

**Derivatives of Exponential and Logarithm Functions**

Differentiate each of the following functions.

1.  $f(w) = 4e^w \ln(w)$ .

2.  $h(t) = \frac{t^2}{1 - \ln(t)}$

**Inverse Trig Functions**

Differentiate each of the following function.

3.  $V(t) = \sin(t) - t^2 \sin^{-1}(t)$

4.  $y = 6 \cos^{-1}(z) - \tan^{-1}(z)$

**Chain Rule**

For problems 5 – 9 differentiate the given function.

5.  $g(z) = \sqrt[3]{4z} + 2 \ln(z^2 - \sin(z))$

6.  $R(t) = e^{-t} \sec^3(t)$

7.  $y = \frac{\cos(3x)}{x - \cos(1-x)}$

8.  $f(w) = \tan(e^{4+w^2} - \ln(5w))$

9.  $T(x) = \sqrt{10x - \sin^3(4x)}$

10. Determine where  $f(z) = 1 - z - \ln(z^2 + 3z + 3)$  is increasing and decreasing.11. Determine where in  $[-30, 30]$  the function  $f(x) = 3x - 4 \cos\left(\frac{x}{2}\right)$  is increasing and decreasing.12. Determine where  $h(t) = 4e^{1+t^2} + e^{5-t^2}$  is not changing.