

You may keep this page of questions. Turn in your answers with all of your work on the blue paper and banana colored paper. Problems # 1 – 6 are worth 8 points each. Problems # 7 and 8 are worth 10 points each. Problems # 9 and 10 are worth 16 points each. You are **NOT** allowed to use calculators or Mathcad on questions #1 – 9. Work these questions on the blue paper. After you have finished these first nine questions, turn in the first part of the exam and receive a page of banana colored paper to use for the numerical integration question.

(1) Find $f'(x)$ if $f(x) = \cosh(4x)$.

(2) Find $\frac{dy}{dt}$ if $y = t \sinh^{-1}(t)$.

(3) Evaluate $\int x^2 \operatorname{csch}^2 x^3 dx$.

(4) Evaluate $\int_0^2 e^{-3t} dt$.

(5) Evaluate $\int \frac{w dw}{w^4 + 1}$

(6) Evaluate $\int_3^{10} \frac{x}{\sqrt{3x-5}} dx$

Find Maclaurin series for the following functions. Express the final answers using summation notation.

(7) $f(x) = \cos x^3$.

(8) $f(x) = \frac{1}{1-x^2}$

(9) Find $y = f(x)$ explicitly if $\frac{dy}{dx} = -2x(y+3)^2$ and $f(0) = -\frac{5}{2}$.

(10) Use Mathcad or your calculator to find the trapezoidal rule approximation T_5 for $\int_2^3 \sqrt{x^3 + e^x} dx$. Show your work!! Calculate values for the y_i and for T_5 to at least six significant digits.