

Written HW7 – MATH 2501 Fall 2021

**Due by 16 September for timely completion credit**

Recall the limits  $\lim_{x \rightarrow 0} \frac{\sin(x)}{x} = 1$  and  $\lim_{x \rightarrow 0} \frac{\cos(x) - 1}{h} = 0$ . Recall that the derivative of a function  $f$  at  $x$  is given by

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

Also recall the sum of angles formula for the sine function:

$$\sin(A + B) = \sin(A) \cos(B) + \cos(A) \sin(B).$$

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1. For this assignment, you must show that  $\frac{d}{dx} \sin(x) = \cos(x)$  by using the definition of the derivative as a limit, as well as the sum of angles formula for the sine, and the two trigonometric limits (if needed).