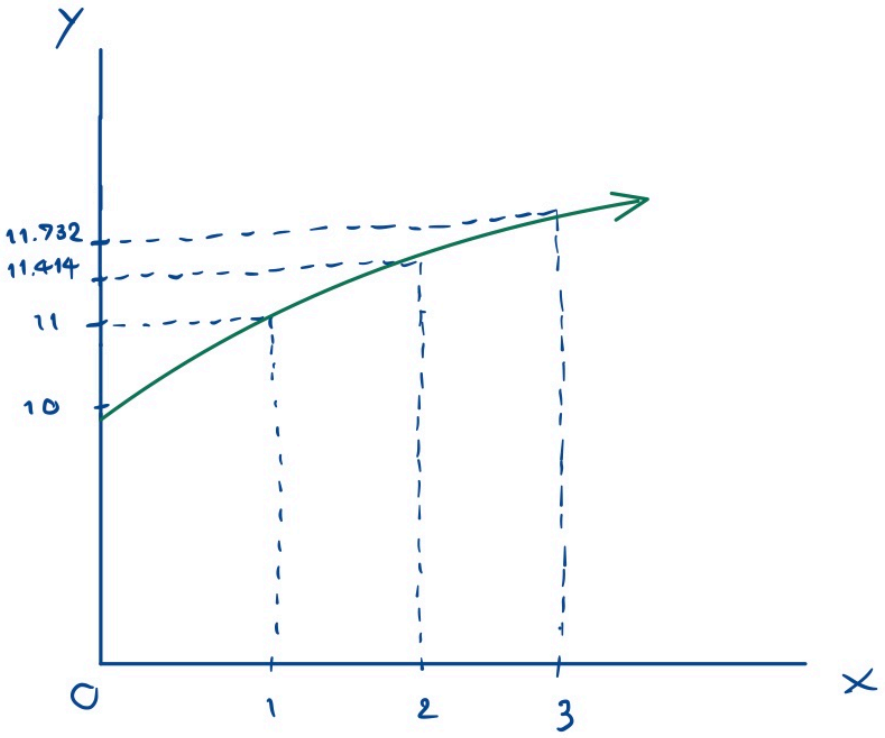
c) Does the slope increase as x increase? No, instead the slope decreasing everytime x increases.

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

$\Delta Y \approx f'(x_1) \cdot \Delta x$

$\Delta Y \approx f'(3) \cdot (0.2)$

$\Delta Y \approx 0.289 \cdot (0.2) \approx 0.0577$



Note: If the function $f(x)$ is linear, the approximation is exact.

The real $\Delta Y = [(10 + \sqrt{3.2}) - (10 + \sqrt{3})] = 0.0568$

The approximation $\Delta Y = 0.0577$

∴ The approximation is overestimate.

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