Name: .

- 1. Prove that $\int_1^3 \sqrt{4t^2 12t + 10} dt$ is the arclength of the curve $y = x^2 3x + 4$ between (1, 2) and (3, 4).
- 2. Use the polar arclength formula to show that the circumference of the circle $r = 4 \sin \theta$ is 4π .
- 3. Find $\lim_{n \to \infty} \frac{\sin n + 3n^2}{n^2 + 1}.$
- 4. Does $\sum_{n=3}^{\infty} \left(\frac{6}{n} \frac{6}{n+1}\right)$ converge or diverge? If it converges, what is its value?
- 5. Does $\sum_{n=1}^{\infty} \frac{1}{4^n}$ converge or diverge? If it converges, what is its value?
- 6. Does $\sum_{j=2}^{\infty} \frac{e^j}{e^{2j}+1}$ converge or diverge?
- 7. Find the domain of $f(x) = \sum_{m=2}^{\infty} \frac{(-2x)^m}{m} = \frac{4x^2}{2} \frac{8x^3}{3} + \frac{16x^4}{4} \frac{32x^5}{5} + \dots$
- 8. Generate the Maclaurin Series for $\cosh x$.
- 9. Use Taylor's Formula to approximate $e^{-1/2} = \frac{1}{\sqrt{e}}$ with an error no greater than $\frac{1}{1000} = 0.001$.

Reminder: These are examples of questions I may put on the final, so this is a good place to start studying, but this list is not exhaustive. You are responsible for understanding all material from Parts 4-6 of the course website, and for the types of problems which were asked on the Midterm.