**Math 2413** **Homework Set 5** **10 Points**

**Derivatives of Exponential and Logarithm Functions**

Differentiate each of the following functions.

**1.** $Q(w)=\dfrac{\ln(w)}{2w^5}$

**2.** $g(z)=12\ln(z)-5z^3\mathbf{e}^z$

**Inverse Trig Functions**

Differentiate each of the following function.

**3.** $f(y)=\tan^{-1}(y)+y^2\sin^{-1}(y)$

**4.** $y=\cos(x)\cos^{-1}(x)$

**Chain Rule**

For problems 5 – 9 differentiate the given function.

**5.** $U(t)=6\sec^4(t)-\csc(7t)$

**6.** $g(x)=\sqrt{7+3x}\ \cos(2-x)$

**7.** $y=\dfrac{\mathbf{e}^{3t}}{6t-\sin(4t)}$

**8.** $h(y)=\left[\sqrt{11y}+\ln(3y-\tan(y))\right]^4$

**9.** $f(x)=\cot^5\left(7x+\mathbf{e}^{\sin(5x)}\right)$

**10.** Determine where $y=\ln(2w^4-w^3-3w^2+25)$ is not changing.

**11.** Determine where in [-20, 40] the function $f(x)=6x+12\sin\left(\frac{x}{3}\right)$ is increasing and decreasing?

**12.** Determine where $h(t)=-2t^2\mathbf{e}^{4-t^2}$ is increasing and decreasing.