10. Infinite Sequences and Series

Starter Quiz ·

AP Calculus BC Name: _____ Score: _____

1. The value of an infinite series is defined as the limit of its...

   ☐ terms

   ☐ derivatives

   ☐ partial sums

   ☐ ratios

2. In the geometric sum formula a/(1−r), a is the _____ term as written.

   _____

3. For the Integral Test on a chosen tail interval, which properties of f are sufficient?

   ☐ Continuous

   ☐ Non-increasing, allowing flat parts

   ☐ A polynomial

   ☐ Positive

   Tick every correct option.

4. The positive p-series $\sum_{n=1}^{\infty} 1/n^p$ converges exactly when...

   ☐ $p \geq 1$

   ☐ $p < 1$

   ☐ $p > 1$

   ☐ $p > 0$

5. The Alternating Series Test checks decrease and the zero limit on the positive magnitudes, not on the signed terms.

   ☐ True ☐ False

6. In the Ratio Test, if $L = \lim |a_{n+1}/a_n| < 1$, the series...

   ☐ Must be geometric

   ☐ Is inconclusive

   ☐ Converges absolutely

   ☐ Diverges

7. When the alternating-series bound applies, $|S - S_N|$ is at most...

   ☐ a_N

   ☐ S_N

   ☐ b_{N+1}

   ☐ b_N

8. Which is the kth Taylor term at center a?

   ☐ $f^{(k)}(a)(x-a)^k/k!$

   ☐ $f^{(k)}(a)x^k/k!$

   ☐ $f^{(k)}(a)(x-a)^k/k$

   ☐ $f^{(k)}(x)(x-a)^k$

9. A power-series ratio calculation gives |x−2|/3<1. What is its radius of convergence?

   _____

10. What is the $n = 0$ term of $\sum_{n=0}^{\infty} u^n$?

    _____

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Answers ·

AP Calculus BC

1. **partial sums**

   $\sum a_n = \lim_{n\to\infty} S_n$.

2. **first**

   Substitute the starting index to identify the actual first term.

3. **Continuous; Non-increasing, allowing flat parts; Positive**

   The function must also satisfy a_n=f(n) at the relevant integers.

4. $p > 1$

   The boundary p=1 diverges.

5. **True**

   First isolate b_n from the alternating sign.

6. **Converges absolutely**

   The theorem proves convergence of the absolute-value series.

7. b_{N+1}

   Use the positive magnitude of the first omitted term.

8. $f^{(k)}(a)(x-a)^k/k!$

   Evaluate the derivative at a, divide by k!, and use the shifted power.

9. **3**

   The allowed distance from 2 is less than 3. The width is 6.

10. **1**

    The constant term is 1.