HW#2 Due Jan 20, 2022

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

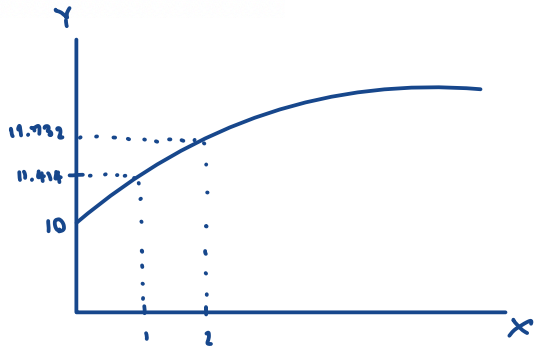
a) Find the derivative $f'(x)$.

b) Fill in the table

Point	X	Y	$f'(x)$
	0	10	
A	1	11	0.5
B	2	11.414	0.35
C	3	11.732	0.29

c) Does the slope increase as x increases?

d) Approximate the change in Y when $\Delta x = 0.2$ at $x_1 = 3$. Is the approximation under- or over-estimate?



a) $f'(x) = \frac{1}{2}x^{-\frac{1}{2}} = \frac{1}{2\sqrt{x}}$

b) $f'(1) = \frac{1}{2} = 0.5$

$f'(2) = \frac{\sqrt{2}}{4} = 0.35$

$f'(3) = \frac{\sqrt{3}}{6} = 0.29$

c) No, the slope decreases.

d) $\Delta y \approx f'(x_1) \cdot \Delta x$

$= f'(3) \cdot 0.2$

$= \frac{\sqrt{3}}{6} \cdot \frac{1}{5} = \frac{\sqrt{3}}{30} = 0.058$

real Δy

$y_2 = f(3.2) = 10 + \sqrt{3.2} = 11.79$

$\Delta y = y_2 - y_1 = 11.789 - 11.732 = 0.057$

∴ The approximation is over-estimate.