H.W.

$y = 10 + \sqrt{x}$

x	y	$dy/dx = \frac{1}{2\sqrt{x}}$
0	10	0
1	11	$\frac{1}{2}$
2	$10+\sqrt{2}$	$\frac{1}{2\sqrt{2}}$
3	$10+\sqrt{3}$	$\frac{1}{2\sqrt{3}}$

(i) Find dy/dx

(ii) Approximate Δy when $x=2$, $\Delta x = 0.1$ & $\Delta x = -0.2$

(iii) Compare the actual Δy to find the error.

(i) $\frac{dy}{dx}\left(10+\sqrt{x}\right) = 0 + \frac{1}{2}\left(x^{\frac{1}{2}-1}\right) = \frac{1}{2}\left(x^{-\frac{1}{2}}\right) \rightarrow \frac{1}{2x^{\frac{1}{2}}} \rightarrow \frac{1}{2\sqrt{x}} \Rightarrow \frac{1}{2\sqrt{2}}$

(ii) $\Delta y = \frac{dy}{dx} \cdot \Delta x_{0.1} = \frac{1}{2\sqrt{2}} \cdot (0.1) = \frac{0.1}{2\sqrt{2}}$

$\frac{dy}{dx} \cdot \Delta x_{-0.2} = \frac{1}{2\sqrt{2}} \cdot (-0.2) = \frac{-0.2}{2\sqrt{2}}$

(iii) actual Δy ; $x = 2.1 \rightarrow y_1 = 10 + \sqrt{2.1}$

; $x = 1.8 \rightarrow y_2 = 10 + \sqrt{1.8}$

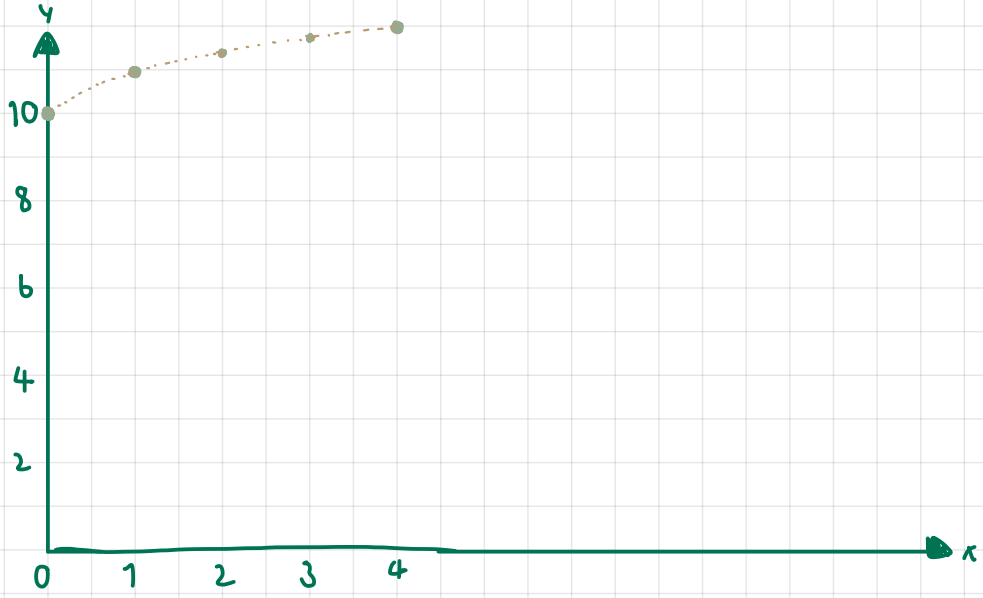
$\therefore \Delta y = (10 + \sqrt{2.1}) - (10 + \sqrt{1.8}) = \sqrt{2.1} - \sqrt{1.8}$

H.W.

Find 2^{nd} order derivative of $y = 10 + \sqrt{x}$ and plot the graph of y and $\frac{dy}{dx}$. Is the slope of slope a constant?

(i) $\frac{d^2y}{dx} = \frac{1}{2}(x^{-\frac{1}{2}})^{-\frac{1}{2}} = \frac{1}{2}(-\frac{1}{2})(x^{-\frac{3}{2}}) = -\frac{1}{4}(x^{-\frac{3}{2}})$

(ii)



x	y	$dy/dx = \frac{1}{2\sqrt{x}}$
0	10	0
1	11	$1/2$
2	$10+\sqrt{2}$	$1/2\sqrt{2}$
3	$10+\sqrt{3}$	$1/2\sqrt{3}$
4	12	$1/4$

(iii) NO, it's not. As you can see the table above that dy/dx are not constant.