

(P.) $y = 10 + \sqrt{x}$

Solution

x	y	dy/dx
0	10	-
1	11	1/2
2	$10 + \sqrt{2}$	$\sqrt{2}/4$
3	$10 + \sqrt{3}$	$\sqrt{3}/6$

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

$= 0 + \frac{1}{2\sqrt{x}}$

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

x increase to 2.1
(from 2)

Approximate Δy when $x = 2$

• when $\Delta x = 0.1$

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

$$\approx (\sqrt{2}/4)(0.1)$$

$$\approx \sqrt{2}/40 \approx 0.0353$$

• when $\Delta x = -0.2$

$$\Delta y \approx (\sqrt{2}/4)(-0.2)$$

$$\approx -\sqrt{2}/20 \approx -0.0707$$

Therefore, the real change in y are (Δy)

- when $\Delta X = 0.1$

then, $X = 2.1$

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

$$\therefore \Delta y = 10 + \sqrt{2.1} - 10\sqrt{2} \\ = 0.0349$$

- when $\Delta X = -0.2$

then, $X = 1.8$

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

$$\therefore \Delta y = 10 + \sqrt{2} - 10 + \sqrt{1.8} \\ = 0.042$$

2.

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

$$\frac{d}{dx} \left(\frac{dy}{dx} \right) = \frac{d\left(\frac{1}{2\sqrt{x}}\right)}{dx} = -\frac{1}{4\sqrt{x}}$$

2nd Order derivative

x	y	$\frac{dy}{dx}$	$\frac{d^2y}{dx^2}$
0	10	-	-
1	11	$\frac{1}{2}$	$-\frac{1}{4}$
2	$10 + \sqrt{2}$	$\frac{\sqrt{2}}{4}$	$-\frac{\sqrt{2}}{16}$
3	$10 + \sqrt{3}$	$\frac{\sqrt{3}}{6}$	$-\frac{\sqrt{3}}{36}$



∴ The slope of slope is not constant