

Math 162: Final - Preparation

Justify all steps for full credit. Please hand in this sheet, too.

Name:

- Using Taylor series, find $e^{0.1}$ with an error < 0.01 .
- Does $\frac{1}{\ln 2} - \frac{1}{2\ln 2} + \frac{1}{3\ln 2} - \frac{1}{4\ln 2} + \dots + \frac{(-1)^{n-1}}{n\ln 2} + \dots$ converge? To what?
- Decide whether $\sum_{n=0}^{\infty} \frac{1}{\sqrt{(n+2)}}$ converges or diverges.
- Find: (a) $\int_4^6 \frac{x+1}{3x^2-4} dx$, (b) $\int_4^6 \frac{x+1}{3x^2+4} dx$, (c) $\int_4^6 \frac{x+1}{3x^2+4\sqrt{3x+4}} dx$.
- Find the length of the curve $\begin{cases} x = 4 \sin t \\ y = 4 \cos t \end{cases}$, where t ranges from 0 to 1.7.
- Find the function $y = y(x)$ that satisfies the differential equation $\begin{cases} \frac{dy}{dx} = x(2+y) \\ y(0) = 3 \end{cases}$
- How loud is a sound 30 times stronger than a 50 decibel one?
- The half-life of Carbon-14 is 5730 years. A fossil has 40% carbon-14 compared to the living sample. How old is it?
- Find $\int_3^{\infty} \frac{7}{3x^2} dx$, if it exists.
- Using de l'Hospital's rule, find $\lim_{x \rightarrow \infty} \frac{3 + \ln x}{x^2 + 7} dx$.