Name:

Note: Use of scrap paper and/or a basic calculator is permitted.

1. Compute the derivatives of the following functions:

[2] (a) $f(x) = \arctan(x)$

[2] (b) $g(x) = \arcsin(x^3)$

[2] (c) $h(x) = \sec(\arccos(x))$ (Hint: simplify first!)

[3] 2. Find $\dfrac{dy}{dx}$ in terms of x and y given that $\sin(y) = x^2y^3$.

3. Consider the function $f(x) = 3x^5 - 5x^3$.

[1] (a) Compute $f'(x)$

[1] (b) Construct a sign diagram for $f'(x)$.

[1] (c) Classify each critical point of $f(x)$ as a local minimum, local maximum, or neither.

[2] (d) Determine the intervals where $f(x)$ is

- Increasing:

- Decreasing:

[1] (e) Compute $f''(x)$.

[1] (f) Construct a sign diagram for $f''(x)$.

[2] (g) Determine the intervals on which the graph of f is

- Concave up:

- Concave down: