Math 182 - Study Guide For The Exam #2

These are just some examples to review for your first exam, to fully prepare yourself for the exam you should know the materials from all of the sections that we have covered as well as the concept of examples we did in the class along mastering all your homework assignments.

1. Find the formula for the general term a_n of the sequence. (Assume that the pattern continues.)

$$\left\{-\frac{1}{2}, \frac{16}{3}, -\frac{81}{4}, \frac{256}{5}, -\frac{625}{6}, \dots\right\}$$

2. Determine whether the sequence defined by $a_n = \frac{n^2-5}{6n^2+1}$ converges or diverges. If it converges find its limit.

3. Write the first five terms of the sequence $\{a_n\}$ whose n^{th} term is given

$$a_n = \frac{n+7}{6n-1}$$

4. Find and expression for the n^{th} term of the sequence. (Assume that the pattern continues.)

$$\left\{\frac{2}{25}, \frac{4}{36}, \frac{6}{49}, \frac{8}{64}, \frac{10}{81}, \dots\right\}$$

5. Determine which one of the *p*-series below is convergent.

a. $\displaystyle\sum_{n=1}^{\infty} \frac{1}{n^7}$ b. $\displaystyle\sum_{n=1}^{\infty} n^{-0.6}$ c. $\displaystyle\sum_{n=1}^{\infty} \frac{1}{n^{0.8}}$ d. $\displaystyle\sum_{n=1}^{\infty} \frac{1}{n^{3/4}}$

6. Determine which one of the *p*-series below is divergent.

a. $\displaystyle\sum_{n=1}^{\infty} \frac{1}{n^{0.3}}$ b. $\displaystyle\sum_{n=1}^{\infty} n^{-8}$ c. $\displaystyle\sum_{n=1}^{\infty} \frac{1}{n^{3e}}$ d. $\displaystyle\sum_{n=1}^{\infty} \frac{1}{n^4}$

7. Use the Integral Test to determine whether the series is convergent or divergent.

$$\sum_{n=1}^{\infty} \frac{1}{8n+2}$$

8. Determine whether the series is convergent or divergent.

$$\sum_{n=1}^{\infty} \frac{1}{n^2+3}$$

9. Find the Maclaurin series for $f(t)$ using the definition of the Maclaurin series.

$$f(t) = t\cos 3t$$

10. Use multiplication or division of power series to find the first three nonzero terms in the Maclaurin series for the function.

$$f(x) = 5e^{-x^2}\cos 4x$$

11. Find the radius of convergence and the interval of convergence of the power series.

$$\sum_{n=0}^{\infty} \frac{(7x)^n}{n!}$$

12. Find the radius of convergence and the interval of convergence of the power series.

$$\sum_{n=1}^{\infty} \frac{(-1)^n(x-8)^n}{\sqrt{n}}$$

13. Find the radius of convergence and the interval of convergence of the power series.

$$\sum_{n=1}^{\infty} \frac{(-1)^{n-1}(x-6)^n}{n5^n}$$

14. Find the interval of convergence of the series.

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

15. Find the radius of convergence of the series.

$$\sum_{n=1}^{\infty} \frac{n^3x^n}{2^n}$$

16. Find the radius of convergence of the series.

$$\sum_{n=1}^{\infty} (-1)^n \frac{(x+10)^n}{n6^n}$$

17. Test the series for convergence or divergence.

$$\sum_{m=1}^{\infty} \frac{(-6)^{m+1}}{4^{8m}}$$

18. Determine whether the series convergent or divergent.

$$\sum_{n=1}^{\infty} \frac{5}{n^2+5}$$

19. Determine whether the geometric series converges or diverges. If it converges, find its sum.

$$\sum_{n=0}^{\infty} 5^n 6^{-n+1}$$

20. Determine whether the geometric series converges or diverges. If it converges, find its sum.

$$-\frac{1}{5}+\frac{1}{25}-\frac{1}{125}+\frac{1}{625}-\cdots$$

21. Determine whether the given series converges or diverges. If it converges, find its sum.

$$\sum_{n=1}^{\infty} \frac{8^n+7}{8^{n+1}}$$

22. Determine whether the given series converges or diverges. If it converges, find its sum.

$$\sum_{n=0}^{\infty} \frac{7^n+3^n}{9^n}$$

23. Express the number as a rational number (quotient of two integers). $5.\overline{45} = 5.454545\ldots$

24. Use the Integral Test to determine whether the series is convergent or divergent

$$\sum_{n=1}^{\infty} \frac{2}{7n+4}$$

25. Use the Comparison Test to determine whether the series is convergent or diverge.

$$\sum_{n=3}^{\infty} \frac{7^n}{2^n-3}$$

26. Determine whether the series is convergent or divergent.

$$\sum_{n=1}^{\infty} \frac{n^6+4}{n^8+n}$$

27. Use the Comparison Test to determine whether the series is convergent or divergent.

$$\sum_{n=0}^{\infty} \frac{1}{\sqrt{n^5+8}}$$

28. Use the Comparison Test to determine whether the series is convergent or divergent.

$$\sum_{n=1}^{\infty} \frac{5 + \sin 2n}{4^n}$$

29. Determine whether the series is absolutely convergent, conditionally convergent, or divergent.

$$\sum_{n=1}^{\infty} \frac{(-1)^{n-1} n^7}{8^n}$$

30. Determine whether the series is absolutely convergent, conditionally convergent, or divergent.

$$\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{\sqrt[3]{n}}$$

31. Determine whether the series is convergent or divergent.

$$\sum_{n=1}^{\infty} \frac{7^n}{n!\,n}$$

32. Find a power series representation for the indefinite integral.

$$\int \frac{\sin 9x}{x}\,dx$$

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Answer Section

1.	ANS:	$a_n = \dfrac{(-1)^n n^4}{n+1}$	Section 11.1
2.	ANS:	$\dfrac{1}{6}$	Section 11.1
3.	ANS:	$\left\{\dfrac{8}{5}, \dfrac{9}{11}, \dfrac{10}{17}, \dfrac{11}{23}, \dfrac{12}{29}, \ldots\right\}$	Section 11.1
4.	ANS:	$a_n = \dfrac{2n}{(n+4)^2}$	Section 11.1
5.	ANS:	A	Section 11.3
6.	ANS:	A	Section 11.3
7.	ANS:	Divergent	Section 11.3
8.	ANS:	Converges	Section 11.3
9.	ANS:	$\displaystyle\sum_{n=0}^{\infty} \frac{(-1)^n 3^n t^{2n+1}}{(2n)!}$	Section 11.10
10.	ANS:	$5\left(1 - 9x^2 + \dfrac{115}{6}x^4\right)$	Section 11.10
11.	ANS:	$R = \infty, I = (-\infty, \infty)$	Section 11.8
12.	ANS:	$R = 1, I = (7,9]$	Section 11.8
13.	ANS:	$R = 5, I = (1,11]$	Section 11.8
14.	ANS:	$(-1,1]$	Section 11.8
15.	ANS:	$R = 2$	Section 11.8
16.	ANS:	$[-16, -4)$	Section 11.8
17.	ANS:	The series is convergent	Section 11.5
18.	ANS:	Converges	Section 11.4
19.	ANS:	36	Section 11.2
20.	ANS:	$-\dfrac{1}{6}$	Section 11.2
21.	ANS:	Diverges	Section 11.2
22.	ANS:	6	Section 11.2
23.	ANS:	$\dfrac{60}{11}$	Section 11.2
24.	ANS:	Divergent	Section 11.3
25.	ANS:	Divergent	Section 11.4
26.	ANS:	Convergent	Section 11.4
27.	ANS:	Convergent	Section 11.4
28.	ANS:	Convergent	Section 11.4
29.	ANS:	Absolutely convergent	Section 11.6
30.	ANS:	Conditionally convergent	Section 11.6
31.	ANS:	Convergent	Section 11.6
32.	ANS:	$\displaystyle\sum_{n=0}^{\infty} \frac{(-1)^n 9^{2n+1} x^{2n+1}}{(2n+1)(2n+1)!} + C$	Section 11.9