Math 232 – Fall 2017 – Thomas – Test 2 Name ___________________________________

I, ________________________________ , have neither given nor received unauthorized aid on this test.

- *Show all work! Work may include explanations in phrases/sentences. Use proper mathematical notation and make complete mathematical statements.*
- *If you need more room to write, get blank paper from me. Do not use your own paper.*
- *Only Scientific Calculators are allowed.* ***NO*** *Graphing Calculators. Test is designed to be completed without a calculator.*
- ***Exact solutions only.***
- *Multiple choice and True/False will be graded correct or incorrect, free response will be graded based on partial credit (NO WORK NO CREDIT)*

Math 232 – Fall 2017 – Thomas – Test 2 Name ___________________________________

#1-6 Multiple Choice (9 points each)

1. Determine the convergence or divergence of the series $\sum_{n=2}^{\infty} \frac{1}{n(\ln n)^2}$ using the Integral Test.

   a) Converges since $\int_2^{\infty} \frac{1}{x^3}\ dx$ converges

   b) Diverges since $\int_2^{\infty} \frac{1}{x}\ dx$ diverges

   c) Converges since $\int_2^{\infty} \frac{1}{x(\ln x)^2}\ dx$ converges

   d) Diverges since $\int_2^{\infty} \frac{1}{x(\ln x)^2}\ dx$ diverges

   e) Converges since $\int_2^{t} \frac{1}{x(\ln x)^2}\ dx$ converges

2. Determine the convergence or divergence of the series $\sum_{n=1}^{\infty} \frac{\text{n}}{n^2-2n+5}$ using the Limit Comparison Test.

   a) Converges since $\lim_{n\to\infty} \frac{1/n^2}{n/(n^2-2n+5)} = 1$

   b) Converges since $\lim_{n\to\infty} \frac{1/n}{n/(n^2-2n+5)} = 1$

   c) Converges since $\lim_{n\to\infty} \frac{1/n}{n/(n^2-2n+5)} = 0$

   d) Diverges since $\lim_{n\to\infty} \frac{1/n}{n/(n^2-2n+5)} = 1$

   e) Diverges since $\lim_{n\to\infty} \frac{1/n^2}{n/(n^2-2n+5)} = 1$

3. Using the Remainder Estimate for the Integral Test, find an upper bound for the error using S_3 as an approximation to *S*. $\sum_{n=1}^{\infty} \frac{1}{n^4}$

a) $-\frac{1}{81}$

b) $-\frac{1}{192}$

c) $\frac{1}{9}$

d) $\frac{1}{81}$

e) $\frac{1}{192}$

4. Determine if the infinite series is convergent or divergent. If convergent, find the sum. $\sum_{n=1}^{\infty} \frac{3}{\sqrt[3]{n}}$

a) Converges to 0

b) Converges to 1

c) Converges to 3

d) Converges to $\frac{1}{\sqrt{3}}$

e) Diverges

Math 232 – Fall 2017 – Thomas – Test 2 Name ________________________________

5. Determine if the series is convergent or divergent. If convergent, find the sum. $\sum_{n=0}^{\infty}\left(\frac{2}{e+1}\right)^n$

a) Converges to 0

b) Converges to 1

c) Converges to $\frac{e+1}{e-1}$

d) Converges to $\frac{2}{e-1}$

e) Diverges

6. Determine if the infinite sequence is convergent or divergent. $\left\{\frac{1}{8}, \frac{2}{27}, \frac{3}{64}, \frac{4}{125}, \ldots\right\}$

a) Converges to 0

b) Converges to 1

c) Converges to $\frac{1}{3}$

d) Converges to $\frac{1}{6}$

e) Diverges

Math 232 – Fall 2017 – Thomas – Test 2   Name ___________________________________

#7-9 True/False (3 points each)

7. If an infinite series $\sum_{n=1}^{\infty} a_n$ is convergent, then the $\lim_{n\to\infty} a_n = 0$. **TRUE** **FALSE**

8. An infinite sequence $\{a_n\}$ is convergent *only if* $\lim_{n\to\infty} a_n = 0$. **TRUE** **FALSE**

9. The integral $\int_{-2}^{2} \frac{1}{(x-1)^2}\, dx = \left.\frac{-1}{x-1}\right]_{-2}^{2} = -\frac{4}{3}$. **TRUE** **FALSE**

#10-12 Free Response/Partial Credit (#10 worth 13 points, #11-12 worth 12 points each)

10. Determine the convergence or divergence of the series $\sum_{n=1}^{\infty} \frac{\cos^2 3n}{1+(1.5)^n}$

Math 232 – Fall 2017 – Thomas – Test 2 Name ___________________________________

11. Determine the convergence or divergence of the series using a telescoping series for $\sum_{n=2}^{\infty} \frac{1}{(n-1)(n+2)}$. If convergent, find the sum.

12. Determine the convergence or divergence of $\int_1^{\infty} \frac{2+e^{-x}}{x}\, dx$ using the Comparison Theorem