Name:_____
M243: Calculus II (Spring 2018)
Instructor: Justin Ryan
Unit V Exam: Chapter 11 (In class)

WICHITA STATE UNIVERSITY

Read and follow all instructions. You may not use any notes or electronic devices. All you need is a pencil and your brain!

Multiple Choice [5 points each]
Select the best answer and write the corresponding letter on the line provided.

_____**1.** Determine whether the sequence converges or diverges. If it converges, find its value.

$$\lim_{n\to\infty} \frac{n \sin n}{n^2+1}$$

A. Converges to 1
B. Converges to 0
C. Converges to $\frac{\pi}{2}$
D. Diverges

_____**2.** Determine whether the series converges absolutely, converges conditionally, or diverges.

$$\sum_{n=1}^{\infty} \frac{(-1)^n n}{n^2+1}$$

A. Converges absolutely
B. Converges conditionally
C. Diverges
D. Cannot be determined

_____**3.** Determine whether the series converges absolutely, converges conditionally, or diverges.

$$\sum_{n=0}^{\infty} \frac{9^{n+1}}{10^n}$$

A. Converges absolutely
B. Converges conditionally
C. Diverges
D. Cannot be determined

_____**4.** Find the sum of the series.

$$1-\pi+\frac{\pi^2}{2}-\frac{\pi^3}{6}+\frac{\pi^4}{24}-\frac{\pi^5}{120}+-\cdots$$

A. -1 **B.** 0

C. e^{π} **D.** $e^{-\pi}$

_____**5.** Find the sum of the series.

$$1-\frac{\pi^2}{2}+\frac{\pi^4}{24}-\frac{\pi^6}{720}+-\cdots$$

A. -1 **B.** 0

C. e^{π} **D.** $e^{-\pi}$

_____**6.** Find the radius of convergence of the power series.

$$p(x)=3-\frac{3}{2}(x-5)+\frac{3}{4}(x-5)^2-\frac{3}{8}(x-5)^3+\frac{3}{16}(x-5)^4-\frac{3}{32}(x-5)^5+-\cdots$$

A. $\frac{1}{2}$ **B.** 1

C. 2 **D.** 5

_____**7.** Find the interval of convergence of the power series.

$$p(x)=3-\frac{3}{2}(x-5)+\frac{3}{4}(x-5)^2-\frac{3}{8}(x-5)^3+\frac{3}{16}(x-5)^4-\frac{3}{32}(x-5)^5+-\cdots$$

A. $(3,7)$ **B.** $(-2,2)$

C. $(-5,5)$ **D.** $(4,6)$

_____**8.** For which test are the hyptheses **NOT** satisfied by the series? (*i.e.*, the test does not apply.

$$\sum_{n=0}^{\infty} \frac{1}{n^2+1}$$

A. Integral Test

B. Limit Comparison Test

C. Alternating Series Test

D. Comparison Test

_____**9.** Which test is **inconclusive** when applied to the series?

$$\sum_{n=2}^{\infty} \frac{n}{n^2-1}$$

A. Integral Test

B. Test for Divergence

C. Limit Comparison Test

D. They're all conclusive

_____**10.** You wish to approximate the series to within one one-thousandth. What should you choose as N to ensure that $R_N < \frac{1}{1000}$?

$$\sum_{n=1}^{\infty} (-1)^{n-1} \frac{n!}{(2n)!}$$

A. 1

B. 3

C. 5

D. 12

Written Problems [5 points each]
Complete all problems, showing enough work.

11. Consider the MacLaurin series for cosine. What is the maximum error of the 5^{th} partial sum in estimating $\cos(1)$? You may leave your answer as a fraction with factorials if necessary.

12. Use a geometric series to derive a power series for $f(x) = \dfrac{1}{x^2 - 4x}$ centered at $x_0 = 2$.