

WRITE THE CORRECT RESPONSE IN THE BLANK SPACE ON YOUR ANSWER SHEET.

FOR THE MULTIPLE CHOICE, **USE ONLY CAPITAL LETTERS**. FOR THE ITEMS INDICATED AS SHORT ANSWER, WRITE YOUR RESULT IN THE BLANK SPACE.

YOU MAY USE A CALCULATOR, YOUR NOTES, AND THE TEXTBOOK.

YOU MUST SUBMIT A PIC OF ALL YOUR ANSWER SHEETS NO LATER THAN TODAY AT **12:15pm**.

I. MULTIPLE CHOICE: WRITE YOUR RESPONSE IN THE SPACE ON THE ANSWER SHEET.
USE ONLY CAPITAL LETTERS.

1. WHICH OF THE FOLLOWING SERIES CONVERGES?

- A. $\sum_{n=0}^{\infty} \left(\frac{9}{7}\right)^n$ B. $\sum_{n=1}^{\infty} \frac{1}{n}$ C. $\sum_{n=1}^{\infty} \frac{1}{\sqrt[4]{n}}$ D. $\sum_{n=0}^{\infty} (-1)^n$ E. NONE OF THESE

2. WHICH OF THE FOLLOWING SERIES DIVERGES?

- A. $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n}$ B. $\sum_{n=1}^{\infty} \frac{(-1)^n}{n}$ C. $\sum_{n=0}^{\infty} \left(\frac{1}{\pi}\right)^n$ D. $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n^2}$ E. NONE OF THESE

3. WHICH OF THE FOLLOWING SEQUENCES DIVERGES?

- A. $\{a_n\} = \left\{\frac{-n+2}{n}\right\}$ B. $\{a_n\} = \left\{\frac{1}{n^2}\right\}$ C. $\{a_n\} = \{2\}$ D. $\{a_n\} = \left\{\frac{(n+1)!}{n}\right\}$
E. NONE OF THESE

4. WHICH OF THE FOLLOWING SEQUENCES CONVERGES?

- A. ALL OF B, C, AND D CONVERGE B. $\{a_n\} = \left\{\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \dots\right\}$
C. $\{a_n\} = \left\{1, \frac{1}{2}, \frac{1}{6}, \frac{1}{24}, \frac{1}{120}, \frac{1}{720}, \dots\right\}$
D. $\{a_n\} = \left\{-3, \frac{3}{4}, -\frac{3}{16}, \frac{3}{64}, -\frac{3}{256}, \dots\right\}$ E. NONE OF THESE

5. WHAT IS THE VALUE OF THE SERIES $\sum_{n=0}^{\infty} (.9)(.1)^n$?

- A. 1 B. 9 C. 10 D. -1 E. NONE OF THESE

6. TO TEST FOR CONVERGENCE, WHICH OF THE FOLLOWING SERIES REQUIRES THE RATIO TEST?

A. $\sum_{n=0}^{\infty} \frac{3n+1}{(n+1)!}$ B. $\sum_{n=1}^{\infty} \frac{3n+1}{n+1}$ C. $\sum_{n=1}^{\infty} \frac{\sqrt[3]{3n+1}}{n+1}$ D. $\sum_{n=1}^{\infty} \frac{\sqrt[3]{3n+1}}{\sqrt{n+1}}$

E. NONE OF THESE

7. WHAT IS THE RADIUS OF CONVERGENCE OF THE POWER SERIES $\sum_{n=0}^{\infty} \frac{x^n}{n!}$?

A. $R = 0$ B. $R = 1$ C. $R = 2$ D. $R = \infty$ E. NONE OF THESE

8. WHAT IS THE INTERVAL OF CONVERGENCE OF THE POWER SERIES $\sum_{n=0}^{\infty} \frac{(x-1)^n}{(n+1)!}$?

A. IT CONVERGES ONLY AT ITS CENTER, $C = 1$ B. $[0, 2)$ C. $[-1, 1)$
D. $(-\infty, \infty)$ E. NONE OF THESE

9. WHICH OF THESE SERIES HAS A SEQUENCE OF PARTIAL SUMS WHICH CONVERGES?

A. $\sum_{n=0}^{\infty} \frac{(2n+1)!}{n!}$ B. $\sum_{n=1}^{\infty} \frac{1}{n}$ C. $\sum_{n=1}^{\infty} \frac{(-1)^n}{n^4}$ D. $\sum_{n=0}^{\infty} n^n$ E. NONE OF THESE

10. FOR THE FUNCTION DEFINED BY THE POWER SERIES $f(x) = \sum_{n=0}^{\infty} \frac{(x-2)^n}{16^n}$ WHAT IS THE VALUE OF $f(-2)$?

A. $-\frac{1}{4}$ B. $\frac{4}{3}$ C. $-\frac{4}{5}$ D. $\frac{5}{4}$ E. NONE OF THESE

11. WHAT IS THE INTERVAL OF CONVERGENCE OF THE POWER SERIES $\sum_{n=0}^{\infty} \frac{x^n}{2^n}$?

A. IT CONVERGES ONLY AT ITS CENTER, $C = 0$ B. $(-2, 2)$ C. $(-1, 1)$
D. $(-\infty, \infty)$ E. NONE OF THESE

12. FOR THE POWER SERIES $\sum_{n=0}^{\infty} 2^n x^n$ WHICH OF THE FOLLOWING IS TRUE?

A. IT DIVERGES FOR ALL VALUES OF x B. IT CONVERGES ONLY AT ITS CENTER
C. IT CONVERGES ON $(-\infty, \infty)$ D. NOT ENOUGH INFORMATION IS GIVEN E. NONE OF THESE

II. SHORT ANSWER. FOR EACH OF THE FOLLOWING SERIES, WRITE THE NAME OF THE TEST YOU WOULD USE TO DETERMINE IF THE SERIES CONVERGES. YOU **NEED NOT** PERFORM THE TEST, SIMPLY INDICATE WHAT TEST WOULD BE USED.

13. $\sum_{n=1}^{\infty} \frac{(-1)^n (n+3)}{(n^2+1)^2}$

14. $\sum_{n=1}^{\infty} \frac{\sqrt[3]{2n+1}}{n+\sqrt{n}}$

15. $\sum_{n=1}^{\infty} \frac{(-1)^n (3n+1)!}{n 2^n}$

III. TEST EACH SERIES FOR CONVERGENCE, USING ONLY THE METHODS DISCUSSED IN THE VIDEO LESSONS. IF A SERIES CONVERGES AND IS GEOMETRIC OR TELESOPING, FIND THE VALUE OF THE SUM. IF YOU DO NOT SHOW YOUR WORK IN A NEAT AND ORDERLY FASHION, YOU FORFEIT YOUR CLAIM TO ANY CREDIT.

16. $\sum_{n=1}^{\infty} \frac{(-1)^{n+1} (n+1)}{n 3^n}$

17. $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{1+\ln(n)}$

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

III. FIND THE INTERVAL OF CONVERGENCE OF EACH POWER SERIES, USING ONLY THE METHODS DISCUSSED IN THE VIDEO LESSONS. IF YOU DO NOT SHOW YOUR WORK IN A NEAT AND ORDERLY FASHION, YOU FORFEIT YOUR CLAIM TO ANY CREDIT.

19. $\sum_{n=0}^{\infty} \frac{(x+2)^n}{n!}$

20. $\sum_{n=0}^{\infty} \left(\frac{x}{9}\right)^n$

WHEN YOU ARE FINISHED, **PRINT NEATLY** THE FOLLOWING STATEMENT AT THE BOTTOM OF ONE OF YOUR ANSWER SHEETS THEN **SIGN YOUR NAME**:

ON MY HONOR, I HAVE NEITHER GIVEN NOR RECEIVED IMPROPER ASSISTANCE ON THIS EXAM.