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001

Math 113 Exam 3

Mar 28-30, Late Day Mar 31,
2016

Name: _____

Section: _____

Instructor: _____

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Instructions

- I) Do not write on the barcode area at the top of each page, or near the four circles on each page.
- II) Fill in the correct boxes for your BYU ID and for the correct answer on the multiple choice completely. Multiple choice questions are 5 points each.
- III) For questions which require a written answer, show all your work in the space provided and justify your answer.
- IV) Simplify your answers.
- V) No books, notes, or calculators of any type are allowed.
- VI) There is no time limit on this exam.



FERPA Permission: Please indicate whether you give permission for your exam to be returned to you by email. This question **supersedes** any permission you have given previously. Please answer it correctly. No score will be assigned to this question. **Note: If you choose not to give permission, you will need to discuss with your instructor how you will get your exam.**

No, I do not give permission.

Yes, I give permission.

Part I: Multiple Choice Questions: *Mark the correct answer. (5 points each)*

1 For which (of the following) value of the real number a will the series

$$\sum_{n=0}^{\infty} \left(\frac{4a + 3}{3a + 1.1} \right)^n \text{ converge?}$$

-3

0

1

2

-2

-1

2 Which answer is the sum of the following series? $\sum_{n=2}^{\infty} \frac{1}{n^2 - 1}$.

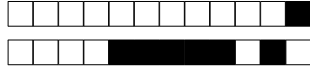
$\frac{3}{2}$

3

2

$\frac{3}{4}$

$\frac{1}{4}$



3 Find the interval of convergence of the series $\sum_{n=1}^{\infty} \frac{2^n}{3n} x^n$.

$-\frac{1}{2} < x \leq \frac{1}{2}$

$-2 < x \leq 2$

$-2 \leq x < 2$

$-2 < x < 2$

$-\frac{1}{2} \leq x < \frac{1}{2}$

$\infty < x < \infty$

4 Determine the behavior of the sequence $a_n = \cos\left(\frac{n\pi}{n+1}\right)$.

It does not converge to any real number.

It converges conditionally to 1.

It converges to 0.

It converges to π .

It converges to -1.

It oscillates between 1 and -1.

5 Which of the following best describes the behavior of the series $\sum_{n=1}^{\infty} \frac{(-1)^n}{n\sqrt{n}}$?

It fails to converge.

It can't be determined to converge or diverge.

It is absolutely convergent.

It is conditionally convergent, but not absolutely convergent.



6 The series $\sum_{n=0}^{\infty} (-2)^n (x-3)^n$ converges to which of the following functions on the interval $(2.5, 3.5)$:

$\frac{1}{7-2x}$

$\frac{2}{x-1}$

$\frac{2}{1-x}$

$\frac{1}{1+(x-3)/2}$

$\frac{1}{1-(x-3)/2}$

$\frac{1}{1+2(x-3)}$



+1/5/56+

Part II: *Justify your answer and show all work for full credit.*

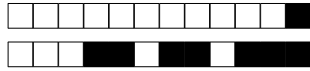
7

0 1 2 3 4 5 6 7 8 9 10 **DON'T MARK**

Determine whether the sequence converges. If it converges, find the limit:

$$a_n = \left(1 - \frac{2}{n}\right)^n.$$

(Consider using L'Hopital's rule.)



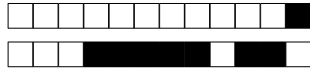
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8

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Determine whether the series is convergent. If it is convergent, find the sum:

$$\sum_{n=2}^{\infty} \left(\frac{2^n + 4^n}{5^n} \right).$$



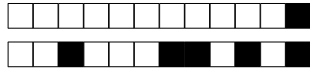
+1/7/54+

9

0 1 2 3 4 5 6 7 8 9 10 DON'T MARK

Determine whether the series is absolutely convergent, conditionally convergent, or divergent. State all tests or theorems you use:

$$\sum_{n=1}^{\infty} (-1)^n \cos\left(\frac{1}{n^2}\right)$$



+1/8/53+

10

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Find the error bounds for $\sum_{n=1}^{\infty} \frac{1}{n^2}$ if the 10th partial sum is used to estimate the sum.
For what value of n is the error bound less than 0.001?



+1/9/52+

11

0 1 2 3 4 5 6 7 8 9 10 DON'T MARK

Find a power series for the function $f(x) = \frac{2x}{1-x^2}$ and give the interval of convergence.

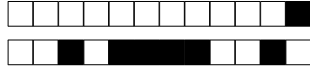


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Find the interval of convergence of $\sum_{n=2}^{\infty} \frac{(2x - 3)^n}{3^n \ln(n) + 1}$.



13

0 1 2 3 4 5 6 7 8 9 10 DON'T MARK

Determine whether the series $\sum_{n=1}^{\infty} \frac{e^n + 1}{n^2 e^n + n}$ is absolutely convergent, conditionally convergent, or divergent. State all tests or theorems you use.