

homework 18/08/20

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

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

find $\frac{dy}{dx}$

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

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

approx. Δy

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

and $\Delta x = -0.2$ compare the actual

Δy to find the errors

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

$\Delta y \approx \frac{\sqrt{2}}{2} \cdot 0.1$ $\Delta y \approx \frac{\sqrt{2}}{2} \cdot (-0.2)$

$\Delta y \approx \frac{\sqrt{2}}{20}$ $\approx -\frac{\sqrt{2}}{10}$
 ≈ 0.071 ≈ -0.141

difference between predicted and actual

$11.91 - 0.071$

≈ 11.8

$11.91 - (-0.141)$

actual change in $y = 10 + \sqrt{2}$

≈ 11.6

$y = 11.91$

2. find the 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

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

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

