MEMORIAL UNIVERSITY OF NEWFOUNDLAND

DEPARTMENT OF MATHEMATICS AND STATISTICS

SECTION 2.4 **Math 2000 Worksheet** WINTER 2020

For practice only. Not to be submitted.

1. Use the Chain Rule to find $\dfrac{dz}{dt}$ given $z = x\ln(x+2y)$, $x = \sin(t)$, $y = \cos(t)$.

2. Use the Chain Rule to find $\dfrac{\partial z}{\partial x}$ and $\dfrac{\partial z}{\partial y}$ given $z = \sin(u)\tan(v)$, $u = 3x + y$, $v = x - y$.

3. Use the Chain Rule to find $\dfrac{\partial w}{\partial r}$ and $\dfrac{\partial w}{\partial \theta}$ given $w = \dfrac{xz}{\sqrt{1-y^2}}$, $x = r^2$, $y = \cos(\theta)$, $z = e^{4r\theta}$.

4. Differentiate implicitly to find $\dfrac{dy}{dx}$ given

$$\sin(x) + \cos(y) = 7 + \sin(x)\cos(y).$$

5. Differentiate implicitly to find $\dfrac{\partial z}{\partial x}$ and $\dfrac{\partial z}{\partial y}$ where

$$x^2 - \sqrt{y} + z^2 = 2xyz.$$

6. Differentiate implicitly to find $\dfrac{\partial z}{\partial x}$ and $\dfrac{\partial z}{\partial y}$ where

$$\sin^2(x)\cos(z) = \tan(z) + \sec(x)\csc(y).$$