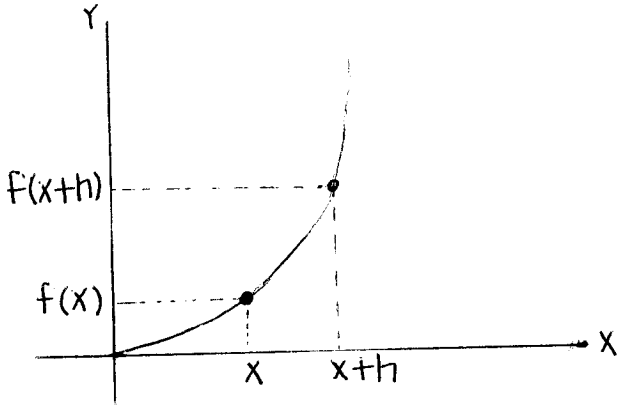
Math Analysis A

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

1.



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

Slope of the secant

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

Slope of the tangent to the curve

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

Slope of the tangent line to the curve = derivative

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

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

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

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

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

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

$f'(x) = \lim_{h \to 0} \frac{h(h+2x)}{h}$

$f'(x) = 2x = m = \text{slope}$

4. Power Rule

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

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

$f'(x) = 2x$

5. $f(x) = x^2 + 3 \quad x = -2 \quad f(x) = 7$

$f(-2) = 7$

Slope $\rightarrow m = 2x$

$m = 2(-2) = -4$

The slope intercept formula

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

$y - 7 = -4(x+2)$

$y - 7 = -4x - 8$

$y = -4x - 1 \rightarrow$ the slope intercept form

$4x + y + 1 = 0 \rightarrow$ the standard form

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

$f'(x) = 2x$

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

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

$f(x) = x^2 + C$

* C represents any constant that must have been lost during the application of the anti derivative