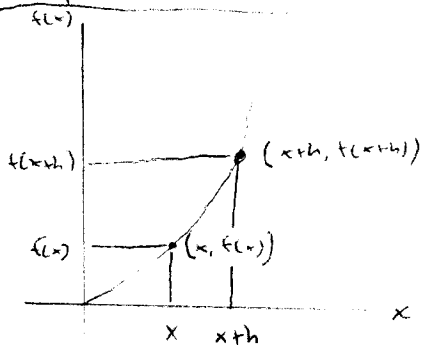


Math Analysis A handwritten quiz

Given: $f(x) = x^2 + x + 3$, $x = -1$

1. Graphic of Derivative Def



2. The Derivative Formula

Slope = $m = \frac{y_2 - y_1}{x_2 - x_1}$

slope of the secant

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

slope of the tangent line

slope = $m = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{x+h - x}$

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

$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$

5. Find equation of a derivative

$f(x) = x^2 + x + 3$ $f'(x) = 2x + 1$ $x = -1$

$f(-1) = (-1)^2 + (-1) + 3$

$= 1 - 1 + 3$

$= 0 + 3$

$= 3$

$(-1, 3)$

$f'(x) = 2x + 1$

$f'(-1) = 2(-1) + 1$

$= -2 + 1$

$= -1$

$y_2 - y_1 = m(x_2 - x_1)$

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

$y - 3 = -1(x - (-1))$

$y - 3 = -1(x + 1)$

$y - 3 = -1x - 1$

$+3$ $+3$

~~$y = -x + 2$~~ $y = -x + 2$

3. Applying Definition of the Derivative

Given = $f(x) = x^2 + x + 3$

$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{x+h - x}$

$f'(x) = \lim_{h \rightarrow 0} \frac{(x+h)^2 + (x+h) - x^2 - x - 3 + 3}{x+h - x}$

$f'(x) = \lim_{h \rightarrow 0} \frac{x^2 + 2xh + h^2 + x + h - x^2 - x - 3 + 3}{h}$

$= \lim_{h \rightarrow 0} \frac{2xh + h^2 + h}{h}$

$= \lim_{h \rightarrow 0} (2x + h + 1)$

$= 2x + 1$

$f'(x) = 2x + 1$

4. Power Rule

Given = $f(x) = x^2 + x + 3$

$f'(x) = 2x^{(2-1)} + 1x^{(1-1)} + 0$

~~$y = -x + 2$~~
 ~~$y = -x + 2$~~
 'Slope Intercept Form'

$y - 3 = -1x - 1$
 $+3$ $+3$

$y = -1x + 2$
 $+x$ $+x$

$y + x = 2$
 'Standard Form'

6. Anti-Derivative

$\frac{n x^{(n+1)}}{n} + C$

$\frac{2x^{(2+1)}}{2} + C$

$x^2 + x + C$