EMT 121

Practice Final Exam

Friday June 4, 2010

1. For the series, $\displaystyle\sum_{n=0}^{\infty} \frac{n(x+1)^n}{2^{n+1}}$, find

   (a) the radius of convergence.

   (b) the interval of convergence.

2. Express e^x as a Maclaurin series.

3. Determine whether $\displaystyle\sum_{k=1}^{\infty} \frac{1}{k^2 - 3}$ converges or diverges.

4. Determine if $\displaystyle\int_1^\infty \frac{1}{x^2}\,dx$ is convergent or divergent.

5. Find the sum of $\displaystyle\sum_{k=1}^\infty \frac{1}{k(k+1)}$

6. Evaluate $\displaystyle\int \frac{\ln(x+5)}{x+5}\,dx$

7. Evaluate $\displaystyle\int_0^\pi x\sin x\,dx$

8. Evaluate $\displaystyle\int \tan^3 x \sec^2 x \, dx$

9. Evaluate $\displaystyle\int \frac{dx}{\sqrt{16 - x^2}}$

10. Estimate the value of $\displaystyle\int e^{x^2} \, dx$ with $n = 2$, using the Trapezoidal rule.

11. Consider the region R, in the first quadrant, bounded above by $y = x$ and below by $y = x^2$.

    (a) Find the area of R.

    (b) Find the volume of the solid that is obtained by rotating R about the y-axis.

12. Solve the following system of equations using Gauss-Jordan elimination.
$$2x_2 - 2x_3 = -8$$
$$x_1 + x_2 + x_3 = 2$$
$$x_1 + 2x_2 = -2$$