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HW#2 Due Jan 20, 2022

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

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

b) Fill in the table

Point	X	Y	$f'(x)$
	0	10	
A	1	11	$\frac{\sqrt{1}}{2} = 0.5$
B	2	11.414	$\frac{\sqrt{2}}{4} = 0.35$
C	3	11.732	$\frac{\sqrt{3}}{6} = 0.29$

c) Does the slope increase as x increases? → no, it decrease

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

a) $\frac{dy}{dx} = 10 + x^{\frac{1}{2}}$

$\frac{1}{2}x^{-\frac{1}{2}} \Rightarrow \frac{\sqrt{x}}{2x} \cdot \frac{\sqrt{x}}{\sqrt{x}} \Rightarrow \frac{x}{2x\sqrt{x}}$

$= \frac{1}{2\sqrt{x}}$

d) $\Delta x = 0.2$, $x_1 = 3$ $\Delta y = ?$

$= \frac{1}{2\sqrt{3}} \times 0.2$

$= 0.0577$

$\Delta Y \Big| \begin{matrix} x_1 = 3 \\ \Delta x = 0.2 \end{matrix} \Big\} 3 + 0.2 = 3.2$

$\Delta Y = Y_2 - Y_1$

$= (10 + \sqrt{3.2}) - (10 + \sqrt{3})$

$= 0.0168$

$\therefore$ overestimate