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H.W. $y = 10 + \sqrt{x}$

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

Find dy/dx Approximate Δy

when $x = 2$, $\Delta x = 0.1$

and $\Delta x = -0.2$

Compare the actual Δy to find the errors.

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

$$= \frac{1}{2\sqrt{x}}$$

$$\Delta y \approx \frac{dy}{dx}\Delta x$$

$$= \frac{1}{2\sqrt{2}} \cdot 0.1$$

$$= \frac{1}{20\sqrt{2}} \approx 0.035$$

actual Δy

$x = 2.1$

$y = 10 + \sqrt{2.1} \approx 11.449$

$\therefore \Delta y \; 10+\sqrt{2.1} - 10+\sqrt{2}$

$11.449 - 11.414 = 0.035$

H.W. Find 2nd order derivative of $y = 10+\sqrt{x}$ and plot the graph of y and dy/dx.

Is the slope of slope a constant

$\frac{1}{2\sqrt{x}}$ diff

$$2^{nd} = \frac{1}{2} \cdot \frac{d}{dx}\left[\frac{1}{\sqrt{x}}\right]$$

$$= \frac{1}{2} \cdot \left(-\frac{1}{2}\right)x^{-\frac{1}{2}-1}$$

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

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

x	y	dy/dx	2nd diff
0	10	0	
1	11	$\frac{1}{2}$	$-\frac{1}{4} \Rightarrow -0.25$
2	11.414 $10+\sqrt{2}$	$\frac{1}{2\sqrt{2}}$ 0.35	-0.088
3	11.732 $10+\sqrt{3}$	$\frac{1}{2\sqrt{3}}$ 0.289	-0.048

not constant