

Name: _____

Instructor: _____

Math 10560, Quiz 9 Tutorial
April 11, 2017

- The Honor Code is in effect for this quiz. All work is to be your own.
- No calculators.
- The quiz lasts for 25 Minutes .
- Be sure that your name is on every page in case pages become detached.
- Be sure that you have all 5 pages of the test.

PLEASE MARK YOUR ANSWERS WITH AN X, not a circle!

1. (a) (b) (c) (d) (e)

2. (a) (b) (c) (d) (e)

3. (a) (b) (c) (d) (e)

4. (a) (b) (c) (d) (e)

Please do NOT write in this box.

Multiple Choice _____

5. _____

Total _____

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Multiple Choice

1.(2 pts) Consider the following series

$$(I) \sum_{n=2}^{\infty} \frac{\ln(n)}{n} \quad (II) \sum_{n=2}^{\infty} \frac{2n^2 + 3}{n^4 + 3n^2 + 1} \quad (III) \sum_{n=1}^{\infty} \frac{(n!)^n}{5^n}$$

Which of the following statements is true?

- (a) (I) and (II) converge
- (b) (II) and (III) converge
- (c) (II) converges, and the others diverge
- (d) All three diverge
- (e) All three converge

2.(2 pts) Consider the following series

$$(I) \sum_{n=4}^{\infty} \frac{(-1)^n(n+1)}{n^2} \quad (II) \sum_{n=4}^{\infty} (-1)^n n 2^n \quad (III) \sum_{n=2}^{\infty} \frac{(-1)^n}{n^3}$$

Which of the following statements is true?

- (a) (I) converges conditionally, (II) diverges, and (III) converges absolutely
- (b) (I) diverges and (III) converges conditionally
- (c) (II) converges and (III) converges conditionally
- (d) (I) and (II) diverge and (III) converges absolutely
- (e) (I) and (III) converge absolutely, and (II) diverges

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3.(2 pts) Which of the following statements is true about the series

$$\sum_{n=3}^{\infty} \frac{\sin(1/n)}{n}?$$

- (a) The series converges conditionally by the alternating series test
- (b) The series diverges by the ratio test
- (c) The series converges absolutely by using the limit comparison test with the series $\sum \frac{1}{n^2}$
- (d) The series diverges by the comparison test using the series $\sum \frac{1}{n}$
- (e) The series diverges by the divergence test

4.(2 pts) What is the radius of convergence of the series

$$\sum_{n=2}^{\infty} \frac{4 \cdot 3^n x^n}{n}?$$

- (a) 3 (b) ∞ (c) $\frac{1}{12}$ (d) $\frac{1}{3}$ (e) 12

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Partial Credit

You must show your work on the partial credit problems to receive credit!

5.(10 pts.) Find the radius and interval of convergence of the power series

$$\sum_{n=0}^{\infty} \frac{(-1)^{n+1}(x+1)^n}{4^n(n+1)}.$$

Be sure to discuss the convergence at the two end points, and state any tests you are using, like the divergence test, root test, p-test, ratio test, alternating series test, or limit comparison test.

R.O.C. _____

I.O.C. _____

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The following is the list of useful trigonometric formulas:

$$\sin^2 x + \cos^2 x = 1$$

$$1 + \tan^2 x = \sec^2 x$$

$$\sin^2 x = \frac{1}{2}(1 - \cos 2x)$$

$$\cos^2 x = \frac{1}{2}(1 + \cos 2x)$$

$$\sin 2x = 2 \sin x \cos x$$

$$\sin x \cos y = \frac{1}{2}(\sin(x - y) + \sin(x + y))$$

$$\sin x \sin y = \frac{1}{2}(\cos(x - y) - \cos(x + y))$$

$$\cos x \cos y = \frac{1}{2}(\cos(x - y) + \cos(x + y))$$

$$\int \sec \theta = \ln |\sec \theta + \tan \theta| + C$$