

# MEMORIAL UNIVERSITY OF NEWFOUNDLAND

## DEPARTMENT OF MATHEMATICS AND STATISTICS

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SECTION 3.1

Math 1000 Worksheet

FALL 2022

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**For practice only. Not to be submitted.**

1. Differentiate each of the following.

(a)  $f(x) = e^{x+2}$

(b)  $g(x) = 5 \sin(x) - \frac{1}{2}\sqrt{x}$

(c)  $f(t) = t^{\frac{7}{3}} - \cos(t) + \pi^2$

(d)  $y = 2x^4 \tan(x)$

(e)  $g(\theta) = \sin(\theta) \tan(\theta)$

(f)  $f(t) = \frac{\csc(t)}{t}$

(g)  $f(x) = \frac{1 - \sec(x)}{1 + \sec(x)}$

(h)  $y = x^3 e^x \cot(x)$

(i)  $f(x) = \frac{x e^x}{\sqrt{x} - 3}$

2. Find the equations of the tangent and normal lines to the graph of

$$f(x) = 2 \tan(x) - \sqrt{2} \sin(x)$$

at the point  $\left(\frac{\pi}{4}, 1\right)$ .

3. Prove that  $\frac{d}{dx}[\csc(x)] = -\csc(x) \cot(x)$ .

4. Prove that  $\frac{d}{dx}[\tan(x)] = \sec^2(x)$ .