

NAME: (print!)

Section: E-Mail address:

MATH 152 (01-03, 07-09), Dr. Z. , First Practice Exam For Second Midterm,
Tue. Nov. 20, 2012.

WRITE YOUR FINAL ANSWER TO EACH PROBLEM IN THE INDICATED PLACE (right under the question) (when applicable)

Explain your work! Do not write below this line

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1. (out of 14)
2. (out of 14)
3. (out of 14)
4. (out of 14)
5. (out of 14)
6. (out of 14)
7. (out of 16)

tot. (out of 100)

1. (14 points, 7 each) For each of the two series below, determine whether they converge or diverge . Explain what test(s) you are using.

$$(a) \sum_{n=1}^{\infty} n(-7)^n \quad , \quad (b) \sum_{n=1}^{\infty} \frac{2n^3 + 4}{5n^3 + 6n^5 + 8} \quad .$$

Ans. (a)

(b)

2. (14 points) Find the radius of convergence and interval of convergence of the power series

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

Ans. radius of convergence=

interval of convergence=

3. (14 points) Find an integer N , so that the partial sum

$$S_N = \sum_{n=1}^N \frac{(-1)^n}{n^3}$$

is within $\frac{1}{1000000}$ of the sum of the whole infinite series $\sum_{n=1}^{\infty} \frac{(-1)^n}{n^3}$. Be sure to explain why the value of N you give is the correct answer. Do not evaluate S_N .

Ans. $N =$

4. (14 points, 7 each) Write in summation notation, and evaluate the series, if it converges

$$(a) \quad 3 + \frac{3}{2} + \frac{3}{4} + \frac{3}{8} + \frac{3}{16} + \dots$$

$$(b) \quad \left(1 - \frac{1}{2}\right) + \left(\frac{1}{2} - \frac{1}{3}\right) + \left(\frac{1}{3} - \frac{1}{4}\right) + \dots$$

Ans. (a)

(b)

5. (14 points, [(a)5,(b)5, c(4)]) Determine whether the following series converge absolutely, converge conditionally or diverge. Show your work! (no credit for just stating the answer).

$$(a) \sum_{n=1}^{\infty} \frac{(-1)^n}{n^2 + 2n + 5} \quad , \quad (b) \sum_{n=2}^{\infty} \frac{(-1)^n}{\sqrt{n}(\ln n)^2} \quad , \quad (c) \sum_{n=2}^{\infty} \frac{(-1)^n}{n(\ln n)^4} \quad .$$

Ans. (a) (b) (c)

6. (14 points, 7 each) Find the sum of the following series, or state that they diverge.

$$(a) \quad 5 + \frac{5}{3} + \frac{5}{3^2} + \frac{5}{3^3} + \frac{5}{3^4} + \frac{5}{3^5} + \frac{5}{3^6} + \dots \quad ,$$

$$(b) \quad \sum_{n=0}^{\infty} \frac{3(-2)^n - 5^n}{8^n} \quad .$$

Ans. (a)

(b)

7. (16 points) Find the average of the function $f(x) = x^4$ over the interval $[0, 1]$. Is it smaller or larger than the average of the maximum and minimum values of $f(x)$ over that interval?

Answers: $Ave(f)=$

Average of Max and Min=
