Practice Questions from 10.7-10.8

1. The Ratio Test and Root Test are based on the properties of convergence of
A. a p-series, $p \neq 1$. B. the harmonic series C. the alternating series D. a television series E. the world series. F. a geometric series

2. Which of these will help you determine if the series $\sum_{n=0}^{\infty} 2e^n$ converges or diverges? Select all possible answers.
A. limit comparison test with a p-series, $p \neq 1$. B. limit comparison test with the harmonic series C. a geometric series
D. alternating series test E. absolute convergence test (i.e., convergence of $\sum |a_n|$ implies convergence of $\sum a_n$)
E. integral test F. ratio test G. nth Term Test for Divergence

3. Which of these will help you determine if the series $\sum_{n=0}^{\infty} e^{-2n}$ converges or diverges? Select all possible answers.
A. limit comparison test with a p-series, $p \neq 1$. B. limit comparison test with the harmonic series C. a geometric series
D. alternating series test E. absolute convergence test (i.e., convergence of $\sum |a_n|$ implies convergence of $\sum a_n$)
E. integral test F. ratio test G. nth Term Test for Divergence

4. Which of these will help you determine if the series $\sum_{n=1}^{\infty} \left(\frac{(-1)^{n+1}}{n^2} \right)$ converges or diverges? Select all possible answers.
A. limit comparison test with a p-series, $p \neq 1$. B. limit comparison test with the harmonic series C. a geometric series
D. alternating series test E. absolute convergence test (i.e., convergence of $\sum |a_n|$ implies convergence of $\sum a_n$)
E. ratio test F. nth Term Test for Divergence

5. Which of these will help you determine if the series $\sum_{n=1}^{\infty} \left(\frac{(-1)^{n+1}}{\sqrt{n}} \right)$ converges or diverges? Select all possible answers.
A. limit comparison test with a p-series, $p \neq 1$. B. limit comparison test with the harmonic series C. a geometric series
D. alternating series test E. absolute convergence test (i.e., convergence of $\sum |a_n|$ implies convergence of $\sum a_n$)
E. ratio test F. nth Term Test for Divergence

6. Which of these will help you determine if the series $\sum_{n=1}^{\infty} \left(\frac{n+2}{n!} \right)$ converges or diverges? Select all possible answers.
A. limit comparison test with a p-series, $p \neq 1$. B. limit comparison test with the harmonic series C. a geometric series
D. alternating series test E. absolute convergence test (i.e., convergence of $\sum |a_n|$ implies convergence of $\sum a_n$)
E. integral test F. ratio test G. nth Term Test for Divergence

7. Use the Ratio Test for each.

a. The series $\sum_{n=1}^{\infty} \frac{(-2)^n}{n!}$ will $\underset{\{\text{converge, diverge}\}}{\underline{\hspace{3cm}}}$ by the Ratio Test because $\lim\limits_{n \to \infty} \boxed{\hspace{3cm}} = \boxed{\hspace{1cm}}$

Write in the box a **simplified expression** involving n.

Write in the box an **exact** number or DNE or ∞ or $-\infty$.

b. The series $\sum_{n=1}^{\infty} \frac{4^n}{n^{800}}$ will $\underset{\{\text{converge, diverge}\}}{\underline{\hspace{3cm}}}$ by the Ratio Test because $\lim\limits_{n \to \infty} \boxed{\hspace{3cm}} = \boxed{\hspace{1cm}}$.

Write in the box a **simplified expression** involving n.

Write in the box an **exact** number or DNE or ∞ or $-\infty$.

8. Use the Root Test for each.

a. The series $\sum_{n=1}^{\infty}(-1)^{n+1}\left(\frac{8n^4}{7n^4+n+5}\right)^n$ will ______________ {converge, diverge} by the Root Test because $\lim_{n\to\infty}$ $\boxed{}$ = $\boxed{}$

Write in the box a **simplified expression** involving n.

Write in the box an **exact** number or DNE or ∞ or $-\infty$.

b. The series $\sum_{n=1}^{\infty}(-1)^{n+1}\left(\frac{2n}{3n+2}\right)^n$ will ______________ {converge, diverge} by the Root Test because $\lim_{n\to\infty}$ $\boxed{}$ = $\boxed{}$.

Write in the box a **simplified expression** involving n.

Write in the box an **exact** number or DNE or ∞ or $-\infty$.

c. $\sum_{n=1}^{\infty}(-1)^{n+1}\left(\frac{n+1}{n}\right)^{n^2}$ will ______________ {converge, diverge} by the Root Test because $\lim_{n\to\infty}$ $\boxed{}$ = $\boxed{}$.

Write in the box a **simplified expression** involving n.

Write in the box an **exact** number or DNE or ∞ or $-\infty$.

9. Consider the series $\sum_{n=1}^{\infty}\left(1+\frac{a}{n}\right)^{18n}$ for some real number a.

a. The series will ______________ {converge, diverge}.

b. Circle the best answer to determine part **a**.
A. It is a p-series. B. It is a geometric series C. Use the Ratio Test D. Use the Root Test
E. Use the nth Term Test for Divergence

c. Explain more fully below how part **b** justifies part **a**.

10. Consider the series $\sum_{n=1}^{\infty}(-2)^n$

a. The series will ______________ {converge, diverge}.

b. Which of these will help you determine if the series $\sum_{n=1}^{\infty}(-2)^n$ converges or diverges? Select all possible answers.

A. It is a p-series. B. It is a geometric series C. Use the Ratio Test D. Use the Root Test
E. Use the nth Term Test for Divergence

c. Explain more fully below how part **b** justifies part **a** for each of your choices.

11. Consider the series $\sum_{n=1}^{\infty}n(-0.5)^n$

a. The series will ______________ {converge, diverge}.

b. Justify your claim in part a.