

HW#2 Due Jan 20, 2022

HW Given  $y = 10 + \sqrt{x}$ ,

- a) Find the derivative  $f'(x)$ .  
 b) Fill in the table

Point	X	Y	$f'(x)$
	0	10	DNE
A	1	11	$\frac{1}{2} = 0.5$
B	2	11.414	0.354
C	3	11.732	0.289

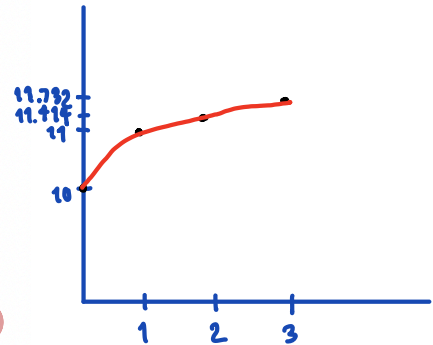
$$y = 10 + \sqrt{x}$$

$$\text{slope} = f'(x)$$

$$= 0 + \frac{1}{2}x^{-\frac{1}{2}}$$

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

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



- c) Does the slope increase as  $x$  increases? **decrease**  
 d) Approximate the change in  $Y$  when  $\Delta x = 0.2$  at  $x_1 = 3$ . Is the approximation under- or over-estimate? **over-estimated**

$$\Delta x = 0.2$$

$$x_1 = 3$$

Estimate  $\Delta Y$

$$\Delta y = f'(x) \cdot \Delta x$$

$$= 0.289 \cdot 0.2$$

$$= 0.0578$$

$$y_1 = 11.732$$

$$y_2 \approx 11.7898$$

Real  $\Delta Y$

$$x_1 = 3 \quad \Delta x = 0.2$$

$$x_2 = 3.2$$

$$y_2 = f(3.2) = 10 + \sqrt{3.2}$$

$$y_2 = 11.789$$

$$y_2 - y_1 = 11.789 - 11.732$$

$$= 0.057$$

$\therefore$  Estimate  $\Delta Y >$  Real  $\Delta Y$