BC Calculus
Comparison Tests

Name_____Pd.____
Infinite Series Day 5

1.Suppose $\sum a_n$ and $\sum b_n$ are series with positive terms and $\sum b_n$ is known to be convergent.

A.)If $a_n > b_n$ for all n, what can you say about $\sum a_n$? Why?

B.) If $a_n < b_n$ for all n, what can you say about $\sum a_n$? Why?

2.Suppose $\sum a_n$ and $\sum b_n$ are series with positive terms and $\sum b_n$ is known to be divergent.

A.)If $a_n > b_n$ for all n, what can you say about $\sum a_n$? Why?

B.) If $a_n < b_n$ for all n, what can you say about $\sum a_n$? Why?

Determine whether the series converges or diverges.

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

4. $\sum_{n=2}^{\infty} \frac{n^3}{n^4-1}$

5. $\sum_{n=1}^{\infty} \frac{n}{n\sqrt{n}}$

6. $\sum_{n=1}^{\infty} \frac{n-1}{n^2\sqrt{n}}$

7. $\sum_{n=1}^{\infty} \frac{9^n}{3+10^n}$

8. $\sum_{n=1}^{\infty} \frac{6^n}{5^n-1}$

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9. $\sum_{k=1}^{\infty} \frac{\ln k}{k}$

10. $\sum_{k=1}^{\infty} \frac{k \sin^2 k}{1+k^3}$

11. $\sum_{k=1}^{\infty} \frac{\sqrt[3]{k}}{\sqrt{k^3+4k+3}}$

12. $\sum_{k=1}^{\infty} \frac{(2k-1)(k^2-1)}{(k+1)(k^2+4)^2}$

13. $\sum_{n=1}^{\infty} \frac{\arctan n}{n^{1.2}}$

14. $\sum_{n=2}^{\infty} \frac{\sqrt{n}}{n-1}$

15. $\sum_{n=1}^{\infty} \frac{4^{n+1}}{3^n-2}$

16. $\sum_{n=2}^{\infty} \frac{1}{\sqrt[3]{3n^4+1}}$

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Review

R1. $\int_0^{\ln 2} e^{2x}dx =$

a. $\frac{3}{2}$
b. 3
c. 4
d. $e^2 - \frac{1}{2}$
e. $2e^2 - 1$

R2. The area of the region enclosed by the graph of $y = \sqrt{9 - x^2}$ and the x-axis is

a. 36
b. $\frac{9\pi}{2}$
c. 9π
d. 18π
e. 36π

R3. If a function f is continuous for all real values of x, and a>0 and b<0, which of the following integrals always has the same value?

$I.\int_0^a f(x)dx \quad II.\int_b^{a+b} f(x-b)dx \quad III.\int_b^{a+b} f(x+b)dx$

a. *I & II only*
b. *I & III only*
c. *II & III only*
d. *I, II, & III*
e. *none*

R4. What is the average value of the function $y = 2\sin(2x)$ on the interval $\left[0, \frac{\pi}{6}\right]$?

a. $-\frac{3}{\pi}$
b. $\frac{1}{2}$
c. $\frac{3}{\pi}$
d. $\frac{3}{2\pi}$
e. 6π

Answers:

1. A.) Nothing B.) Then $\sum_{n=1}^{\infty} a_n$ converges by the comparison test

2. A.)Then $\sum_{n=1}^{\infty} a_n$ is divergent by the comparison test. B.) Nothing

All of these you must tell A.) Converges or Diverges and use an appropriate test.

3. Converges
4. Diverges
5. Diverges
6. Converges
7. Converges
8. Diverges
9. Diverges
10. Converges
11. Converges
12. Converges
13. Converges
14. Diverges
15. Diverges
16. Converges

R1. A
R2. B
R3. A
R4. C