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HW#2 Due Jan 20, 2022

$x^{\frac{1}{2}}$

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

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

b) Fill in the table

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

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

change to $x^{\frac{1}{2}}$ and $f'(x) = \frac{1}{2\sqrt{x}}$

Point	X	Y	$f'(x)$
	0	10	undefined
A	1	11	$\frac{1}{2}$
B	2	11.414	$\frac{1}{2\sqrt{2}}$
C	3	11.732	$\frac{1}{2\sqrt{3}}$

c) Does the slope increase as x increases? no, the slope are decreasing when x increasing

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

d. find Δy

when $x_1 = 3$ $y_1 = 11.732$ $\Delta x = 0.2$

slope $= \frac{\Delta y}{\Delta x}$

$\Delta y = (\Delta x)(\text{slope})$

$\Delta y = (0.2)\left(\frac{1}{2\sqrt{3}}\right)$

$\Delta y = \frac{\sqrt{3}}{30} = 0.0577$

find real Δy

when $x_1 = 3$ $\Delta x = 0.2$ $y_1 = 11.732$

$x_2 = 3.2$

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

$= 11.78885$

real $\Delta y = y_2 - y_1$

$= 11.78885 - 11.732$

$= 0.0569$

So, the approximation over-estimate.