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

HW#2 Due Jan 20, 2022

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

- Find the derivative $f'(x)$.
- Fill in the table

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

- Does the slope increase as x increases? $\Rightarrow$ No, it does not increase
- Approximate the change in Y when $\Delta x = 0.2$ at $x_1 = 3$. Is the approximation under- or over-estimate?

d) We estimate: $\Delta x = 0.2$, $x_1 = 3$, $\Delta Y = ?$

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

$$= 0.0577$$

The real ΔY is: $\Delta Y = Y_2 - Y_1$

$$\left(\Delta Y \mid \begin{array}{l} x_1 = 3 \\ \Delta x = 0.2 \end{array} \right) \left. \vphantom{\begin{array}{l} x_1 = 3 \\ \Delta x = 0.2 \end{array}} \right\} 3+0.2=3.2 \quad = (10 + \sqrt{3.2}) - (10 + \sqrt{3})$$

$$= 0.0563$$

$\therefore$ overestimate