

1)

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

Find $\frac{dy}{dx}$

X	y	$dy/dx = 2x$
0	10	0
1	11	2
2	11.41	4
3	11.73	6
4	12	8

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

Compare the actual Δy to find the error

Slope at the point $x=2$

$$\frac{dy}{dx} \frac{d}{dx} (10 + \sqrt{x})$$

$$x=2 \quad \left| \quad \frac{dy}{dx} = 2x = 2(2) = 4 \right.$$

when $x=2$ $y=11.41$ slope = 4

$$\Delta x = 0.1$$

$$\begin{aligned} \Delta y &\approx \frac{dy}{dx} \cdot \Delta x \\ &= 4 \times (0.1) = 0.4 \end{aligned}$$

$$\Delta x = -0.2$$

$$\begin{aligned} \Delta y &\approx \frac{dy}{dx} \cdot \Delta x \\ &= 4 \times (-0.2) = -0.08 \end{aligned}$$

what is the real change in y ?

$$x = 2.1, y = 10 + \sqrt{2.1} = 1.45$$

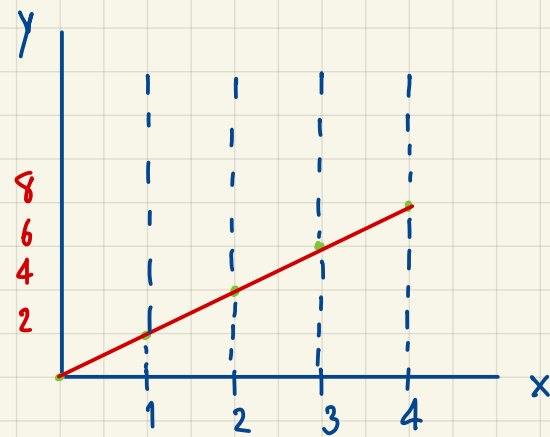
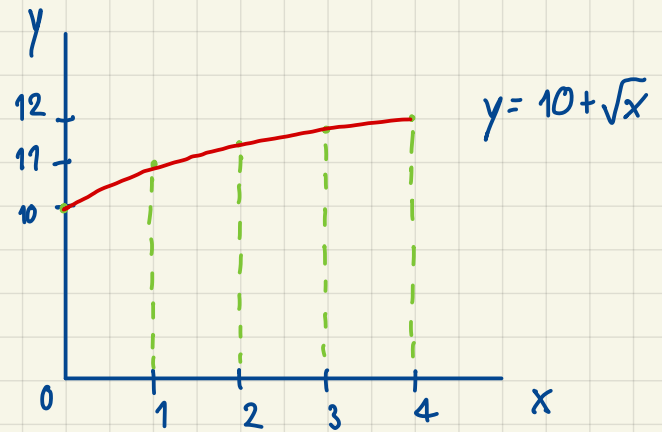
$$\begin{aligned} \therefore \Delta y &= 1.45 - 2.1 \\ &= -0.65 \end{aligned}$$

$$x = 1.98, y = 10 + \sqrt{1.98} = 1.4$$

$$\begin{aligned} \therefore \Delta y &= 1.4 - 1.98 \\ &= -0.58 \end{aligned}$$

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

X	Y	$\frac{dx}{dy} = 2x$	$\frac{d^2y}{dx^2} = 2$
0	10	0	2
1	11	2	2
2	11.41	4	2
3	11.73	6	2
4	12	8	2



Slope of Slope is constant = 2