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	11.914	$\frac{1}{2\sqrt{2}} = 0.35$
C	3	11.732	$\frac{1}{2\sqrt{3}} = 0.29$

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

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

$f(x) = 10 + x^{\frac{1}{2}}$

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

$= \frac{1}{2\sqrt{x}}$ ✱

c) Does the slope increase as x increase?

No, on the other hand the slope decreases as x increase

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

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

$= f'(3) \cdot 0.2$

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

$= 0.0577 \approx 0.058$ ✱

Real Δy ?

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

$= 11.789$

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

∴ The approximation is underestimate.

Note: If the function $f(x)$ is linear, the approximation is exact.

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