MATH 2501 Fall 2018 Quiz 2

Find slope of tangent line to $f(x) = 5x + 4$ at $a = 1$ using the definition of the derivative.

Solution: $f'(1) = \lim_{h \to 0} \frac{f(1+h) - f(1)}{h}$

$$= \lim_{h \to 0} \frac{[5(1+h)+4] - [5(1)+4]}{h}$$

$$= \lim_{h \to 0} \frac{5+5h+4-5-4}{h}$$

$$= \lim_{h \to 0} \frac{5h}{h}$$

$$= \lim_{h \to 0} 5$$

$$= 5$$

OR

$$f'(1) = \lim_{b \to 1} \frac{f(b) - f(1)}{b - 1}$$

$$= \lim_{b \to 1} \frac{(5b+4) - (5(1)+4)}{b-1}$$

$$= \lim_{b \to 1} \frac{5(b-1)}{b-1}$$

$$= \lim_{b \to 1} 5$$

$$= 5$$