

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

Find dy/dx Approximate Δy when $x=2$, $\Delta x=0.1$ and $\Delta x=-0.2$ Compare the actual Δy to find the errorwhen $x=2$, $y=10+\sqrt{2}$, slope = $\frac{1}{2\sqrt{2}}$ $\Delta x = 0.1 \rightarrow x$ change $2 \rightarrow 2.1$

$$\begin{aligned}\Delta y &\approx \frac{dy}{dx} \cdot \Delta x \\ &= \frac{1}{2\sqrt{2}} \times 0.1 \\ &= \frac{1}{20\sqrt{2}}\end{aligned}$$

Actual Δy

$$\begin{aligned}x &= 2.1, y = 10 + \sqrt{x} \\ y &= 10 + \sqrt{2.1} \\ \therefore \Delta y &= \sqrt{2.1} - \sqrt{2}\end{aligned}$$

 $\Delta x = -0.2 \rightarrow x$ change $2 \rightarrow 1.8$

$$\begin{aligned}\Delta y &\approx \frac{dy}{dx} \cdot \Delta x \\ &= \frac{1}{2\sqrt{2}} \times (-0.2) \\ &= -\frac{1}{10\sqrt{2}}\end{aligned}$$

Actual Δy

$$\begin{aligned}x &= 1.8, y = 10 + \sqrt{x} \\ y &= 10 + \sqrt{1.8} \\ \therefore \Delta y &= \sqrt{1.8} - \sqrt{2}\end{aligned}$$

H.W. 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.

$$\frac{dy}{dx} = \frac{1}{2\sqrt{x}} = \frac{1}{2} x^{-\frac{1}{2}}$$

$$\begin{aligned} 2^{\text{nd}} \text{ derivative} &= -\frac{1}{4} x^{-\frac{3}{2}} \\ &= -\frac{1}{4x\sqrt{x}} \end{aligned}$$

x	y	$\frac{dy}{dx}$	2 nd derivative
0	10		
1	11	$\frac{1}{2}$	$-\frac{1}{4}$
2	$10 + \sqrt{2}$	$\frac{1}{2\sqrt{2}}$	$-\frac{1}{8\sqrt{2}}$
3	$10 + \sqrt{3}$	$\frac{1}{2\sqrt{3}}$	$-\frac{1}{12\sqrt{3}}$

NOT CONSTANT

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