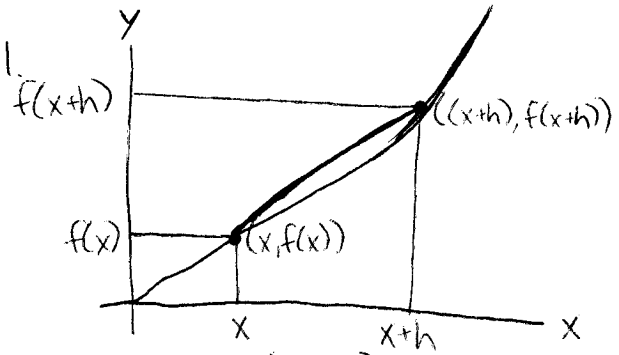
Math Analysis A Handwritten Quiz Prompt

Given: $f(x)=x^2+3$, $x=-2$

1.



2. $\text{slope} = m = \dfrac{(y_2 - y_1)}{(x_2 - x_1)}$

slope of the secant

$\text{slope} = m = \dfrac{f(x+h)-f(x)}{x+h-x}$

slope tangent to the curve

$\text{slope} = m = \lim\limits_{h\to 0} \dfrac{f(x+h)-f(x)}{x+h-x}$

$f'(x)$ = slope of the tangent line to the curve

$f'(x) = \lim\limits_{h\to 0} \dfrac{f(x+h)-f(x)}{x+h-x}$

3. $f'(x) = \lim\limits_{h\to 0} \dfrac{f(x+h)-f(x)}{x+h-x}$

$f'(x) = \lim\limits_{h\to 0} \dfrac{f(x+h)-(x^2+3)}{x+h-x}$

$f'(x) = \lim\limits_{h\to 0} \dfrac{f(x+h)^2-x^2-3}{x+h-x}$ $\quad (x+h)(x+h)$

$f'(x) = \lim\limits_{h\to 0} \dfrac{x^2+2hx+h^2+3-x^2-3}{h}$

$f'(x) = \lim\limits_{h\to 0} \dfrac{2hx+h^2}{h}$

$f'(x) = \lim\limits_{h\to 0} \dfrac{h(2x+h)}{h}$

$f'(x) = \lim\limits_{h\to 0} 2x+h$

$f'(x) = 2x$

4. $f(x) = x^2+3$

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

$f'(x) = 2x^1 = 2x$ ✓

5. $f(x) = x^2+3$

$f(-2) = (-2)^2+3 = 4+3 = 7$

$(-2, 7)$

$y-y_1 = m(x-x_1)$

$y-7 = 2(x-(-2))$

$y-7 = 2(x+2)$

$y-7 = 2x+4$

$+7 \qquad +7$

$\boxed{y = 2x+11}$ ← slope-intercept form

$y-7 = 2x+4$

$-y \qquad -y$

$-7 = 2x+4-y$

$-4 \qquad -4$

$\boxed{2x-y = -11}$ ← standard form

6. $f(x) = \dfrac{x^{n+1}}{n+1} + C$

$f(x) = \dfrac{2x^{2+1}}{2+1} + C$

$f(x) = \dfrac{2}{3}x^3 + C$

The constant C represents any constants that might have been lost in the derivative process.