Mathematics I **Worksheet 8** Name:

1. Find dy if $y = x\csc(3x^2 - 1)$.

2. Find ds if $s = -16t^2 + 20t + 10$.

3. Find the linearization of $s = -16t^2 + 20t + 10$ at $t = 1$.

4. Find dV if $V = \frac{4}{3}\pi r^3$.

5. Find dy if $y = \dfrac{\sin(2x)}{1 - \log_3 x^2}$.

6. Use differentials to approximate $(1.999)^4$.

7. Consider $f(\theta) = \sqrt{3}\,\theta - 2\cos\theta$. Does $f(\theta)$ have an absolute max on $[0, 2\pi]$? What about an absolute min? If either exist, find it.

8. Consider the function $f(x) = x^3 - 6x^2$ on the interval $[-1, 5]$. Find all critical values and find the absolute max and min.

9. Find the critical numbers of the function $f(x) = x^{4/5}(x - 6)^2$.

10. Find the critical numbers of the function $f(x) = x^{-7}\ln(x)$.