

Homework

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$$y = 10 + \sqrt{x}$$

$$10 + x^{\frac{1}{2}} : \text{slope } \frac{1}{2} x^{-\frac{1}{2}}$$

x	y	dy/dx
0	10	0
1	11	$\frac{1}{2} = 0.5$
2	11.414	$\frac{\sqrt{2}}{4} = 0.35$
3	11.735	$\frac{\sqrt{3}}{6} = 0.28$

Find $\frac{dy}{dx}$

• Approximately Δy

when $x = 2$, $\Delta x = 0.1$ and $\Delta x = -0.2$

• Compare the actual Δy to find the errors.

$$\frac{dy}{dx} : 10 + x^{\frac{1}{2}} \\ : \frac{1}{2} x^{-\frac{1}{2}}$$

• when $x = 2$; $\frac{dy}{dx} = 0.35$; $\Delta x = 0.1$

$$\therefore \Delta y : \frac{dy}{dx} \cdot \Delta x$$

$$\Delta y : 0.35 \cdot (0.1) \\ : 0.035$$

• $\Delta x : 2.1 \rightarrow x$ increasing from 2 to 2.1

$$\therefore y = 10 + \sqrt{x}$$

$$y = 10 + \sqrt{2.1}$$

$$y = 11.44$$

$$\therefore \Delta y = 11.44 - 11.414 = 0.036 *$$

$$\Delta x = -0.2$$

$$\therefore \Delta y = \frac{dy}{dx} \cdot \Delta x$$

$$\Delta y = 0.35 \cdot (-0.2) \\ = -0.07$$

$$\Delta x = 1.8$$

$$\therefore y = 10 + \sqrt{x}$$

$$y = 10 + \sqrt{1.8}$$

$$y = 11.341$$

$$\Delta y = 11.44 - 11.341 = 0.099 *$$

Homework

$$y = 10 + x^{\frac{1}{2}}$$

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

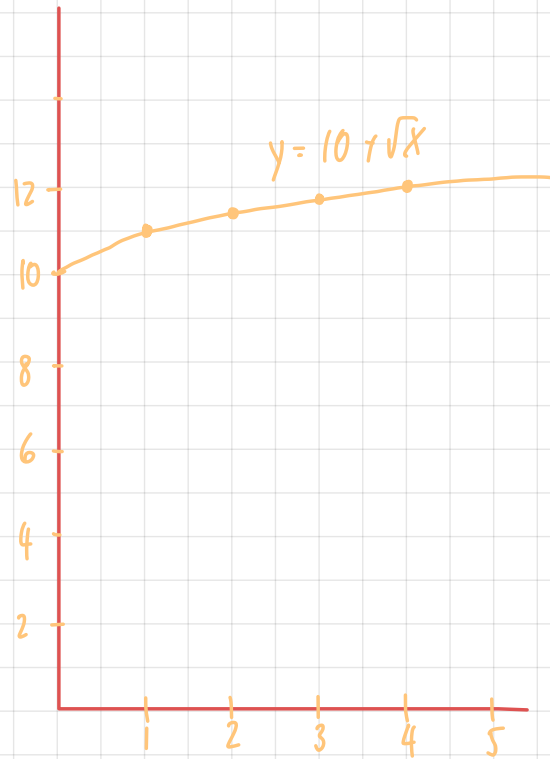
$$\frac{dy}{dx} : 10 + \sqrt{x}$$

$$: 10 + x^{\frac{1}{2}}$$

$$: \frac{1}{2}x^{-\frac{1}{2}}$$

$$\frac{d^2y}{d^2x} : \frac{1}{2}x^{-\frac{1}{2}}$$

$$: -\frac{1}{4}x^{-\frac{3}{2}}$$



x	y
1	11
2	11.414
3	11.735
4	12

∴ slope is not constant