UNBC UNIVERSITY OF NORTHERN BRITISH COLUMBIA

Department of Mathematics & Statistics

Winter 2024, Math 100, HW Assignment 3

Due: February 16, 2024, in class.

The numbers between brackets in the margin represent the marks assigned to the question. The maximum grade is 100.

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1. Compute the following limits, if they exist (giving the necessary justifications). If the limit does not exist, state that.

(10) (a) $\lim_{x\to 7} \dfrac{\sin(x-7)}{2x-14}$.

(10) (b) $\lim_{x\to 7} \dfrac{5(x-7)\sin(x-7)}{(2x-14)^2}$.

(10) (c) $\lim_{x\to 7} \dfrac{1-\cos(x-7)}{(x-7)}$.

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2. For the following functions, find the derivative $f'(x)$ at the points x where f is differentiable. Simplify your answer as much as possible.

(14) (a) $f(x) = \dfrac{\left(2x+\frac{5}{x}\right)\sqrt{x^3+4}}{6x^3+1}$.

(14) (b) $f(x) = \dfrac{\sin(\sqrt{2x+5})}{6x^3+1}$.

(14) (c) $f(x) = 2\sin\left(\dfrac{3x+5}{2}\right)\cos\left(\dfrac{3x+5}{2}\right)$.

(14) (d) $f(x) = \tan(\sin 2x)$.

(14) (e) $f(x) = \sin(\cos^2 3x)$.

TOTAL MARKS: 100