Name:

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

1. Calculate the degree 3 Taylor polynomials, centred at $a = 0$, for the following functions:

[3] (a) $f(x) = \ln(x + 1)$

[3] (b) $g(x) = e^{2x}$

[2] 2. Let $f(x) = 2x^3 + \sin(x) - \dfrac{1}{\sqrt{1 - x^2}}$.

Determine the antiderivative $F(x)$ of $f(x)$ such that $F(0) = 7$.

3. Estimate the area under the graph of $f(x) = \dfrac{x}{x^2 + 1}$ between $x = 1$ and $x = 4$ using 3 rectangles of equal width, if the height of each rectangle is computed using the left endpoint of each interval.

[3]

[2]   4. Compute the derivative of $f(x) = x \displaystyle\int_1^x \sin(t^3 + 1)\, dt$.

[3]   5. Evaluate the integral $\displaystyle\int_0^4 \left(2x + \dfrac{1}{\sqrt{x}} \right) dx$.