

Derivatives of Exponential and Logarithm Functions

Differentiate each of the following functions.

1. $g(z) = z^6 \ln(z)$

2. $f(x) = \frac{1 + 4e^x}{3 - e^x}$

Inverse Trig Functions

Differentiate each of the following function.

3. $h(x) = \cos(x) - 4 \cos^{-1}(x)$

4. $R(y) = y \sin^{-1}(y) + \tan^{-1}(y)$

Chain Rule

For problems 5 – 9 differentiate the given function.

5. $g(z) = \sqrt{7z} - 4 \tan^3(z)$

6. $y = (1 + 6t^2)^9 \sec(6t)$

7. $g(w) = \frac{e^{-w}}{w^2 + 4e^{6w}}$

8. $h(t) = \ln(\sqrt{3-5t} + \ln(t^2))$

9. $T(x) = \csc^2(2x^5 - \cos(4x))$

10. Determine where $g(t) = e^{4t^2} + e^{10-2t^2}$ is increasing and decreasing.

11. Determine where in $[-2, 2]$ the function $f(x) = 4x - 2 \cos(3x)$ is increasing and decreasing.

12. Determine where $Q(t) = \frac{1}{2}t - \ln(1+t^2)$ is not changing.