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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	$\frac{1}{2} = 0.5$
B	2	11.414	$\frac{1}{2\sqrt{2}} = \frac{1}{\sqrt{8}} = 0.354$
C	3	11.732	$\frac{1}{2\sqrt{3}} = \frac{1}{\sqrt{12}} = 0.289$

c) Does the slope increase as x increases? No, when x increase slope decrease.

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

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

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

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

d) when $x_1 = 3$, $y_1 = 11.732$ and $\Delta x = 0.2$

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

$= f'(3) \cdot 0.2$

$= \frac{1}{2\sqrt{3}} \cdot 0.2$

$= 0.058$

-real Δy

$x_1 = 3$, $\Delta x = 0.2$; $y_2 = f(3.2) = 10 + \sqrt{3.2} = 11.789$

$x_2 - x_1 = 0.2$

$x_2 - 3 = 0.2$

$x_2 = 3.2$

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

$\therefore$ The approximation is overestimate the real Δy.