

**AP Questions 9.1 – 9.6**

Name: \_\_\_\_\_

1) What is the sum of the series  $\sum_{n=0}^{\infty} \frac{2 + 3^n}{5^n}$ 

- (A) 15/4                      (B) 25/6                      (C) 9/2                      (D) 5                      (E) Divergent

2)  $\sum_{n=2}^{\infty} \frac{3}{5^n} =$ 

- (A) 3/20                      (B) 9/20                      (C) 9/10                      (D) 5/2                      (E) 15/4

3)  $\sum_{n=1}^{\infty} \left(\frac{1}{2}\right)^{2n} =$ 

- (A) 1/3                      (B) 1/2                      (C) 1                      (D) 2                      (E) Infinity

4) Which of the following are true statements?

- I. If  $\sum_{n=0}^{\infty} a_n$  converges conditionally, then  $\sum_{n=0}^{\infty} (-1)^n a_n$  converges.
- II. If  $\sum_{n=0}^{\infty} |a_n|$  converges, then  $\sum_{n=0}^{\infty} a_n$  converges.
- III. If  $\lim_{n \rightarrow \infty} a_n = 0$ , then  $\sum_{n=0}^{\infty} (-1)^n a_n$  converges

- (A) I only
- 
- (B) II only
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- (C) I and II only
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- (D) II and III only
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- (E) I, II, and III

5) The sum of the infinite geometric series  $2 - \frac{2}{3} + \frac{2}{9} - \frac{2}{27} + \dots$  is

- (A) -6                      (B) -3                      (C) 0                      (D)  $\frac{3}{7}$                       (E)  $\frac{3}{2}$

6) Which of the following series are convergent?

I.  $\sum_{n=1}^{\infty} (-1)^{n+1}$

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

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

- (A) None                      (B) II only                      (C) III only                      (D) I and II                      (E) I and III

7) Which of the following functions grow faster than  $e^x$  as  $x \rightarrow \infty$ ?

- (A)  $x^4$                       (B)  $\ln x$                       (C)  $e^{-x}$                       (D)  $3^x$                       (E)  $\frac{1}{2}e^x$

8) Let  $a_n$ ,  $b_n$ , and  $c_n$  be sequences of positive numbers such that for all positive integers  $n$ ,  $a_n \leq b_n \leq c_n$ . If  $\sum_{n=1}^{\infty} b_n$  converges, then which of the following statements must be true?

I.  $\sum_{n=1}^{\infty} a_n$  converges

II.  $\sum_{n=1}^{\infty} c_n$  converges

III.  $\sum_{n=1}^{\infty} (a_n + b_n)$  converges

- (A) I only                      (B) II only                      (C) III only                      (D) I and III only                      (E) I, II, and III