

Name:

Math 116 Exam 2

March 15, 2012

Directions: WRITE YOUR NAME ON THIS EXAM! Except where indicated, merely finding the answer to a problem is not enough to receive full credit; you must show how you arrived at that answer. DO NOT convert irrational numbers such as $\sqrt{3}$ or π into decimal approximations; just leave them as they are.

1) Determine whether the following series converge or diverge. If they converge, find the sum.

a) (10 points) $\sum_{n=1}^{\infty} \left(\arctan \left(\frac{\pi}{4n} \right) - \arctan \left(\frac{\pi}{4n+4} \right) \right)$

b) (12 points) $\sum_{n=2}^{\infty} \frac{31^n}{6^{2n+3}}$

2) (16 points) Evaluate the integral $\int_{-1}^9 \frac{x}{x^2 + 6x - 16} dx$.

3) Find the limit of the sequence or show that it diverges.

a) (10 points) $\left(\frac{\ln((2n)^5)}{\ln(2n+1)+1} \right)_{n=1}^{\infty}$

b) (12 points) $\left(n \tan \left(\frac{11}{n} \right) \right)_{n=1}^{\infty}$

4) Determine whether the following series converge or diverge. CLEARLY STATE WHICH TEST YOU ARE USING!

a) (8 points) $\sum_{n=1}^{\infty} \left(\frac{8n+3}{n+9} \right)^{1/3}$

b) (12 points) $\sum_{n=13}^{\infty} \frac{(-12)^n}{n!}$

c) (10 points) $\sum_{n=5}^{\infty} \frac{e^n}{e^{2n} + 1}$