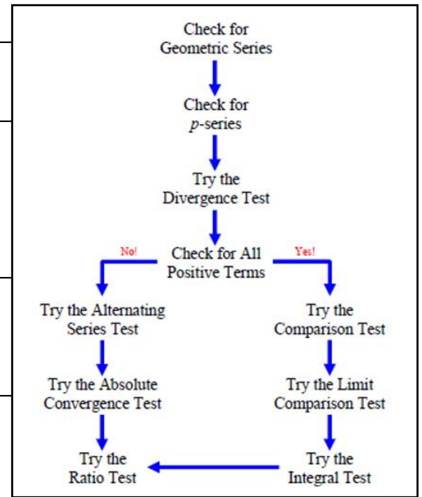
BC Calculus Name________________________________Pd.___
Series: Review Date______________________________Seat #___

Please start off every review with reading your notecards for that unit several times!!!!! This is a very limited review!!!!



Test	What does it look Like?	Converge & Diverge
Geometric		Converge: Diverge:
Divergent		Converge: Diverge:
Harmonic/Telescoping		Converge: Diverge:
Integral		Converge: Diverge:
P-Series		Converge: Diverge:
Comparison		Converge: Diverge:
Limit Comparison		Converge: Diverge:
Alternating		Converge: Diverge:
Ratio		Converge: Diverge:
Root		Converge: Diverge:

Key: 1-E 2-B 3-B 4-D 5-C 6-A 7-A 8-C 9-D 10-A 11-D 12-C 13-D 14-C 15-C 16-D 17-C 18-E

BC Calculus Name_________________________________Pd.___

Series: Review Date_______________________________Seat #___

Taylor Polynomial-centered at $x=a$

$$\sum_{n=0}^{\infty}\frac{f^{n}(a)}{n!}(x-a)^{n}=f(x)=\frac{f(a)}{0!}(x-a)^{0}+\frac{f'(a)}{1!}(x-a)^{1}+\frac{f''(a)}{2!}(x-a)^{2}+\frac{f^{3}(a)}{3!}(x-a)^{3}+\frac{f^{4}(a)}{4!}(x-a)^{4}+....$$

Maclaurin Polynomial-centered at $x=0$

$$\sum_{n=0}^{\infty}\frac{f^{n}(0)}{n!}(x)^{n}=f(x)=\frac{f(0)}{0!}(x)^{0}+\frac{f'(0)}{1!}(x)^{1}+\frac{f''(0)}{2!}(x)^{2}+\frac{f^{3}(0)}{3!}(x)^{3}+\frac{f^{4}(0)}{4!}(x)^{4}+....$$

Power Series-You must know

$f(x)$	$f(x)$ written as a summation	$f(x)$ written as a polynomial
$\frac{1}{1-x}=$	$=$	
$\frac{1}{1+x}=$	$=$	
$\sin(x)=$	$=$	
$\cos(x)=$	$=$	
$e^{x}=$	$=$	
$\ln(1+x)=$	$=$	

Error Bound: $\frac{k}{(n+1)!}\left|x-a\right|^{n+1}$ $k=\left|f^{n+1}(x)\right|$ or $\left|f^{n+1}(a)\right|$ the bigger of the the two or the one you can find.

Practice:

1.The series $\sum_{n=1}^{\infty}a_n=\sum_{n=1}^{\infty}\frac{(-1)^{n}e^{n}}{n^{2}}$ diverges because,

I. The terms do not tend to 0 as n tends to ∞.

II. The terms are not all positive.

III. $\lim_{n\to 0}\left|\frac{a_{n+1}}{a_n}\right|>1$.

a.) I only

b.) II only

c.) III only

d.) I and II only

e.) I and III only

2. The interval of convergence for the series $\sum_{n=1}^{\infty}\frac{(3x+2)^{n+1}}{n^{\frac{5}{2}}}$

a.) $-1\le x<-\frac{1}{3}$

b.) $-1<x\le-\frac{1}{3}$

c.) $-1\le x\le-\frac{1}{3}$

d.) $\frac{1}{3}\le x\le 1$

e.) $-1<x<\frac{1}{3}$

3. Given that $f(x)=\sum_{n=0}^{\infty}\frac{n(x-a)^{n}}{2^{n}}$ on the interval of convergence of the Taylor series, $f^{(4)}(a)=$

a.) 0

b.) 6

c.) 9

d.) $\frac{1}{4}$

e.) $\frac{1}{4!}$

BC Calculus | Name________________________________Pd.___

Series: Review | Date______________________________Seat #___

4. Which of the following converge?

I. $\sum_{n=1}^{\infty}\left(\frac{n^2-n+5}{n^{\frac{7}{2}}+1}\right)$

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

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

a.) I & II only
b.) I & III only
c.) II & III only
d.) They all do.
e.) None of them do

5. Which of the following series is divergent?

a.) $\sum_{n=1}^{\infty}\frac{1}{n(n+1)}$
b.) $\sum_{n=1}^{\infty}\frac{n+1}{n!}$
c.) $\sum_{n=2}^{\infty}\frac{1}{n\ln(n)}$
d.) $\sum_{n=1}^{\infty}\frac{\ln n}{2^n}$
e.) $\sum_{n=1}^{\infty}\frac{n}{2^n}$

6. The Taylor series for $\ln(1+2x)$ about $x=0$ is

a.) $2x-\frac{(2x)^2}{2}+\frac{(2x)^3}{3}-\frac{(2x)^4}{4}+....$
b.) $2x-2x^2+8x^3-16x^4+....$
c.) $2x-4x^2+16x^3+....$
d.) $2x-x^2+\frac{8x^3}{3}-4x^4+....$
e.) $2x-\frac{(2x)^2}{2!}+\frac{(2x)^3}{3!}-\frac{(2x)^4}{4!}+....$

7. The radius of convergence of $\sum_{n=1}^{\infty}\frac{(-1)^{n+1}(x-2)^n}{n\bullet 3^n}$ is

a.) 3
b.) 2
c.) 1
d.) 0
e.) ∞

8. The radius of convergence of the series $\sum_{n=1}^{\infty}\frac{(x-3)^n(n+1)}{2^n(2n+1)}$

a.) 4
b.) 3
c.) 2
d.) 1
e.) 0

9. What is the sum $\frac{5}{2}+\frac{5}{4}+\frac{5}{8}+\frac{5}{16}+.....$?

a.) 2
b.) $\frac{75}{16}$
c.) $\frac{315}{64}$
d.) 5
e.) The series diverges

10. Which of the following series is convergent?

I. $\sum_{n=1}^{\infty}\frac{1}{n^3}$ II. $\sum_{n=1}^{\infty}\frac{2}{n+1}$ III. $\sum_{n=1}^{\infty}\frac{3^n}{n\bullet 2^n}$

a.) I only
b.) II only
c.) III only
d.) I and III only
e.) I, II, & III

11. What is the third-dergree Taylor polynomial for $f(x)=\tan x$ at $x=0$?

a.) $x-\frac{x^3}{3!}$
b.) $x+\frac{x^3}{3!}$
c.) $x-\frac{x^3}{3}$
d.) $x+\frac{x^3}{3}$
e.) $x+\frac{2x^3}{3}$

BC Calculus
Series: Review

Name________________________________Pd.___
Date______________________________Seat #___

12. The Maclaurin series for the function f is given by $f(x)=\sum_{n=0}^{\infty}\left(-\frac{x}{4}\right)^n$. What is the value of $f(3)$?

a.) -3
b.) $-\frac{3}{7}$
c.) $\frac{4}{7}$
d.) $\frac{13}{16}$
e.) 4

13. Which of the following series converge?

I. $\sum_{n=1}^{\infty}\frac{8^n}{n!}$ II. $\sum_{n=1}^{\infty}\frac{n!}{n^{100}}$ III. $\sum_{n=1}^{\infty}\frac{n+1}{(n)(n+2)(n+3)}$

a.) I only
b.) II only
c.) III only
d.) I and III only
e.) I, II, & III

14. What is the radius of convergence of the series $\sum_{n=0}^{\infty}\frac{(x-4)^{2n}}{3^n}$?

a.) $2\sqrt{3}$
b.) 3
c.) $\sqrt{3}$
d.) $\frac{\sqrt{3}}{2}$
e.) 0

15. For $x>0$, the power series $1-\frac{x^2}{3!}+\frac{x^4}{5!}-\frac{x^6}{7!}+.....+(-1)^n\frac{x^{2n}}{(2n+1)!}+...$ converges to which of the following?

a.) $\cos(x)$
b.) $\sin(x)$
c.) $\frac{\sin(x)}{x}$
d.) $e^x-e^{x^2}$
e.) $1+e^x-e^{x^2}$

16. The power series $\sum_{=0}^{\infty}a_n(x-3)^n$ converges at $x=5$. Which of the following must be true?

a.) The series diverges at $x=0$.
b.) The series diverges at $x=1$.
c.) The series converges at $x=1$.
d.) The series converges at $x=2$.
e.) The series converges at $x=6$.

17. For what values of p will both series $\sum_{n=1}^{\infty}\frac{1}{n^{2p}}$ and $\sum_{n=1}^{\infty}\left(\frac{p}{2}\right)^n$ converge?

a.) $-2<p<2$ only
b.) $-\frac{1}{2}<p<\frac{1}{2}$ only
c.) $\frac{1}{2}<p<2$ only
d.) $p<\frac{1}{2}$ & $p>2$
e.) There are no such values of p.

18. Let *f* be a function having derivatives of all orders for $x>0$ such that $f(3)=2$, $f'(3)=-1$, $f''(3)=6$, and $f'''(3)=12$. Which of the following is the third-degree Taylor polynomial for *f* about $x=3$?

a.) $2-x+6x^2+12x^3$
b.) $2-x+3x^2+2x^3$
c.) $2-(x-3)+6(x-3)^2+12(x-3)^3$
d.) $2-(x-3)+3(x-3)^2+4(x-3)^3$
e.) $2-(x-3)+3(x-3)^2+2(x-3)^3$